THE AMERICAN INSTITUTE OF ARCHITECTS

The Architect's Handbook Of Professional Practice

Fifteenth Edition

WILEY

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WILEY

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Foreword

The Architect's Handbook of Professional Practice, published by the AIA since 1920, has become the definitive information source of architectural practice for over 90 years. While major changes have altered the demand for design and architectural services in the intervening decades, this handbook has kept pace and has risen in value to the profession.

The 15th edition, which you are about to read, reflects a range of current AIA initiatives aimed at improving the built environment and public well-being. At the same time, it reflects a contemporary ethos with emphasis on diversity and inclusion, small-firm culture, sustainability, and evolving representational and project delivery methods such as BIM and architect-led design-build.

How does the Handbook reflect these factors? By including expanded content for emerging professionals, such as information on career development, as well as expanded content for established architects who work for or own small and midsize firms. Case studies and targeted articles, written by real-world practitioners, portray a discipline that has been recently segmented by economic circumstances, technological change, and generational difference. Licensed architects, who are united in their professionalism, and those on the path to licensure—both are represented here, united in their desire to meet a high standard of excellence.

Architecture has become an adaptable enterprise for a world that requires nimbleness, pragmatism, and no small amount of ingenuity. From one architect to another, I think you will appreciate the strength of the knowledge base on which this 15th edition rests. I think you will also find it to be an indispensable tool in a time of great change and even greater opportunity for architects.

Robert A. Ivy, FAIA
EVP/Chief Executive Officer
The American Institute of Architects
Washington, D.C.

Preface

The 15th edition of the *Architect's Handbook of Professional Practice* builds on its long tradition as a definitive resource while providing new and significantly revised material. Since the release of the 14th edition, rapidly developing technologies saw greater adoption and the economy plunged into recession. These and other changing conditions influence firm management, project delivery, and other aspects of practice, and the 15th edition has been modified and supplemented accordingly.

When the AIA and Wiley's editorial team asked us to serve on the Steering Group, we were honored to help guide the development of the 15th edition. Our members reflect the diversity of the profession in terms of firm size, geographical distribution, services offered, technologies and delivery methods employed, involvement in academia, and stages of firms and careers. We shared a common goal of crafting a reference relevant to firms of all sizes, and useful to emerging firms and professionals as well as established practitioners.

The Steering Group started work by reviewing the 14th edition in depth. We met for intense conversations regarding how the profession had changed and would continue to develop, which topics were important to retain and update, and what needed to be set aside or added to the 15th edition. As the content took shape, editors called on steering committee members to continue their involvement by suggesting potential authors and reviewing submissions.

We hope you find that our efforts—and the efforts of many others—have contributed to a reference that is both timely and farsighted. We were privileged to be part of this endeavor and believe that the work of the many architects and allied professionals who undertook to develop and share their expertise has resulted in an indispensable resource. We expect you will turn to this Handbook many times as you make decisions related to participating in, developing, and managing a successful practice.

Linda Reeder, AIA
Associate Editor
15th Edition Handbook Steering Group Member

Acknowledgments

It has been my privilege to work with those who have participated in the creation of the 15th edition of the Handbook. I am deeply grateful to the contributing authors who have generously shared their knowledge. I especially appreciate their willingness to engage in our peer review process and work closely with the editorial team to produce excellent content.

At the outset of content development for the 15th edition, the Handbook editors turned to subject matter experts for guidance on many of the chapters. These "chapter captains," as we called them, advised us on the articles needed for their chapter and, in many cases, recommended authors to write them. Many were tireless in their work as peer reviewers and in assisting us in creating comprehensive chapters with minimum redundancy. I would like to extend special and heartfelt thanks to these expert advisers, including Jim Atkins and Phil Bernstein, who gave significant time and thought to the Handbook effort. Similarly, the guidance and insight of the Steering Group has been critical to the development of the 15th edition and their effort is also greatly appreciated.

To enable coordination between Handbook authors and their related topics, especially within a chapter, most contributors also served as peer reviewers for the other authors in their chapters. I truly appreciate the willingness of the authors to accept this extra task on top of producing their own articles. In addition, we had a number of peer reviewers who were not Handbook authors and we are sincerely grateful for their efforts.

The efforts of AIA's publishing partner John Wiley & Sons, Inc., are also most appreciated. Katherine Malm Bourgoine, Wiley's architecture and design Senior Acquisitions Editor, was always available to offer advice on publishing matters, and Senior Editorial Assistant Danielle Giordano was extremely helpful in addressing numerous administrative details.

Finally, on a personal note, I would like to thank the Handbook editorial team for their excellent work throughout this process. Although our collaboration was conducted almost entirely online, we worked together with remarkable effectiveness. I can only describe the team as insightful and dedicated and I am honored to have been able to work with Linda Reeder, Mary Anderson, and Richard L. Hayes.

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About the 15th Edition of the Handbook

Much has changed in the practice of architecture since the publication of the Handbook's 14th edition in 2008. Many tools that architects take for granted in 2013 were not widely used or available in 2008. More important, in 2008 the U.S. economy fell into the grip of a widespread and deep economic downturn, with a long-awaited recovery just now beginning at the time of this writing.

Many articles in the 15th edition discuss the significant impact of the Great Recession on the profession of architecture, including "Navigating Economic Cycles" by AIA Chief Economist Kermit Baker. Chapters on firm management, particularly in the areas of human resources and marketing, benefit from insight gained during this difficult period. Articles such as "Entrepreneurial Practice: Starting an Architectural Firm" offer understanding gained from practice experience about management strategies that respond to the new norm.

Significant changes in technology and project delivery have also taken place since 2008. Architects and owners are increasingly turning to delivery methods other than traditional design-bid-build in an effort to improve effectiveness and reduce risk. The 15th edition includes an expanded section on project delivery. It also includes, for the first time in the Handbook, an entire chapter devoted to technology.

While there is no chapter specifically focused on sustainability in the 15th edition, the topic is not being ignored. Just as sustainable design is no longer additive but instead integrated into the work of most architects, the topic of sustainable design has been integrated into other content. This is particularly true in relation to teamwork, project delivery, and codes. A case study that illuminates strategies for sustainable office management practices is also included.

NEW TO THE 15TH EDITION

Two-thirds of the 15th edition content is completely new, reflecting the state of practice in 2013 and looking ahead to emerging trends. In an effort to present the most current information, over 90 percent of 15th edition authors are new to the Handbook, although all are experts in their topics. These authors have contributed articles that are new to the Handbook, have written new articles on topics that have previously appeared in the Handbook, or have updated articles written for the 14th edition by others. Many of these authors are seasoned practitioners, sharing insight sourced from personal practice experience. Overall, they represent a diverse group that is meant to be reflective of the profession as a whole.

New Chapters

In addition to *Technology in Practice*, the 15th edition includes a number of other chapters that are new to the Handbook. These include:

- **Diversity and Demographics.** The importance of diversity as a practice management issue is discussed in this chapter along with a historical perspective on diversity in the AIA. Significant data on practice trends from *The Business of Architecture: AIA 2012 Survey Report on Firm Characteristics* are also presented.

- **Career Development.** Contributions from the National Council of Architectural Registration Boards (NCARB) explain the basics of the Intern Development Program and the path to licensure for emerging professionals. For seasoned practitioners, articles have been included to help increase understanding of the regulatory environment of professional practice, including state-mandated continuing education (MCE) and certification as a minority, women-owned, or small business enterprise.
- **Public Interest Design.** This new chapter reflects the growing interest and participation by architects in activities that benefit local communities and the public at large. Many examples of how architects are applying their skills and talents for the public good are included. Also discussed is the architect's role in disaster recovery and preparedness, pro bono work, and the profession's engagement with the nonprofit sector.
- **Research in Practice.** Research is increasingly becoming a regular and integrated aspect of architectural practice. In this chapter, academic researchers who work in practice settings and experienced practitioners who engage in research discuss various topics, including evidence-based design and research in a small firm context.

More Content for Smaller Firms

For the 15th edition, care has been taken to include information and best practices that are applicable to architects who practice in small and midsize firms, as well as large firms. Authors have been encouraged to help readers understand how to apply general information and recommend processes that work in the context of smaller practices. Authors from small firms were asked to write about their experiences to supplement information that might apply only to larger firms.

As a result there are a number of backgrounders targeted to small-firm practitioners, such as "Professional Developing and Mentoring in Small Firms," "Architect-Led Design-Build for Small Projects and Small Firms," "The Multi-Office Small Firm," and "Research in Small Firm Practice." There is also an article called "Small Firm Collaboration," which explores ways that small firms are aligning with other design firms to acquire and deliver work. And in the realm of technology, there is an article about using Building Information Modeling (BIM), called "Small Firms, Small Projects, and BIM."

Expanded Business Management Content

Twenty-first-century business realities require that entrepreneurial architects and their staffs develop skill in business management. The chapters on organizational development, marketing, finance, and human resources contain articles that demystify concepts and introduce firm leaders to best practices in each management arena. Consultants, who possess deep knowledge of specific aspects of practice, are the authors of most of these articles.

For owners of midsize firms with mature practices, there are articles on developing multiple offices or a global practice, and advice on how to maintain a culture of creativity. Articles on ownership transition, leadership effectiveness, the legal context of practice, and more provide information and knowledge vital to leaders of firms of all sizes.

NAVIGATIONAL FEATURES

The Handbook is divided into four major sections:

- Part 1: The Profession
- Part 2: Firm Management
- Part 3: Project Delivery
- Part 4: Contracts and Agreements

Each part contains a number of chapters. For example, "Part 4: Contracts and Agreements" includes the chapters "Project Definition," "Risk Management," and "Agreements and AIA Documents."

Each chapter contains multiple articles. Each article addresses a specific aspect of practice within the practice area covered by the chapter. For example, the chapter "Design Project Delivery" contains articles on integrated project delivery, design-build, and construction management, among others.

Some articles include backgrounders that elaborate on an aspect of the topic or bring a new perspective. For example, the article "Recruiting and Hiring" contains a backgrounder on social networking in recruiting activities.

Most articles conclude with a "For More Information" section, which lists and describes relevant resources about the subject. These resources may include publications, organizations, and URLs.

HOW TO USE THE HANDBOOK

The Handbook is designed to have multiple entry points. It is expected that most users will have an interest or need for knowledge in a particular area of practice and start there.

Articles can be read individually and in any order. Many chapters begin with an overview article that can direct the reader to the location of more detailed information on a particular topic. When articles in a chapter are taken together, they are intended to present the whole picture of a practice area. Users may want to read an entire chapter to gain fuller understanding of the material presented in any one of the articles. For example, the articles on financial management work best when read together.

The index, which contains key words and concepts, will help readers readily find specific information. In addition, margin elements on the article pages contain both navigational and informational features by

- Reinforcing some aspect of the narrative with a quote
- Highlighting key ideas in brief notes or comments
- Pointing to related Handbook articles and backgrounders

THE HANDBOOK AND THE "STANDARD OF CARE"

Architects are expected to perform within the legal concept of the "standard of care," which considers what reasonably prudent architects would do in the same community at the same time, facing the same or similar circumstances. As a result, fixed or uniform standards cannot be used to evaluate the performance of architects. Thus, the Handbook does not contain absolute rules and procedures. Rather, it presents concepts, principles, techniques, and other fundamental information that together provide guidance for the day-to-day needs of architects and other building design professionals.

Rena M. Klein, FAIA
Executive Editor

PART 1
THE PROFESSION

Laws, regulations, and codes of conduct govern the profession of architecture and define the obligations of architects to the public. AIA members comprise a community of practice that additionally agrees to abide by its Code of Ethics and its requirements for continuing education. For prospective architects, the path to licensure is prescribed. For emerging and mature practitioners, professional life includes participation in professional organizations and architectural education. For some architects, professional life at every stage includes engagement in public interest design.

CHAPTER 1

Ethics and Professional Practice

1.1 The AIA Code of Ethics and Professional Conduct

Michael L. Prifti, FAIA

Members of the American Institute of Architects lead the way through the highest standards of professionalism, integrity, and competence. The Code of Ethics and Professional Conduct is both guide and measurement of those practices.

INTRODUCTION TO THE CODE OF ETHICS AND ETHICAL PRACTICE

Architecture in built form is exclusively predicated on the universal constant of gravity. This is true regardless of location, weather, material, building or client type, codes and regulations, aesthetic, or other variable. Architecture as a practice is equally based on a moral foundation of professionalism, with responsibilities to the general public, our respective clients, to the profession itself, our colleagues, and to the shared environment

Michael L. Prifti is managing principal of BLT Architects, a firm headquartered in Philadelphia, Pennsylvania. Prifti has played an instrumental role in promoting professional practice, serving for two terms on the National Ethics Council and speaking at numerous AIA National Conventions on related topics such as "The Role of Ethics in Sustaining the Profession."

that surrounds all of us. For members of the American Institute of Architects (AIA), the concise language of the Code of Ethics and Professional Conduct is both guide and measuring stick for professional behavior.

HISTORY OF THE AIA CODE OF ETHICS

In 1909, the AIA first adopted a formal set of rules governing the conduct of architects. The rules were published as "A Circular of Advice Relative to Principles of Professional Practice and the Canons of Ethics." According to the National Council of Architectural Registration Boards (NCARB), only four states (Illinois, New Jersey, California, and Colorado) had by that time adopted laws regulating the practice of architecture. As a result, the AIA's rules served to set standards for practice in much of the country. The AIA periodically revised its ethical code in mostly limited ways during the ensuing 60 years.

Limitations Imposed by Antitrust Law

Unlike the NCARB member registration boards, each of which is a part of a state or other government entity, the AIA is a nongovernmental organization. State governments and their agencies enjoy various powers and privileges that do not extend to other types of organizations or to individuals. As a result, both the scope of professional rules adopted by the AIA and the manner of their enforcement by the AIA necessarily differ from what registration boards may do.

Antitrust law imposes significant restrictions on what conduct the AIA can mandate or prohibit in a code of ethics for its members. Although antitrust law is complex, its general purpose is to foster economic competition. One way that antitrust law accomplishes this goal is to prevent competitors in a given market from acting together to unreasonably restrain competition. Because the members of the AIA are competitors of each other, AIA activities cannot be carried out with the purpose or effect of reducing competition in ways that courts have found to be unreasonable, that is, without having an offsetting precompetitive effect.

In the 1970s, in various legal proceedings, the U.S. Supreme Court and other courts established new understandings of antitrust law as applied to professional membership associations, including their codes of ethics. As a direct result, the AIA's own code of ethics was repealed in 1980, temporarily replaced by unenforceable "Ethical Principles," then completely revised and reinstituted as a new enforceable Code of Ethics and Professional Conduct in 1987. The structure and much of the content adopted in 1987 continue to be reflected in the current version of the AIA's code of ethics.

Prior Provisions No Longer in the Code

Some subjects were covered in pre-1980 versions of the AIA's code of ethics but are no longer covered, mostly as a result of restrictions imposed by antitrust law. Prominent in a list of such subjects is any restriction pertaining to fees or compensation for services. In a 1978 appeal by the National Society of Professional Engineers, the U.S. Supreme Court specifically held that a professional association's ethical code may not prohibit competitive bidding—despite the argument that such a regulation would further public health, welfare, and safety.

The absence of ethical provisions regarding fees has a broader effect than just competitive bidding or minimum fee amounts, however. There is no ethical restriction on providing free services whether or not part of marketing; providing services at no charge is, of course, simply charging a fee of zero. Similarly, there are no ethical restrictions specifically pertaining to design competitions, which amount to providing services for no fee or a very small fee.

Other subjects no longer prohibited by the AIA code of ethics include:

- *Supplanting or replacing another architect on a project*. Historically, it was considered unprofessional to have any business contact with another architect's client. The AIA code of ethics does not prohibit such conduct.
- *Advertising*. The AIA's code does not prohibit advertising of professional services. The code does contain provisions that could be violated in the context of advertising, however, such as making false statements or failing to properly credit other participants in a project.
- *Contracting to do construction*. The 1909 code prohibited engaging in any of the "building trades" or guaranteeing any estimate. These restrictions, which are incompatible with design-build, disappeared by the 1970s.
- *Determinations of law*. Prior versions of the code did not shy away from provisions that required legal analysis. For example, prior to 1997 the code made explicit reference to copyright. Currently, however, in order for any legal or regulatory violation to be taken into account in application of the AIA's code of ethics, the legal or regulatory determination must have been made by an appropriate authority.

THE SIX CANONS OF THE AIA CODE OF ETHICS

CANON I: GENERAL OBLIGATIONS

Members should maintain and advance their knowledge of the art and science of architecture, respect the body of architectural accomplishment, contribute to its growth, thoughtfully consider the social and environmental impact of their professional activities, and exercise learned and uncompromised professional judgment.

CANON II: OBLIGATIONS TO THE PUBLIC

Members should embrace the spirit and letter of the law governing their professional affairs and should promote and serve the public interest in their personal and professional activities.

CANON III: OBLIGATIONS TO THE CLIENT

Members should serve their clients competently and in a professional manner, and should exercise unprejudiced and unbiased judgment when performing all professional services.

CANON IV: OBLIGATIONS TO THE PROFESSION

Members should uphold the integrity and dignity of the profession.

CANON V: OBLIGATIONS TO COLLEAGUES

Members should respect the rights and acknowledge the professional aspirations and contributions of their colleagues.

CANON VI: OBLIGATIONS TO THE ENVIRONMENT

Members should promote sustainable design and development principles in their professional activities.

STRUCTURE OF THE CODE

The code is arranged in three tiers of statements: Canons, Ethical Standards, and Rules of Conduct.

- *Canons* are broad principles of conduct. The code of ethics primarily addresses responsibilities that architects and other AIA members have to others. Except for Canon I, General Obligations, the canons reflect the categories of those to whom duties are owed: the public, clients, the architectural and related professions, colleagues (as individuals), and the environment.
- *Ethical Standards* are more specific goals toward which members should aspire in professional performance and behavior.
- *Rules of Conduct* are mandatory. Violation of a Rule of Conduct is grounds for disciplinary action by the Institute. Rules of Conduct, in some instances, implement more than one Canon or Ethical Standard.

Commentary is provided for some of the Rules of Conduct. That commentary is meant to clarify or elaborate the intent of the rule. The commentary is not part of the code, however. Enforcement is determined by application of the Rules of Conduct alone. The commentary is intended to assist those who are seeking to conform their conduct to the code as well as those who are charged with its enforcement.

NATIONAL ETHICS COUNCIL

The bylaws of the AIA establish the processes under which the ethical code is adopted, amended, and enforced. The bylaws provide for the establishment of a National Ethics Council, which has the authority to interpret the Code of Ethics. Individual members, officers, directors, employees, and officers and staff of state and local components of the AIA do not have this authority.

The National Ethics Council is the body charged by the bylaws to enforce ethical matters in the practice of architecture, in accordance with current, published editions of the Code of Ethics and Rules of Procedure. It does so through the process of complaint and response, measuring ethical behavior as defined by the code. The Council also considers proposed changes to the code for adoption by the Board of Directors or membership of the Institute, and may itself propose revisions. The Council amends its Rules of Procedure when appropriate, with any such changes requiring approval of the Board of Directors. As part of its educational mission, the Council conducts programs at the annual National Convention and at other component events. Occasionally, members of the Council publish articles on ethics.

The Council operates with operational support provided by the Institute's Office of General Counsel. The Council publishes on the Institute's website all of its publicly available information. This information can also be obtained by contacting the Office of General Counsel.

Composition of and Appointments to the Council

As established by the AIA's bylaws, the National Ethics Council consists of up to 12 architect members of the Institute, appointed by the Board of Directors to staggered three-year terms. Typically, the Council operates with seven members, each of whom generally is reappointed to a second three-year term. Individual terms are staggered to enhance institutional memory since Council members are not permitted to serve more than two consecutive three-year terms. Nominations for new appointments to the Council are made by the Institute's president with the advice of the Council. The Council's chairperson is also appointed annually by the Board of Directors following recommendation of the Council and nomination by the Institute's president.

Promulgation of the Code of Ethics

The National Ethics Council's page on the AIA website contains the current Code of Ethics, supporting documentation, and all necessary forms. In addition to violation notices published upon the conclusion of a case, decisions of the Council are also published in redacted form, that is, with names, places, and other identifying information removed. Prospective ethical matters may also be addressed through published advisory opinions issued by the Council upon request.

Redacted Decisions

Decisions of the Council in redacted form are published on the National Ethics Council's page of the AIA's website. These decisions are analogous to case law in a legal system and provide examples of how the National Ethics Council has applied various Rules of Conduct in contested cases. It should be noted, however, that prior decisions do not have binding authority on the Council in applying the Code of Ethics in any particular case that comes before it. Summaries of two such decisions are included here.

Advisory Opinions

The National Ethics Council offers the opportunity to AIA members to request advisory opinions be issued that apply the Code of Ethics to particular factual situations. Unlike complaints, which the Council always accepts in keeping with its current Rules of Procedure, granting a request for an advisory opinion is at the discretion of the Council. Decisions issued at the conclusion of a contested complaint have the benefit of the fact-gathering hearing process and usually input from both a complainant and a respondent. Advisory opinions, by comparison, ordinarily would be based on the single point of view of the member making the request.

Changes in the Code of Ethics and Complaint Process

How the Code Itself Is Modified

The AIA's bylaws provide two means for amending the Code of Ethics. The Institute's Board of Directors is empowered to adopt amendments at any time. In addition, the members as a whole, through a vote of their delegates at an annual meeting, may adopt amendments. Typically, amendments have been made by the Board.

How the Rules of Procedure Are Modified

The National Ethics Council is given authority by the AIA's bylaws to adopt the rules under which it operates, subject to specific requirements set by the bylaws themselves. Under the Council's Rules of Procedure, notice is given to the Board of Directors annually of any amendments adopted by the Council. The rules under which appeals are taken are established by the bylaws and the Board of Directors.

COMPLAINT PROCESS

Confidentiality

The AIA's bylaws require that the complaints filed with the National Ethics Council and the complaint processes that follow are maintained in confidence. Limited exceptions to the confidentiality requirement apply, as, for example, when a member is found to have committed a violation and a nonconfidential penalty is imposed. The confidentiality requirement does not prevent the complainant or respondent from contacting persons who already have knowledge of the circumstances described in the complaint and who are therefore potential witnesses. Maintaining confidentiality prevents an ethics complaint from becoming a subject of discussion beyond those who are already involved in the circumstances. In some instances, of course, no violation is ultimately found or only a confidential penalty is imposed for a minor infraction. In those instances, confidentiality ensures that the respondent does not suffer from publicity about the ethics complaint.

Filing of Complaints and Circumstances of Dismissal

Anyone who is directly aggrieved by the conduct of a member of the Institute may lodge a formal complaint against the member. This must be done in accordance with the Council's Rules of Procedure. A time limit of one year is imposed for filing a complaint after the alleged violation unless good cause for delay is shown.

Complaints are filed with the chairperson of the Council by sending them to the Institute's Office of General Counsel, which provides staff support for the Council. The format for complaints is established by the Council's Rules of Procedure, and a form is provided for this purpose. Once staff has determined that a complaint meets the formal requirements of the Rules of Procedure, the complaint will be reviewed by the Council chairperson, who may dismiss or defer the complaint, or determine that the case should proceed.

The chairperson is authorized to dismiss a complaint when the matter is trivial, when filing was delayed beyond the one year time limit without good cause, or if the matter would not result in an ethical violation, even if the facts alleged were proven to be true. The latter reason is analogous to the "motion to dismiss" standard in legal proceedings, but the Council does not follow any procedure analogous to "summary judgment."

The chairperson typically will defer a case if the parties are involved in litigation, arbitration, or another dispute resolution process, including a proceeding before a licensing board. In that instance, both parties will be notified of the deferral and a copy of the complaint will be sent to the respondent. Deferral due to another proceeding is not uncommon. About half of the complaints filed with the Council are deferred either upon initial filing or later if another dispute resolution proceeding is initiated.

In nearly all other instances, however, the Chair will determine that the initially filed complaint should proceed, and the Council forwards it to the respondent for response. As with a complaint, the form for the respondent's response is established by the Rules of Procedure, and a form is provided for this purpose. In the event that a respondent does not file a response after being notified, the complaint process will nevertheless proceed. Even if a respondent remains uncommunicative while the ethics case is proceeding, the Council sends notices of all opportunities for the parties to participate.

The Hearing Officer

Unless information received from the respondent would support dismissal or deferral of the ethics case under the same standards that apply to review of the complaint itself, the chairperson assigns the case to one of the other members of the Council who will serve as the hearing officer. This selection is predicated on an absence of previous knowledge of the matter and existence of significant ties to the complainant, the respondent, or any of the likely witnesses. To help meet these standards and to avoid other possible conflicts, the Council member selected to serve as a hearing officer is often located geographically distant from parties to the case. Notice of the hearing officer's appointment is sent to both the complainant and respondent to allow them to challenge the appointment by reason of alleged bias, prejudice, or conflict of interest.

The hearing officer serves in a capacity similar to an arbitrator. One major difference, however, is that a Council member serving as hearing officer is not the decision maker in the case but runs the process during the pre-hearing and hearing phases. The hearing officer's responsibilities for a case largely end with submission of a report and recommendation as described below.

After receiving the case file, the hearing officer will review the complaint, response, and accompanying documentation in order to independently confirm whether the case should proceed based on the same standards under which the complaint was initially reviewed by the chairperson. Dismissal or deferral by the hearing officer is subject to concurrence by the chairperson.

The complaint process does not provide for counterclaims, even in circumstances when the complainant is a member of the AIA. Upon occasion, a respondent has filed a separate complaint against an original complainant while the original complaint is pending. Although the Council formally treats the two cases separately, in the past the same Council member has been appointed to serve as hearing officer in both cases in the interest of efficiency.

Before the Hearing

The AIA's ethics complaint process is streamlined and does not include features of more formalized dispute resolution methods. Discovery of the opposing party's information through depositions and document production, which are common to litigation and arbitration, is not a part of the Council's procedures. As a nongovernmental organization, the AIA does not have governmental powers and has little means, if any, by which to enforce directives to complainants, respondents, or third parties to produce information that may be relevant to a case. With limited exceptions, a complainant and a respondent both come to a hearing primarily with the information they have in their own possession.

One essential step in preparing for an ethics hearing is for the hearing officer to conduct a pre-hearing conference, which is akin to a pretrial conference conducted by a judge in a court case.

The conference, which is typically by telephone, ordinarily includes introductions, brief statements by the parties regarding their views of the case, and reference to the possibility of settlement between the parties. The parties are permitted to have their counsel or their designated non-attorney advisers participate in this call. The conference call is neither transcribed nor recorded, and nothing said during the call becomes part of the case record. The hearing officer may ask questions of the parties in order to better understand the framework of the dispute. A date for the hearing is set, along with a location, in the event that the complainant and respondent are not in the same area.

Also established during the pre-hearing conference call is a deadline for the parties to submit and exchange various information in advance of the hearing, notably including their expected witnesses and any additional documents (not submitted with the complaint or response) that will be used as evidence at the hearing. This pre-hearing exchange largely constitutes the extent of "discovery" in the AIA's ethics complaint process.

Hearing

The hearing is conducted as an in-person meeting among the hearing officer (assisted by staff counsel), the complainant, the respondent, and their respective counsel or other designated advisers. Witnesses are ordinarily allowed to be present in the room only during the time that they are giving their testimony. The hearing is also attended by a court reporter, retained by the AIA, who makes a transcript of the proceedings for the case record. Most commonly, a hearing lasts the better part of a day, but occasionally the amount of information to be presented may require more than one day.

As with the pre-hearing conference call, the hearing officer presides. No evidence is typically permitted beyond what was indicated by the parties in their pre-hearing exchange of information. The hearing typically follows the following agenda: brief opening statements by both parties, presentation of the complainant's evidence, presentation of the respondent's evidence, and, finally, brief closing statements by both parties. After each witness (usually including the complainant and respondent) provides testimony, an opportunity is provided to the opposing party to ask questions of the witness. The hearing officer (and staff counsel) also frequently have questions to ask a witness to complete the record. During the hearing, the complaint, the response, and the supporting documentary evidence submitted by each party are marked as exhibits for inclusion in the case record.

Report and Recommendation

Following the hearing, the hearing officer prepares a Report and Recommendation. This written document describes the circumstances of the case, cites the Rule(s) of Conduct from the Code of Ethics that were alleged to be violated, presents pertinent facts, states the hearing officer's conclusions regarding violations, and, if a violation is found, recommends a penalty. This Report and Recommendation is distributed to the parties, who are given the opportunity to submit written comments.

Deliberation and Decision by the Council

The entire case record is submitted to the members of the Council for their review. The case record includes the Report and Recommendation, the reporter's transcript of the hearing, the hearing exhibits, and the written comments, if any, submitted by the parties. At a subsequent meeting of the Council, the hearing officer makes introductory remarks and responds to questions that the other Council members may have, after which the hearing officer withdraws and is not present for any case deliberations. If either of the parties has requested to appear before the Council, they also may make short statements and respond to questions the Council members may have.

The Council conducts a vigorous review and deliberation of the transcript, other evidentiary materials, and the hearing officer's Report and Recommendation. The Council makes its determinations by majority vote and authors the written decision, which is subsequently issued to the parties. In the event no ethical violation is found, the case is closed and confidentiality continues to protect the innocent respondent. Should the Council find one or more violation has occurred, a penalty will be determined.

Penalties

Penalties that may be imposed for ethical violations are set by the AIA's bylaws. The National Ethics Council does not have the authority to require a respondent to pay money. The Council also does not have the authority to require a respondent to take any action or to refrain from any conduct. Penalties are imposed in keeping with the severity of the violation by the respondent in the eyes of the Council.

Unintended or relatively minor matters may result in a nonpublic *admonishment*. More significant violations are made public and are of increasing severity. First is a *censure* of the respondent, which includes publication of a notice describing the violation in an Institute periodical. Next, membership in the Institute may be *suspended* for a period of time, usually one to three years. In more egregious matters, membership is *terminated*. In all instances of violation, the respondent's AIA membership record will reflect the penalty, although the AIA will maintain confidentiality in the matter except for the published notice of violation.

Appeals

Members found in violation of the Code of Ethics may choose to appeal the decision of the Council to the AIA's Executive Committee. In an appeal, both parties are given an opportunity to submit statements to the Executive Committee. The Executive Committee is provided the entire case record for consideration. Except in cases where the penalty is termination, the decision of the Executive Committee is final, and no further appeal is offered. Upon appeal, the Executive Committee may approve the Council's decision and penalty, approve the decision but reduce the penalty, dismiss the complaint, or return the matter to the Council for further proceedings.

Matters resulting in termination are automatically considered as an appeal. In such cases, the Council's decision is first considered by the Executive Committee. In the event that the Executive Committee approves the decision and the penalty of termination, the case is further considered as an appeal by the full AIA Board of Directors. The Board is provided the Council's decision, the parties' statements to the Executive Committee, and the Executive Committee's decision. The Board may concur in the Executive Committee's decision or return the matter for reconsideration.

PRACTICAL CONSIDERATIONS

Although the number of cases pending before the National Ethics Council varies, usually between 20 and 30 complaints are filed each year. Because of the requirement of confidentiality, most of these will never be made known to the public in any fashion. Only in cases where violations are found, accompanied by penalties of censure, suspension, or termination, are the names of the respondents disclosed.

Guidelines for Complaint and Response

Complaints

Regardless of category, the formal complaints will cite one or more Rules of Conduct and briefly describe the circumstances of alleged violation. It is essential that complainants thoroughly and accurately understand the rules chosen for citation and that the argument be clearly stated.

Responses

A member's response to a complaint falls into a few broad categories, regardless of the particulars of the matter. Best are the thoughtful, well-documented responses filed in a timely way. Unfortunately, some responses are not timely or thorough. Worse are cases where a response is not provided, which can result in a finding of violation. Regardless, the formal response should address each of the Rules of Conduct cited in the complaint and briefly refute the alleged violation. It is equally essential that respondents thoroughly and accurately understand the Rules of Conduct allegedly violated and that their rebuttal argument be clearly stated.

Effective Communications and Proof

The hearing officer's role is to facilitate fact-finding and submission of information by the parties, not as an investigator or judge. The burden of proof of a violation rests exclusively with the complainant. Inappropriate citation of Rules of Conduct, lack of supporting evidence, large amounts of irrelevant information, and presenting self-serving witnesses are unlikely to be persuasive. The same cautions hold true for the respondents, who are well advised to take care to address each of the allegations comprehensively and in correct sequence.

COMMON COMPLAINTS

Attribution of Credit

Because architecture firms market their services based on their portfolios of completed work, it is no surprise that some of the most frequent complaints are filed by architects against other architects over project credit provided or taken. These circumstances may arise out of the dissolution of a firm or the departure of a principal from a firm. Other credit disputes may be prompted by the departure of project staff members from a firm or between firms formerly in joint venture or other collaboration on project work.

ATTRIBUTION: CASE 2004–10

Case 2004–10 involved a complaint by an architect member against two other architect members regarding project credit, citing Rules 4.201, 5.201, and 5.202. The Complainant founded an architecture firm 30 years ago and was chairman of that firm. Respondent A was a former employee of the Complainant of 10 years' duration, departing to become vice president and managing principal of a regional office of the Respondents' architecture firm. Respondent B was a senior vice president of the Respondents' firm. A hearing was held with the Complainant and both Respondents present and participating.

Testimony at the hearing established that, at the time of the move, Respondents' firm hired a marketing consultant to publicize Respondent A's new presence as manager of one of the firm's regional offices. A folded announcement brochure prepared by the marketing consultant was reviewed by both Respondents and subsequently mailed to prospective clients of the Respondents' firm, including some clients of the Complainant's firm. The announcement described Respondent A as "one of this region's leaders in architectural design and project management with over $200 million in projects and 10 years of award-winning design and project management experience." The announcement also stated: "Her portfolio includes the acclaimed Office Building, Sports Facility, and College Facility, as well as other award-winning facilities like the Stadium, the University Facility, and the University Hospital." The Complainant learned of the announcement from clients who were confused by the fact that the Complainant firm's projects were being attributed to the Respondents' firm without mention of Complainant's firm.

Initially, the Complainant sought the publication of specific corrections to the announcement by the Respondents' firm but without success. The Complainant then filed a complaint with the National Ethics Council, alleging an absence of credit and improper use of photographs that had been commissioned by the Complainant's firm. At the hearing, the parties offered testimony regarding permission for Respondent A to use materials from her former firm, which had no published policy regarding the use of photographs or other project materials by former employees. It was established that another principal of the Complainant's firm, Respondent A, and the former counsel to the Complainant's firm had met as friends for lunch a few months after Respondent A's departure. During that conversation, Respondent A's experience at the Complainant's firm was discussed and use of the Complainant's firm's projects by the Respondent's firm as examples of Respondent A's experience was deemed acceptable as long as the Complainant's firm was given credit. The discussion did not include permission to use Complainant's project photographs given to Respondent A, and the type of materials her new firm might want to use was unspecified.

Other evidence submitted at the hearing included promotional materials of the Respondents' firm that incorporated photographs of Complainant's firm projects, including nine of the Complainant's firm projects as examples. While several dozen photographs were used, all of which were commissioned by Complainant's firm, identification of the Complainant's firm was by text under only one photograph of each example. The type font was smaller than that used in the body of the text describing the project and was the sole attribution.

Applying Rule 4.201 ("Members shall not make misleading, deceptive, or false statements or claims about their professional qualifications, experience, or performance, and shall accurately state the scope and nature of their responsibilities in connection with work for which they are claiming credit") and the accompanying commentary ("This rule is meant to prevent Members from claiming or implying credit for work which they did not do, misleading others, and denying other participants in a project their proper share of credit"), the Council concluded that Respondent A violated the rule by making such misleading and deceptive statements in the initial announcement.

Regarding Respondent B, prior decisions of the National Ethics Council have explained that the principals of a firm may be held accountable under the Code of Ethics for their firm's marketing materials regardless of whether they are directly involved in preparation of the materials. (*See Decision 92-07; Decision 94-07.*) In this case, the testimony reflected Respondent B's awareness of the content, review, and approval of the announcement prior to publication. Hence, Respondent B also violated Rule 4.201 by making misleading and deceptive statements.

Regarding Rule 5.201 ("Members shall recognize and respect the professional contributions of their employees, employers, professional colleagues, and business associates"), the Council concluded that Respondent A had both overstated her project influence on certain projects and understated the contributions of the Complainant's firm, creating an impression that the projects were projects of the Respondents' firm. The Council concluded that both Respondent A and Respondent B violated Rule 5.201 by failing to provide appropriate credit to the Complainant's firm for its professional contributions.

Applying Rule 5.202 ("Members leaving a firm shall not, without the permission of their employer or partner, take designs, drawings, data, reports, notes, or other materials relating to the firm's work, whether or not performed by the Member"), the Council determined that testimony did not support Respondent A's claim that she had tacit approval to take and use the Complainant's firm's photographs of that firm's projects and concluded that Respondent A had violated Rule 5.202. Having found a violation by Respondent A of three cited rules, and by Respondent B of two cited rules, these ethical lapses warranted a penalty of censure on both of the members.

Homeowner Complaints

Nowhere is the relationship between architect and client closer than in bespoke residential commissions. Another common type of complaint is filed by homeowner clients, who believe that services provided were in some way inadequate: the scope of the project was unknowingly altered; the overall schedule was hindered; and the project budget was ignored. Often, homeowners are first-time clients, without a depth of knowledge necessary for a good client-professional relationship.

HOMEOWNER COMPLAINTS: CASE 2005–15

Case 2005–15 involved a homeowner who filed a complaint against an architect, citing Rules 2.104 and 3.102. The Complainant, along with his wife, had retained the Respondent architect to design and prepare construction documents for an addition to their 100-year-old house, which was located in a historic district. An agreement for architectural services was prepared and signed, and the Respondent provided architectural services as a sole proprietor.

(continued)

Testimony during the hearing established that the Respondent had encouraged the Complainant to act as his own general contractor, so as to save construction expense. While preparation of signed and sealed drawings for the building permit took five months, the Respondent also suggested the existing kitchen be demolished at the midpoint of this period, resulting in the loss of kitchen use for two years.

The Respondent signed and sealed drawings for the project on two separate dates, although he did not have a valid architectural license for more than six months during the project because of a failure to renew the license. The Respondent proposed that he provide plumbing construction services for the project through a separate construction business that he owned, although he was not a licensed plumber. Finally, the Respondent used the Complainant's personal credit card, with permission, to purchase roofing materials for the project but charged $1,500 for materials used on another project.

Evidence in the case included a copy of a consent order with the state architectural licensing board wherein the Respondent had previously agreed to accept a reprimand, complete the NCARB Continuing Education Monograph on "Professional Conduct," and pay a $250 civil penalty. The Respondent had also signed a consent agreement with the state board of plumbing contractors, agreeing not to provide such services without a license.

The essential facts in this case were not in dispute. The Respondent performed various architectural services for the project while he did not have a valid architectural license, including signing and sealing drawings for the project. The Complainant had a right to expect that the architect he retained was licensed and would maintain a current license throughout the duration of the project. The lapse in the Respondent's architectural license created a high degree of risk that the Complainant would be adversely affected. For example, approval of submittals to a building department that required an architect's seal might be denied or substantially delayed. Therefore the Council concluded that the Respondent's failure to renew his license was in wanton disregard of the Complainant's rights and that the Respondent violated Rule 2.104 ("Members should uphold the law in the conduct of their professional activities"). The Respondent's execution of a consent order with the state architectural licensing board was an admission of fault to that state's relevant governing body and sufficient proof of an ethical violation.

The Council next considered Rule 3.102 ("Members shall undertake to perform professional services only when they, together with those whom they may engage as consultants, are qualified by education, training, or experience in the specific technical areas involved") and its commentary ("This rule is meant to ensure that Members not undertake projects that are beyond their professional capacity. Members venturing into areas that require expertise they do not possess may obtain that expertise by additional education, training, or through the retention of consultants with the necessary expertise").

The Respondent's plumbing construction was also carried out without the required state license. His execution of a consent agreement with the state board of plumbing contractors is admission of fault with that body. The Complainant alleged that the Respondent violated Rule 3.102 due to his lack of valid licenses, as Members must be "qualified by education, training, or experience" to perform the services they provide. The evidence, however, did not prove that the Respondent lacked either education, training, or experience as an architect or plumber. What the Respondent lacked was a valid plumbing license, which was not covered under Rule 3.102. Hence, the Council concluded that the Complainant had not established a violation of this particular rule. Having found a violation, albeit of Rule 2.104 only, the Council determined that this particular ethical lapse was sufficiently serious to warrant a penalty of a three-year suspension of membership.

CONCLUSION

Architects strive to provide exemplary service, while adding beauty and functionality to the built environment. Within and without, each commission brings untold decisions predicated on ethical practice, balancing the competing interests of clients, the public at large, our profession and colleagues, and of the earth itself. The AIA's Code of Ethics and Professional Conduct is that essential document by which all such decisions are benchmarked.

For More Information

AIA Code of Ethics and Bylaws website: http://www.aia.org/about/ethicsandbylaws/index.htm.

1.2 Ethics and Architectural Practice

Thomas Fisher, Assoc. AIA

Understanding ethics helps architects deal with the dilemmas faced in the course of practice as well as those that arise in the design and construction of the built environment. This article discusses four ways of considering the ethical issues of practice and offers three case study vignettes with analysis.

FOUR WAYS TO THINK ABOUT ETHICS

Architecture practitioners continually encounter questions such as: what is the right thing to do in a conflicted situation, and how to decide among the divergent values or opinions of people? Ethics helps architects find answers in such questions. While ethics, like any branch of knowledge, has a long and complex history, this essay explores four of the main approaches to thinking about the topic:

- Character-based ethics (Virtue)
- Contract-based ethics (Social Contract)
- Duty-based ethics (Deontology)
- Results-based ethics (Consequentialism)

Character-Based Ethics

Dating back to ancient Greece, this approach to ethics encourages people to focus on the development of a good character or what the ancient Greeks called "virtue." Virtues such as justice, courage, prudence, and temperance all stress the importance of a person acquiring a sense of balance, persistence, and moderation, which philosophers such as Aristotle thought of as key to living a good life.

Such virtues also lie at the heart of professional practice. Exhibiting fairness when dealing with others, having courage to do the right thing in the face of opposition, using good judgment when encountering new information, and displaying self-control in the midst of multiple pressures can all help architects successfully serve their clients, retain their staffs, and remain well regarded among their colleagues and coworkers.

The medieval period saw a shift toward more empathic virtues such as faith, hope, charity, and love. These, too, have direct applications to architecture practice, whether it means having faith in oneself and one's talent in competitive situations, giving people hope that they can have a better physical environment, showing charity toward the aspirations of clients or needs of users, or loving the act of designing itself.

Modern virtues like honesty, respect, tolerance, and trust also underpin the effective operation of commercial society. Following through on what one promised, recognizing the value that comes from a diversity of perspectives, accommodating viewpoints or ideas different from one's own, and having confidence that others will also do what they have committed to all enable a practice, a profession, and a community to operate effectively.

Contract-Based Ethics

If the virtues involve the development of a good character, a contractual approach to ethics focuses more on the creation of a good society. Under a "social contract," morality consists of a set of rules governing behavior, which rational people would accept on

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the condition that others accept it as well. People tend to follow the rules because, on the whole, they are to their advantage, while breaking the rules undermines that useful system. Differing historic views of what constitutes a good life and a good social contract derive from two diametrically opposed ideas about the earliest human settlements. The seventeenth-century philosopher Thomas Hobbes saw human nature as somewhat wild and early human life as "nasty, brutish, and short," and argued that people should give up some of their personal freedom in exchange for the authority of a strong government able to keep the peace and enable people to lead longer and happier lives.

In contrast, the eighteenth-century thinker Jean-Jacques Rousseau saw early life in "the state of nature" as one of blissful harmony and independence, ruined only when people started to claim property as their own. Rousseau saw the possessiveness surrounding property as a corrupting influence and argued that the best societies enabled people to live as close as possible to the original state of nature, with the least interference from outside authority.

Modern social-contract philosophers, such as John Rawls, take a more nuanced view of what a good society comprises. Rawls argued that people should imagine "a veil of ignorance" behind which they cannot predict their own individual futures or fortunes in life. Using this thought experiment, he said, a good society would distribute resources so that everyone would benefit fairly and without prejudice.

These different views of the social contract have clear parallels in architecture. Hobbes foretells the generations of architects who have reacted to urban decay with new visions of urban order, while Rousseau presages the rise of suburbanization and the modern desire to live close to nature. Meanwhile Rawls gives justification to laws such as the Americans with Disabilities Act and strategies such as universal design.

Duty-Based Ethics

All professions have a duty to those whom they serve. In the case of architects, that duty extends not only to the needs and wishes of clients but also to the present and future users of buildings as well as to past generations (via preservation), to other species (via sustainability), and even to underserved populations (via public interest design). What distinguishes professions from ordinary businesses is the obligation, embedded in professional licensure, of using disinterested judgment to do the right thing, regardless of the biases of particular interest groups. In duty-based ethics, one's own actions must be ethical regardless of the consequences, and the ends do not justify the means.

This approach to ethics is most closely associated with the eighteenth-century philosopher Immanuel Kant who argued for a set of what he called "categorical imperatives" to guide a person's decisions when faced with common ethical dilemmas. The first of these imperatives would have everyone treat others as ends in themselves, and not as a means to an end. This is a variation of the biblical appeal to "do unto others as you would have them do unto you." This imperative helps practitioners remember to treat clients, users, and society with respect and dignity.

A second categorical imperative entreats people to judge every action as if it were to become universal. In architecture, this idea relates most closely to attempts by practitioners and scholars to develop architectural theories: principles derived from particular buildings that should apply to all buildings. While some theories may have universal relevance, most do not: Think of the pretensions of "International Style" architecture and how ill-suited it was to many cultures and climates.

A possible caveat related to duty-based ethics has to do with the importance of having good intentions and acting accordingly, regardless of the results. Kant's dismissal of consequences brings to mind Colin Rowe's observation that modernism was an "architecture of good intentions," whose practitioners seemed too willing to overlook its negative impact. Architecture education, too, has had a strong focus on design intentions, with relatively little attention paid to design results, as would be learned from postoccupancy evaluations of buildings.

Results-Based Ethics

In part as a reaction to duty-based ethics, results-based ethics—consequentialism—arose in the nineteenth century, arguing that we determine the goodness of an action by looking at its consequences. In consequentialism, the ends justify the means. Architecture, of course, has always had functional utility at its core: Buildings have to meet occupants' needs, protect people from the elements, and stand up against the forces pulling or pushing a structure. And buildings make the consequence of ignoring such things quickly evident: They fail, leak, or fall down.

Utilitarianism, one example of consequentialism, is a theory that values whatever brings the greatest happiness to the greatest number. For the nineteenth-century thinker Jeremy Bentham, that involved a simple calculation: Whatever maximized the most good for the most people was, by definition, the right course of action. But that quantitative approach also brought problems. Providing everyone the same minimum shelter would maximize happiness for the greatest number, but would it result in a good built environment? Bentham's follower John Stuart Mill argued instead that qualitative consequences have more value than quantitative ones: that the quality of the built environment, for example, matters more than the quantity that each person has.

For pragmatists like William James and John Dewey, what matters is not maximizing happiness, but looking at the results of our actions to discover what works best in a given situation. James argued that something is good if it is useful and corresponds to how things actually are. Dewey thought, instead, that experimentation is needed in order to find the good, repeatedly trying things and learning from the results. A recent variation of this results-based ethic has a strong environmental component. Philosopher Peter Singer has argued that we cannot limit thinking about consequences to human beings, but instead need to include all "sentient" beings—all of the animals who, like us, can feel pleasure or pain. This presents a major challenge to architecture, which consistently degrades the habitat of other animals in the process of creating habitat for human beings. Were architects to consider the impact on all sentient beings, buildings would likely be much more energy conserving, environmentally friendly, and ecologically diverse than most are now.

Summary

TABLE 1.1 Four Approaches to Ethical Issues in Practice

	Being Good	Doing Good
As Individuals	Character-based ethics Fairness, courage, moderation, good judgment Faith, hope, charity, love Honesty, respect, tolerance, trust	Duty-based ethics Treat others as ends, not means Act as if it were to become universal Act with good intentions, regardless of consequences
As a Group	Contract-based ethics The good lies in social harmony and security The good comes from living close to nature The good comes from helping the least advantaged	Results-based ethics Do the greatest good for the greatest number Do what seems most useful and true Maximize benefits to all sentient beings

CASE STUDY VIGNETTES

These four approaches to ethics (see Table 1.1) offer different ways of resolving the ethical dilemmas faced during the course of practice. The following case studies, all adapted from real situations, show how ethics can help professionals sort through and evaluate alternative decisions and actions.

1. Conflict Between Personal and Employer Values

An architect worked, during the day, designing big-box stores. During her free time, though, she volunteered for nonprofit groups helping the poor, some of whom had been displaced by the same big-box stores she had designed. While big-box stores provide a public good in the sense of making low-cost products available to more people, such developments sometimes disrupt existing neighborhoods and environments in ways that can bring harm. This architect considered quitting her job because of its conflict with her values, but she also needed the income and had few other employment alternatives.

Analysis

In her sense of responsibility for the well-being of people negatively affected by the work of her employer, this architect exemplifies such virtues as a sense of fairness, an instinct for charity, and a deep respect for others. However, the decision to stay in her job or leave it depends upon other virtues, like the courage to act even if it runs counter to her financial best interest or the honesty to tell her employer of her misgivings even if it means her dismissal.

Situations like this also show how complicated questions of duty can become. This architect has a duty to her employer, but does that trump her feeling of duty to those negatively affected by the employer's buildings? Design as a way of thinking can help when confronted by such divided loyalties, since it can often find win-win solutions to seemingly unresolvable dilemmas, whether in a building or in life. As a way to honor duty to the community and to her employer, this architect might do better staying with the company and trying to change its practices rather than leaving and relinquishing that possibility.

From a social-contract perspective, the dilemma has to do with a paradox of capitalism. Her employer has an obligation to generate the greatest return to its shareholders and to attract customers to its products and services. But in a case like this, a company cannot maximize its returns while damaging its reputation in the community in which it wants to do business. The idea of ensuring that the least fortunate benefit from every action applies here. If this company put more emphasis on how its actions affect the community, and worked more on improving community relations and less on maximizing profit, it would likely make more money. There is a reason why the terms *ethics* and *economics* both have their origin in ancient words having to do with stewardship and care.

The company could argue that, from a strictly consequentialist perspective, the benefits of a big-box store to a community—directly through its goods and services and indirectly through its taxes—outweigh the displacement of a much smaller number of homeowners and the qualitative deficiencies of big-box stores. Making less-expensive goods available to less-affluent people can improve the quality of their lives economically, but does that have to come at the expense of the quality of their physical environment?

The architect, in this case, decided to talk to her employer about her volunteer work and her misgivings about the impact of the company's big-box stores on lower-income communities. And to her surprise, her employer asked her to move into a community-relations position in which she could work with neighborhoods prior to the development of the company's urban stores, in order to mitigate their negative effects. That response showed an understanding within the company that it is often beneficial to proffer in good as well as in goods.

2. Clash of Ethics and Aesthetics

A client came to an architect wanting his firm to design a building that would put it on the covers of magazines and get the publicity presumably needed to market the facility. The architect obliged and created a structure so striking that it achieved the coverage the client wanted, but at a price. The structure proved so difficult to occupy and unpleasant to be in that the client still had a hard time attracting tenants, and the design represented such an extreme that it triggered *a broader conversation in the profession about the absurdity of such work, ultimately leading to less coverage of the architect's work thereafter.*

Analysis

From the point of view of duty ethics, this situation seems perfectly justifiable. Architects have an obligation to meet the clients' needs and help them achieve their goals, and so, in that sense, the architect here did the right thing as a professional. While architects also have a duty to the general public and to protect people's health, safety, and welfare, that does not preclude the architect from helping a client get as much publicity as possible for a project, including getting it featured on the covers of magazines. The client, too, conceivably has a duty to get the greatest return on the investment in a building, and getting a lot of press for the project can be an effective way of doing that, attracting potential tenants without having to do as much marketing.

Other ethical approaches, however, help shed some light on why the project's reception did not turn out as either the client or architect expected. Consider the character of the client in this situation. His placing publicity above all else suggested that the building was as much about his desire for attention as it was about attracting tenants. And the architect's accommodation of the client's immoderate ambitions casts doubts on the character of this design practitioner as well. Architects may have a duty to meet clients' needs, but professionals also have a duty to advise clients about potentially unwise actions.

From a social-contract perspective, the self-importance of this project also raises ethical questions. Buildings represent creative responses to the needs of people, organizations, and communities, but at the same time, architecture also has an obligation to meet at least some of the expectations of the societies and cultures in which it stands. Moving too fast and too far away from those expectations can backfire, as happened here, when the building, having received the press coverage that the client had wanted, still could not attract tenants.

In terms of functional utility, this project hardly met that measure, either. While its design obviously held some value for the client and architect, both of whom had the freedom to largely do what they wanted, the structure lacked even the most basic utility, given the number of people who found it too hard to inhabit. By ignoring certain important consequences of their actions, in favor of pursuing publicity, both architect and client undermined their original goal of attracting tenants. In addition, the building's pragmatic flaws did not end with the structure itself; its sheer extremism cast a pall over the architect's career.

3. Difference Between Employer Obligation and Employee Needs

An intern in an office wanted to go through the Intern Development Program (IDP) required of him in order to sit for his licensing exam. The principal of the firm in which he worked, however, could not be bothered by the requirements of IDP and did not give his intern the variety of experiences in the office that IDP expected. The intern complained to the national organization that oversees the program, but its representatives told him that there was nothing they could do to force this architect to participate and, despite the poor economy and few employment options, they told him that he could always look for work in another firm.

Analysis

Being an architect involves not just the acquiring of the skills required to design and detail buildings, but also the joining of a community of professionals. Professional communities are not without their tensions. Architecture firms, for example, often have to compete against each other for commissions even as they cooperate with each other on matters affecting the profession as a whole. And, as happens in every community, practitioners have different levels of involvement in the profession; some get very engaged and even seek leadership positions in the various professional organizations in the field, while others pursue their practice and never attend a single meeting or contribute to any committee. Professional obligations range, in other words, from the mandatory—taking the licensing exam, for instance—to the voluntary, such as joining the American Institute of Architects.

That personal preference becomes an ethical issue when it affects others, as in the case here, where an architect did not see his oversight of an employee's progress through the Intern Development Program (IDP) as part of his professional obligation. The IDP arose in the 1970s to address this very problem. Because so many firms in the past did not attend to the needs of interns for diverse experiences in order to become well-rounded professionals, the National Council of Architectural Registration Boards (NCARB) made the IDP a requirement for an intern to sit for the architect registration examination (ARE). The profession saw this as being in the best interest of the entire field and, in utilitarian terms, as doing the greatest good for the greatest number of those who aspire to become architects.

▶ Intern Development Program (3.2) discusses the IDP in further detail.

The IDP, however, puts the responsibility on the interns and has little force in requiring practitioners to participate in it. Most practitioners do support interns' IDP efforts because it has become an expected part of being an architect in the United States, part of the "social contract" that an older generation has to the younger generation of professionals. Most architects also see this as part of their duty to their staff and perhaps, self-interestedly, as a way of attracting and keeping interns who want to become architects themselves. From almost every ethical position and from the perspective of an employer as well as an employee, participation in the IDP makes sense. Virtue ethics may shed some light on that question. A character-based approach to ethics emphasizes personal responsibility, and while that has many benefits in terms of helping people lead better lives, it also tends to see a community as a set of autonomous individuals. In cases like this one, an emphasis on individualism allows practitioners to opt out of their community responsibilities, with little or no leverage to force them to do otherwise. However, as of 2012, the AIA National Ethics Council has adopted a rule that makes supporting the professional development of interns an ethical obligation of AIA members.

WHAT'S NEXT FOR ETHICS AND PRACTICE?

Architecture has taken an "ethical turn" in recent decades, reflecting a renewed emphasis on ethics in other fields like medicine and law and a reinvigorated interest within the profession in issues like sustainability and social justice. Ethics has become a required part of an accredited architecture curriculum and a topic covered with greater frequency in the profession's annual meetings and academic conferences.

At the same time, ethics has highlighted areas in which the profession needs to pay more attention:

- Architects generally have good intentions, but rarely give enough time and attention to postoccupancy evaluations of the consequences of what they do.
- Architects often seek to create the greatest good for the greatest number, but have largely overlooked the needs of the world's poor and the habitat of other creatures.
- Architects frequently respond well to the contexts in which they work, but have a much worse record when it comes to giving awards to buildings that represent a-contextual extremism.

The work of architects has such an enormous effect on large numbers of people and other species that the profession cannot avoid the ethical consequences of its actions. This will continue to make ethics a relevant issue for architects in the twenty-first century as the scope of professional activity expands to include responsibility for global populations and global climate disruption, and to address the resources, systems, and infrastructures that are all part of the built environment. This ethical turn may even lead to a redefinition of what it means to be an architect, attending to the health, safety, and welfare not just of clients and building users but also of other sentient beings, future generations, and diverse ecosystems, ultimately for the good of all.

For More Information

AIA Code of Ethics and Professional Conduct: www.aia.org/about/ethicsandbylaws.

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1.3 Design Beyond Ethics

Victoria Beach, AIA

As with safe food, many actors contribute to the ethical project of safe shelter: inspectors, engineers, and more. Rather than compete with them, architects, like chefs, should seek their niche with aesthetics—not in the narrow sense of beauty but in the broad sense of understanding and shaping how humans interact with their surroundings.

INTRODUCTION: THE CHEF ARCHITECT

We all experience architecture before we have even heard the word.

—Peter Zumthor, Architect

Expecting an architect to design a safe structure is like expecting a chef to cook a safe meal: It is at once a high ethical requirement and a very low expectation.

Food and shelter, the raw materials that chefs and architects work with, are absolutely essential to human survival. Because of this, their quality (or lack thereof) rises to an ethical concern that society takes seriously, creating a great umbrella involving testing, codes, inspectors, and the like to protect the public from getting sick or injured. Obviously, anyone involved with things that can save or threaten lives is ethically mandated to uphold these protections. This mandate forms a foundation for professional ethics.

American architects became subject to professional ethics fairly recently, when they formed a regulated profession in the twentieth century. A well-defined branch of applied moral philosophy, professional ethics pertains to all professionals, including doctors, lawyers, and engineers.

But just as with chefs, the core, defining work of architects—the work that differentiates them from all the other contributors to the safety of the built environment—goes beyond ethics and into aesthetics. And just as there are many sources for a safe snack, many kinds of people (and even computers) can make a building firm, but it takes an architect to make one commodious and delightful.

Currently the legal authority of architects rests with their licensure and their parallel commitment to professional ethics. But what if the raw, primal power of aesthetics could trump that of ethics? If so, aesthetics may be the key to unlocking the real authority of architects, and therefore of architecture, to shape society.

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AESTHETICS

Aesthetics is the mother of ethics.

Joseph Brodsky, 1987 Nobel Laureate

"Aesthetics" is not what it used to be: the term has undergone some renovations. Around the mid-nineteenth century, the word became most closely associated with ideas of beauty or taste. But this recent definition constitutes a detour away from its more enduring and ancient foundations in basic notions of perception—with etymological connotations of sensing as well as understanding:

> Greek: *aesthethikos*—pertaining to sense perception, from *aistheta*, perceptible things, from *aisthenasthai / aesthesis*, to perceive. Latin: *percipere*, to seize wholly, to see all the way through; *per*, thoroughly + *capere*, to seize.

The philosopher Immanuel Kant saw the detour coming and railed against a corruption of this word that would rob our language of a useful conceptual tool:

> At the foundation of this term lies the disappointed hope…of subjecting the criticism of the beautiful to principles of reason, and so of elevating its rules into a science…. It is advisable to give up the use of the term as designating the critique of taste, and to apply it solely to that doctrine, which is true science—the science of the laws of sensibility—and thus come nearer to the language and the sense of the ancients.

The trendy definition may have had its run, but the concept of "sensory knowledge" is too helpful to architecture's current predicament to keep it buried. It's time to reconnect the modern definition to the timeless one.

Under its timeless definition, aesthetics is a most capacious term—encompassing the perception of all material things by all living senses: the earthy warmth of fresh milk and the repulsive acridness when it spoils. An aesthetic experience, then, is simply a perceptible one, just as a medical anesthetic renders us unable to perceive. To study or to master such a fundamentally human kind of knowledge is to connect to the essence of life in a way that ethics never can.

Nobel Laureate in Literature Joseph Brodsky remarks, "The tender babe who cries and rejects the stranger…does so instinctively, making an aesthetic choice, not a moral one." In other words, aesthetic knowledge comes first, long before moral knowledge.

> An aesthetic instinct develops in man rather rapidly, for, even without fully realizing who he is and what he actually requires, a person instinctively knows what he doesn't like and what doesn't suit him. In an anthropological respect, let me reiterate, a human being is an aesthetic creature before he is an ethical one.

Aesthetics describes the first contact with reality, whether at the beginning of each day or at the beginning of life itself. Morality, in contrast, evolves as part of the culture utilizing it.

ETHICS AND MORALITY

Under their largely uncontested definitions, ethics and morality are fairly circumscribed terms—dealing with the shared values and duties developed by and describing a particular group of people, and etymologically connoting customs, manners, or habits:

> Latin: *ethicus*, Greek: *ethikos*—ethos, character; (pl.) manners.
> Latin: *moralis*, concerned with ethics, moral; *mor-*, *mos*, custom; (pl.) *mores*, habits, morals. Classical Latin *moralis* was formed by Cicero (*De Fato* ii. i) as a rendering of ancient Greek *ethikos* (*mores* being the accepted Latin equivalent of *ethe*).

Whether a person's action is right or wrong, therefore, highly depends on what the ethos of that person's group requires. For example, it would be quite wrong for members of a local street gang to try to cut a person open with sharp knives, unless, of course, those same folks were the nurses and doctors on a surgical team. The societal group called doctors is defined by its devotion to medical ethics and the ethical goal of health; the street gang has other goals.

Doctors, as we know, form a self-selected subset of a larger group called professionals. People who devote themselves to professional ethical duties (shorthand: "pro" ethics) are, by definition, professionals. But professionals are also a self-selected subcategory of a larger social group of ordinary citizens with their own set of ordinary ethics (shorthand: "joe" ethics), things like being honest, kind, or fair. Even membership in this subgroup is elective, though. Folks who eschew these neighborly values, sticking to the bare legal minimums for behavior (shorthand: "schmoe" ethics) belong to an even larger group best defined, perhaps, as the unimprisoned.

With all this talk of ethical options, it is interesting to note that deciding between being a pro, joe, or schmoe, or a member of any other identifying group actually requires an aesthetic choice. People choose to pursue the kind of life that appeals to them, the one that follows their aesthetic vision for themselves; nobody *must* grow up to be a doctor, after all. Only once that meta-choice is made must future ethical choices follow the value system of the group in order to ensure that the life pursued will actually be led.

"Aesthetics is the mother of ethics," according to Brodsky, which of course makes ethics the offspring of aesthetics. Aesthetics deals with physical truths while ethics deals with social constructs dependent upon them. Sense follows sensibility. As architect Peter Zumthor states, "We all experience architecture before we have even heard the word." If so, then aesthetics provides the foundation to ethics, not the reverse.

PROFESSIONAL ETHICS

Though professional ethics may not fully describe the ultimate aesthetic obligations of architects, it's worth sorting through the complex web of obligations it does describe. All licensed professions share at least four common characteristics. They apply (i) technical knowledge, nurtured by (ii) collegial organizations, to advance (iii) ethical public values, through (iv) client service. Each one of these four brings with it its own universe of moral duties to perform or moral virtues to cultivate.

An ethical public value (iii) provides the primary defining justification for establishing a regulated profession. This goal, such as safety for engineers, health for doctors, or justice for lawyers must be so crucial to humanity's survival that it rises to the high level of an ethical value. And it follows that the highest ethical priority professionals have is to serve the public, above serving their discipline, colleagues, or even clients. The sociologist Talcott Parsons put it well in discussing lawyers:

> [Their] function in relation to clients is by no means only to "give them what they want" but often to resist their pressures and get them to realize…what the law will permit them to do. In this sense, then, the lawyer stands as a kind of buffer between the illegitimate desires of clients and the social interest. Here he "represents" the law rather than the client.

And the public is not limited to the paying public. Medicine and law, in fact, require pro bono services to those who cannot pay, because to deny someone access to a hospital or a fair trial would be to deny someone a fundamental human right. Obviously, it requires the exercise of certain human virtues to maintain this principled stance: philanthropism, humanitas, Samaritanism, and transcendency, to name a few.

Client service (iv) is one of the four cornerstones of a profession because professionals achieve their general moral goals iteratively and incrementally, through many specific client cases. Theirs is an applied science: neither basic laboratory research nor overarching political policy. This endows the relationship between professionals and clients with the utmost societal importance and with crucial ethical dimensions. Furthermore, due to the imbalance of technical knowledge in the relationship, the situation is ripe for exploitation and must be counterbalanced. Professionals, therefore, must cherish this special relationship and must always prefer their clients' interests above their own. In doing so, they may call on such moral virtues as selflessness, trustworthiness, fidelity, and discretion.

It may seem strange to have ethical obligations toward a nonhuman abstraction. But professionals must respect technical knowledge (i) just as they might look after an important tool, like a sharp knife. If the tools do not perform, neither can the professionals using them perform their obligatory societal role. In fact, states cede power to professions to self-govern because neither the state nor any other entity is more expert than the professionals themselves to evaluate their own standards. So, a profession that does not maintain high technical standards can simply decline until it disappears or until it becomes regulated by outsiders, as occurred with accountants in the wake of the Enron scandals. In a rapidly evolving global culture, everyone must continually expand the boundaries of their knowledge even to stay current—a minimum standard for professionals. Just to stay ahead of lay knowledge can, therefore, be a Herculean task, requiring access to virtues such as inquisitiveness, disinterestedness, rigor, and diligence.

Stranger still, perhaps, are ethical obligations toward the self, which may initially appear selfish, a decidedly unvirtuous quality. But if the ethical goals of a profession are to thrive, so must the profession itself. A profession is therefore ethically obliged to ensure its own survival. In a strong collegial organization (ii), each member contributes to the unified voice of the profession's ethos and must be respected and nurtured. This is especially true for those who are most vulnerable: the aspiring professionals who quite literally represent the future of any profession. This self-referential focus performs another important function in upholding professional ethics. For example, the unanimity with which doctors in California adhered to their own ethical code led to the indefinite postponement, in 2006, of the practice of lethal injection. If a single doctor had broken this collegial bond, the profession would have remained ineffectual on this matter. To come together, sometimes against corrosive exterior forces, may involve ethical virtues such as empathy, nurturing, kinship, and protectiveness.

ETHICS OF AESTHETICS

Though complicated and with competing duties that often seem impossible to balance, professional ethics is not particularly controversial; there is widespread agreement on the specifics of its four cornerstones and on the general notion that professions entail ethics in the first place. In contrast, there is very little agreement on the general question of whether aesthetics entails ethics or on the specifics of how that might work.

And since architecture derives its identity through the artistic treatment of the medium of shelter, it is worth exploring whether this component of the work involves ethics. Over the millennia, many philosophers have investigated the moral purpose of art in search of an ethical justification for all the aesthetic activities (visual, musical, culinary) that humans just cannot seem to resist. Here is a brief sampling of the mixed results.

Human beings require an expressive outlet, goes one argument. As sports provide physical release for our animal energies, without the emotive outlet of the arts, our species descends into instability. This theory seeks moral authority for the arts based on its role in maintaining a civilized society, but many, including Plato himself, take issue with whether self-indulgent expression rechannels or actually cultivates depravity.

Many argue that art's moral purpose is to edify. Art improves us, they claim, makes us more morally virtuous—often through the empathy we feel with artists or their subjects. But counterclaims point out that interpretations of artistic works vary uncontrollably from person to person. In fact, lessons that are intentionally planned and obvious to anyone verge on the pedantic or the doctrinaire—hardly the province of art.

The Mithraditic approach to art's moral purpose may be among the most creative. King Mithradates VI ruled Pontus (modern-day Turkey) in the first century BC and took small doses of poison starting in childhood so that he could not be secretly poisoned by his enemies. Art, by analogy, provides life experience by proxy—protecting us, in small, harmless doses, from the otherwise overwhelming dimensions of life. This might provide a moral justification for art, though it does not take into account life's unusual twists and turns. In fact, the king's plan hit a major snag when, under threat of capture by Rome, he could not commit suicide by the usual, more gentle means of poison and had to command his servant to stab him to death.

Problems seem inherent to every known attempt to justify art in moral terms. Some maintain, therefore, that it is the very resistance to, or transcendence of, morality that defines the artistic endeavor. In other words, they see art as a meta-ethical thing: beyond or outside ethical consideration, ethically inert like a potato or a pebble.

This would imply that art can be neither moral nor immoral. It can neither uphold nor subvert any particular morality. Under this theory art is amoral: simply nonmoral. This is the theory that Henry Cobb, the world-renowned architect and regrettably less-renowned ethicist, espoused in a 1995 essay:

> How do principles of human duty relate or apply to works of art? We can go a long way toward answering this question by referring to an aphorism of the poet-philosopher Paul Valéry, who wrote: "We recognize a work of art by the fact that no idea it inspires in us, no mode of behavior it suggests we adopt, could exhaust or dispose of it." This statement seems to me precisely correct. And though its eloquence be sacrificed, I think its meaning is not lost when we rephrase it as follows: a work of art always transcends those principles of human duty which it may embody or to which it refer. Thus the work of art is alone among human productions in being privileged, indeed obligated, to escape the rule of human duty. Hence we can say that the only absolute duty imposed on a work of art is that of being undutiful.

The duty to have no duty, though a contradiction of logic, is an evocative description of the amorality of art and could certainly apply to the aesthetic aspect of what architects do.

ETHICS OF ARCHITECTURAL AESTHETICS

Though most moral philosophers investigate aesthetics through the general category of the fine arts, occasionally someone tackles the particular aesthetic case of architecture head-on. In a 2000 essay, philosopher and planner Nigel Taylor explores a few possibilities for understanding the aesthetic content of buildings through ethical means. He takes on three familiar historical arguments that ascribed moral imperatives to design choices: arguments for "honesty," for a certain superior style, and for following the "spirit of the age." He finds each one lacking ethical force.

Modernists and Gothicists alike argued for aesthetic honesty, for revealing structure, for being true to materials, and so on. But Taylor finds that this theory's own proponents espoused so many exceptions to their ethos that it falls apart into incoherence. Moreover, he points out, sometimes we prefer the aesthetic deceit, the elaborate ceiling shape that accommodates the old ductwork, such that ethical honesty would actually be the lesser choice.

Proponents of architectural styles often assert their moral superiority. For the Gothicists, the argument was both religious and moral, an ethical responsibility to mimic the glory of Nature. The evocation of Mother Nature was meant to add finality to the discussion. Taylor sees, however, that even the original choice to elevate nature is actually not a moral one as claimed but an aesthetic one, a fact that he says becomes clear as soon as anyone forms a similar attraction to a straight line or right angle.

The spirit of the age or Zeitgeist argument, favored by Modernists, disintegrates as well, according to Taylor. He questions the premise that we can ever successfully identify a distinctive technology or culture that characterizes a particular historical period. Then he questions the conclusion that we should necessarily design to express that distinctive technology or culture should we find it. If, for example, in our rapidly changing multicultural world, Nazi culture were somehow to become completely pervasive, it should obviously be resisted, he explains.

Taylor thus obliterates many of the best architects' attempts to bring ethics into their aesthetic choices. He also points out that buildings themselves are ultimately amoral, ethically inert artifacts, and that only people can be said to be moral or immoral.

We may find, for example, that an ancient Greek temple seems morally depraved if we discover that it hosted human sacrifice, but that would be misdirecting the blame from the people to the place, and probably would not prevent us from finding it aesthetically excellent anyway.

AESTHETIC ATTENTIVENESS

Though buildings may not embody the ethical principles of their creators or occupants, Taylor concludes that we can still detect something significant in these built artifacts: thoughtful design work, or what he calls "aesthetic attentiveness." He asks us to

> Imagine a building, which we find aesthetically displeasing, and where this displeasure arises in large part because all kinds of features and details in the building appear to have been thrown together carelessly, without any thought or sensitivity. Imagine, too, that part of our displeasure arises because the building as a whole appears as if it has just been "plonked" down on its site without any apparent consideration of how it fits on the site or relates to its surroundings. Such a building might literally offend us aesthetically, but, more than that, part of our offence might be ethical. Thus we might reasonably be angered or outraged, not just by the look of the thing, but also by the visible evidence that the person who designed it didn't show sufficient care about the aesthetic impact of his building. And this moral objection would be supported by the fact that buildings, unlike (say) paintings or books, are things we are compelled to look at, for architecture (unlike painting and literature) is necessarily a public art. Consequently, any lack of care given to the design of a building is also, in effect, a lack of care shown to the public.

Architecture serves, then, as a fossil of sorts, preserving in stone, wood, and steel, if not ethics generally, at least a work ethic. The designer's work ethic, Taylor implies, must take into account how the dimensions of architecture cut across so many scales of aesthetic human experience: affecting our individual senses at the personal scale of the detail as well as our social senses at the public scale of the city.

John Ruskin also seems to have wished that design at least demonstrate some effort:

> [T]here is not a building that I know of, lately raised, wherein it is not sufficiently evident that neither the architect nor builder has done his best.… Ours has constantly the look of money's worth, of a stopping short wherever and whenever we can, of a lazy compliance with low conditions.…

And so does Peter Zumthor offer a similar complaint about how little is required of his design efforts and a belief that he must transcend those low demands:

> Our clients are of the opinion that the careful way in which we treat our materials, the way we develop the joints and transitions from one element of the building to the other, and the precision of detail to which we aspire are all too elaborate. They want us to use more common components and constructions, they do not want us to make such high demands on the craftsmen and technicians who are collaborating with us: they want us to build more cheaply.… When I think of the air of quality that the building could eventually emanate on its appointed site in five years or five decades, when I consider that to the people who will encounter it, the only thing that will count is what they see, that which was finally constructed, I do not find it so hard to put up a resistance to our clients' wishes.

Moreover, according to Leon Batista Alberti, when architects put aesthetics first, it ensures the longevity and influence of their structures long after the designing is done:

> Thus I might be so bold as to state: No other means is as effective in protecting a work from damage and human injury as is dignity and grace of form. All care, all diligence, all financial consideration must be directed to ensuring that what is built is useful, commodious, yes—but also embellished and wholly graceful, so that anyone seeing it would not feel that the expense might have been invested better elsewhere.

Yet all these pleas for aesthetic excellence in the art of architecture in no way diminish ethical responsibilities to the underlying science of safe shelter. Confusing the two, however, has presented obstacles to the practice of architecture.

ART VS. SCIENCE IN ARCHITECTURE

Good building involves engineering and therefore relies on the science of physics, just as law relies on logic and medicine relies on biology. But the art of building, like the art of cuisine, brings so much more to the table than science that it is not quite parallel to those engineering, legal, and medical counterparts. Since modern professions are scientifically based, the professionalization of architecture does not fully encompass or describe the practice of architecture.

Not so long ago, many of the finest minds in architecture made this argument in an attempt to actually prevent architecture from becoming a regulated profession. During the late nineteenth century, a group of prominent British architects led by Richard Norman Shaw fought desperately against professional regulation, predicting that it would "kill" architecture. They observed that because the science of shelter is different from the art of architecture, the former can therefore be regulated and the latter cannot.

The Brits never disputed that the scientific aspects of building (sanitation, safety, durability) could be professionalized, because those things can be taught, tested, and objectively evaluated. They believed that building inspectors, engineers, and codes (increasingly, we can include software) do and should take charge of these technical issues.

But regulation of architecture as a whole, they claimed, would imply that its subjective, artistic aspects are as objective as its scientific aspects. Licensure would confuse and deceive an unwitting public, a lay public, into equating licensed "architects" with legitimate architects. The result, they predicted, would be an inadvertent degradation of the built environment.

In the hundred years that followed, of course, the opposite view seems to have prevailed. At its founding in 1857, the American Institute of Architects, just like their British colleagues, did recognize and promote a distinct field they called "architectural science." Moreover, the language of state regulations falls (as it must) squarely in the sciences, relying on the "health, safety, and welfare" justification for protecting monopoly privileges to practice. However, when their campaign for professional regulation began, somehow that important semantic clarification got lost, and it is "architecture" generally, rather than "architectural science" specifically, that states now regulate. The first American state to regulate architecture was Illinois in 1897; the last states were quite recent—Vermont and Wyoming in 1951—well within the lifetimes of many current practitioners.

This long-fought regulatory victory has coincided with some mixed trends. The science of building has advanced. Net zero-energy facilities, the Burj Dubai, and better protection than ever from natural disasters testify to remarkable innovations. Yet the art of building has retreated, in the sense that since architectural regulation the built environment has not seen a corresponding aesthetic improvement—quite the contrary, perhaps. The fact that clients are hiring "architects" and not always getting architecture out of them could indeed, as the Brits predicted, point to some confusion about what architects add to a project beyond safe construction.

CONCLUSION: THE CHEF ARCHITECT

In contrast, there does not seem to be much confusion about the role of chefs in society. Nobody chooses a restaurant, or even just a recipe, based on whether the meal will be safe. Fortunately, in modern societies, science and ethics make food safety virtually a given. This allows chefs to move beyond the science, beyond the merely ethical and the merely edible, and on to the aesthetically engaging.

Similarly, no chef would try to attract diners by drawing attention to the safety of their meals. Even though the issue is crucial—life and death—to dwell on it is to highlight the danger and not the joy: to court business with fear rather than with aromas from the kitchen. Scaring customers about the hazards of cuisine also runs the risk of scaring off customers altogether, sending them scrambling for their own kitchens and backyard vegetable gardens.

A fear-based approach also runs the risk of perpetuating a lie about what chefs do. If diners thought that all chefs do is help prevent food poisoning, why would customers value or pay for their other talents? While government regulators have an ethical obligation to make sure that chefs produce cuisine as safe as a Twinkie, if chefs had to deliver cuisine for the same price as a Twinkie, they just might start to feel overworked and undervalued. And legally forcing the public into hiring a chef, when all they need is a factory-sealed pastry, is surely a recipe for dissatisfaction.

However, with safety issues ethically handled back in the pantry, chefs are liberated to unleash their creativity out in the kitchen. They celebrate the aesthetic essence of what they do, the exploration of all the senses that are involved with eating. At their best, they study and understand what we humans can perceive with our taste buds, and they use that knowledge to help us experience an enhanced existence, so that when we sit down at the table, the food that we need to sustain our bodies does that plus much more: It helps us live our lives better than we knew we could.

As with safe food, there are many actors that contribute to the ethical project of building safe shelter: building officials, licensing agencies, examiners, materials testers, engineers, contractors, lawyers, and the like. Rather than argue that architects have something unusually valuable to contribute in this arena, architects, like chefs, should seek their niche with aesthetics—in the timeless sense not merely of beauty but also of profoundly understanding how humans interact with their surroundings. Ironically it is in this completely ungovernable, amoral arena of pure design, where nobody else is legally kept out, that they should find almost no competition for what they do best. Aesthetics is the value architects add, better than anyone else, to safe shelter.

If architects could just channel their inner chefs, they could better celebrate and promote the essence of their work: going beyond just the science of shelter to the art of inhabitation. Where ethics is transactional, aesthetics is sensory; and where ethics involves obligation, aesthetics involves instinct. Architecture, therefore, as the mother art, with a scale larger than most any other art, has the raw, instinctual power to move people, to direct culture and society more than any moral code ever could—to inspire rather than regulate us toward lives better lived. Architects need only honestly and unabashedly embrace design and devote their efforts to aesthetic attentiveness to assume their natural authority.

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CHAPTER 2

Diversity and Demographics

2.1 Diversity and Practice Management

Craig D. VanDevere, AIA, NOMA

In the twenty-first century, everyone from firm leaders on down must learn to understand, as a fundamental principle, how the cultures, traits, values, and experiences of a diverse workforce can contribute toward maintaining a successful business and a competitive edge.

Ultimately, America's answer to the intolerant man is diversity, the very diversity which our heritage of religious freedom has inspired.

—Robert F. Kennedy

THE BENEFITS OF DIVERSITY AND INCLUSION

Historically, the architecture profession has engendered a great deal of respect from the general public. In large part, this is due to the role of architects as creative thinkers and thought leaders. However, the profession's lack of ability to develop a workforce that is reflective of the general population in the United States has the potential to create a significant drag on the image of the profession and its ability to lead in the twenty-first century.

It is important to remember that the demographics of the United States are changing quickly. In 2012, the number of nonwhite births outnumbered white births for the first time in the United States. It is predicted that by 2050, the majority of U.S. citizens will be nonwhite. Businesses, including architecture, have become more global, meaning interactions with people from other cultures are now commonplace. With the advent of Building Information Modeling (BIM) and integrated delivery systems, design and construction is becoming more of a collaborative process. As a business

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strategy, having a diverse workforce and mastering the ability to work with many different kinds of people will become essential. In order to succeed, the profession and how architecture is practiced must become more flexible, scalable, relevant, and business savvy.

Definitions in Practice

- *Diversity*: A commitment to recognize, encourage, and appreciate a variety of characteristics, including but not limited to race, ethnicity, gender, national origin, religion, physical ability, age, sexual orientation, and economic background.
- *Inclusion*: The intentional act of being open, reaching out, removing barriers, and creating an environment in which all members of an organization can achieve their fullest potential.
- *Business case*: Benefits to a business entity—in this case, an architecture firm—to be gained by initiating and accomplishing diversity and inclusion in its workforce.
- *Culture*: The values and practices of a society or a group of people who interact together over time. Cultural values are used to synthesize, interpret, and experience the various events of daily life and can be defined as a shared basis for social interaction. This helps formulate worldviews as well as the perception of wrong from right. Varied worldviews and cultural perspectives can bring richness and creativity to an organization's culture.

► See the backgrounder accompanying this article, Forging a Diverse Culture: The Shepley Bulfinch Experience, for a case study of a firm that transformed its homogeneous, hierarchical environment to one of diversity and collaboration.

Increase Employee Engagement

Diversity fosters creativity. We need to generate the best ideas from our people in all levels of the company and incorporate them into our business practices.

—Frédéric Rozé, chief executive officer, L'Oréal USA

It is widely known that when companies embrace diversity and inclusion in their firms, employees feel energized. They are encouraged to believe in themselves and that what they bring to the firm is valued. Firms benefit through better client relations, higher productivity, and more informed design.

Employees who are empowered and have a sense of their value to the firm will be more willing to take risks, likely resulting in enhanced creativity, leadership, and innovation. A diverse employee base provides for a large pool of ideas reflecting different views and values.

Increase Creativity

Architectural design has its roots in asking questions in order to identify and provide a solution to meet the particular needs of clients and users. However, this process is really only as good as a firm's aggregate ability to ask provocative questions and synthesize information. Employees from varied backgrounds and experiences help improve a firm's ability to respond to clients' needs with creativity and sensitivity. Diversity can bring a variety of ideas and viewpoints to an organization and be especially important when creative problem solving is required.

Match Demographics of Clients

The lack of diversity may affect a firm's ability to appear fully capable to meet the needs of increasingly diverse clients. Institutional, governmental, and nonprofit clients are likely to be represented by a very diverse group of people. Architecture firms can look at diversity and inclusion as an opportunity to increase client service. Increased diversity leads to a boost in ideas, the ability to understand a variety of customer segments, and the ability to expand locally, nationally, and internationally with greater ease.

Facilitate Global Practice

In a global market clients look at firms whose leadership reflects their own staff and clients. Firms that demonstrate a multicultural environment to global clients are likely

MAKING DIFFERENCES MATTER

By Rena M. Klein, FAIA

According to an article by David Thomas and Robin Ely, "Making Differences Matter: A New Paradigm for Managing Diversity" (*Harvard Business Review*, 1998), the benefits of diversity to any business depend on its organizational culture and management approach.

TRADITIONAL APPROACHES

Best ethical practices, as defined by the AIA, require fairness in hiring and promotion. Clearly, it is beneficial to a firm to be perceived as responsible and unbiased. The *AIA Code of Ethics and Professional Conduct* states, in Rule 1.401, "Members shall not discriminate in their professional activities on the basis of race, religion, gender, national origin, age, disability, or sexual orientation."

Thomas and Ely name this the *Discrimination and Fairness* paradigm of workforce diversity. The emphasis is on quantity, counting employment statistics as evidence of equitable practices. While this may serve to increase the number of minorities and women employed, it minimizes the creative possibilities diversity can bring.

On the other side of the coin is the conventional business case for diversity—accessing new markets. This paradigm, called *Access and Legitimacy* by the researchers, emphasizes minority group identity as a business strategy. Organizations regularly hire minority employees in the hope of gaining increased access to new segments of the market, accompanied by expanded expertise and profitability. While this may be an effective strategy at times, the minority employees often feel pigeonholed at best and at worst, exploited.

A NEW MODEL

Thomas and Ely suggest the benefits of diversity to a business can be much greater than ethical practice or market access. These benefits include increased creativity, organizational flexibility, capacity to see issues from many perspectives, and ability to deal successfully with the challenges of change. Organizations that benefit most from a diverse workforce exhibit management structures that are egalitarian, fostering staff empowerment, continuous learning, and openness to different points of view. Egalitarian management is especially critical in architecture firms, where the main asset is an innovative staff, and the main objective of management is to increase both productivity and creativity.

Because architecture firms depend on the innovation and expertise of their professional staff, flexibility and empowerment prove to be critical factors in increasing productivity. Not surprisingly, flexibility and empowerment are qualities that also promote diversity and the creative potential it brings. This means productivity and diversity go hand in hand within practice management structures capable of encouraging both.

According to research by Thomas and Ely, these management practices are inseparable from the culture set in place by the organization's leaders. In order for a diverse workforce to flourish, the leadership must truly welcome differing perspectives and alternative points of view.

to gain the trust of international clients more quickly. Just as sustainability can become central to a firm's socially responsible activities, diversity and inclusion initiatives can become a meaningful aspect of its business strategy.

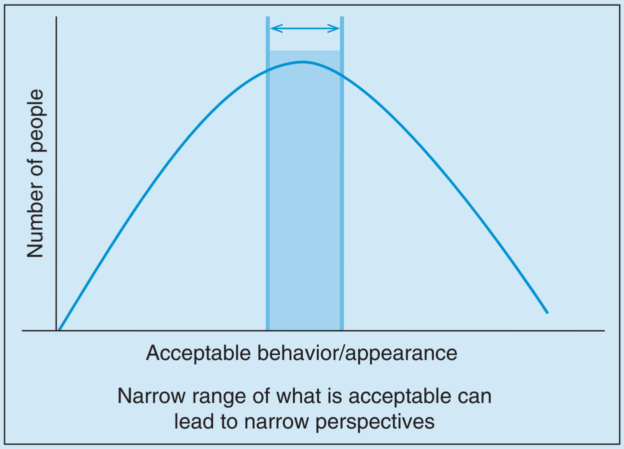
Competitive Advantage in Recruiting

A diverse and inclusive workforce and culture can provide a competitive advantage to a firm in recruiting and retention. With the looming retirement of the Baby Boom generation and the relative small size of the Generation X workforce, the percentage of staff that come from the Millennial generation is expected to increase significantly in the coming decades. Attracting and retaining talented, capable, and tech-savvy Millennials to a firm will become increasingly important to its competitive position, regardless of its size. The Millennials are the most diverse generation in U.S. history and, as a group, reportedly value multiple perspectives and broad tolerance for differences. Firms that value and foster a culture of diversity and inclusion are most likely to attract these talented younger workers. Firms that don't are not likely to keep up in a competitive and ever-changing global marketplace.

THE BELL CURVE OF INCLUSION

By Rena M. Klein, FAIA

In any organization there will be what could be called a "range of acceptable behavior" (Figure 2.1).

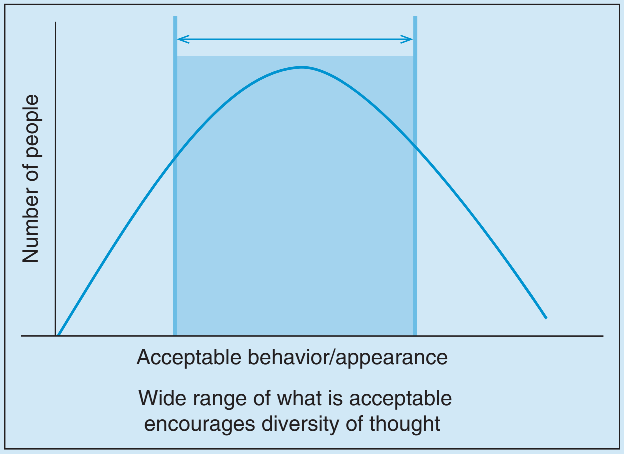


Rena M. Klein, FAIA

FIGURE 2.1 A Narrow Range of What Is Acceptable Can Lead to Narrow Perspectives.

The shaded band represents the range of normal appearance and behavior styles exhibited by the majority of people in an organization. This implicit and established culture is created by the organization's leadership and may be heavily influenced by firm legacy and the culture of an industry, as is the case with architecture. With or without awareness, most firm leaders will perpetuate the narrowness of this acceptable range by always hiring people who "fit in."

Firms that want to benefit from differing perspectives and points of view must widen the range of what is considered to be acceptable behavior and appearance. People who look and act differently may also think differently. If they are welcomed and encouraged, they will bring new ideas and creative perspectives to an organization. For architecture firms, this capacity is critical (Figure 2.2).



Rena M. Klein, FAIA

FIGURE 2.2 Wide Range of What Is Acceptable Encourages Diversity of Thought.

While widening the range of what is acceptable may be challenging, firms that want to succeed in the twenty-first century will have no choice. The next generation of American workers will be significantly more diverse than any that have come before. Having a culture of openness and acceptance will enable firms to attract young talent and retain diverse staff over the long run.

Fortunately, the time has long passed when people liked to regard the United States as some kind of melting pot, taking men and women from every part of the world and converting them into standardized, homogenized Americans. We are, I think, much more mature and wise today. Just as we welcome a world of diversity, so we glory in an America of diversity—an America all the richer for the many different and distinctive strands of which it is woven.

—Hubert H. Humphrey

THE DIVERSITY CHALLENGE

To minimize the challenges of diversity, firm leaders can start by creating a culture that is transparent and fair. A firm where all people are valued and given opportunity to contribute will create an environment of trust. When people trust each other, there can be a norm of mutual respect, even if there is not always agreement or familiarity. With respect comes creative freedom, empowerment, and a sense of responsibility toward one's work.

To foster diversity and inclusion, firm leaders must overcome the powerful human tendency to feel more comfortable when surrounded by people they resemble. This may be especially challenging to leaders of small firms, who work closely on a daily basis with their staff. The inclination to hire and trust people who are similar to oneself, in ethnicity, gender, even age, is almost irresistible. However, lack of diversity and inclusion can create blind spots. Opportunities and risks alike can be missed if everyone thinks alike or comes from similar backgrounds. This can be true of minority or women-owned firms, as well as firms owned by white men. To counter this propensity, firm leaders appreciate, value, and understand differences.

DIVERSITY WITHIN THE AIA

The United States' tumultuous and turbulent past with regard to racial and gender equality set the stage for consideration of diversity and inclusion in the workplace. According to the 1960 U.S. Census, virtually all doctors, attorneys, architects, engineers, executives, and managers were white men. The civil unrest of the sixties provided a catalyst for change.

In 1964, the Civil Rights Act was passed, which made it illegal for the organizations to engage in employment practices that discriminated against employees on the basis of race, color, religion, gender, national origin, age, and disability. In 1965, Executive Order 11246 was passed, requiring all government contractors to take affirmative actions to overcome past patterns of exclusion and discrimination. While these federal mandates plus several others helped to eliminate formal policies that discriminated against various classes of workers, professions and the organizations that represented them were slow to make changes toward a more diverse membership.

At the 1968 AIA National Convention in Portland, Oregon, Whitney M. Young Jr., civil rights activist and Executive Director of the National Urban League, in his keynote speech challenged the AIA membership on the issues of human/civil rights, diversity, and inclusion.

> It took a great deal of skill and creativity and imagination to build the kind of situation we have, and it is going to take skill and imagination and creativity to change it. We are going to have to have people as committed to doing the right thing, to inclusiveness, as we have in the past to exclusiveness.
>
> —*Whitney M. Young (1968)*

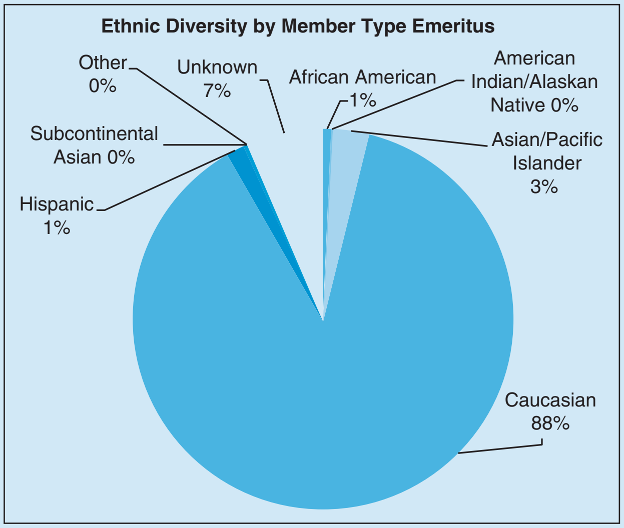
In 2012, 44 years later, it is instructive to understand how the situation has changed and has not changed. Unless otherwise noted, the source of demographic information shown is *The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics.*

In 2012, current emeritus AIA members embody the ethnic makeup of the profession during the second half of the twentieth century (see Figure 2.3).

The ethnic demographics of AIA member architects in 2012, as shown in Figure 2.4, reflect the status quo in the early twenty-first century. It is worth noting that over the past 20 years, the percentage of African American AIA architect members has remained at only 1 percent.

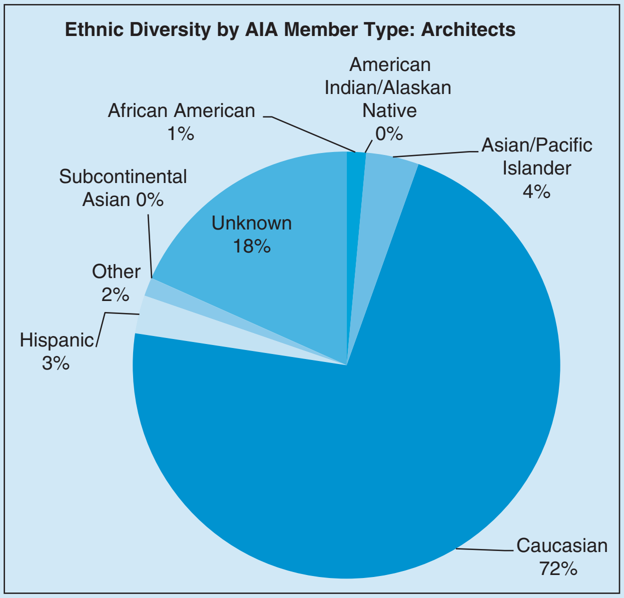
Nevertheless, the 2012 ethnic makeup of associates (see Figure 2.5) portends a future AIA and architectural profession with more non-Caucasian participants.

For women the trend is similar, as Figure 2.6 shows. Only 4 percent of emeritus members are women, while women make up 16 percent of Architect members, and 30 percent of Associates.



The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

FIGURE 2.3 Ethnic Diversity: AIA Emeritus Members



The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

FIGURE 2.4 Ethnic Diversity: AIA Architect Members

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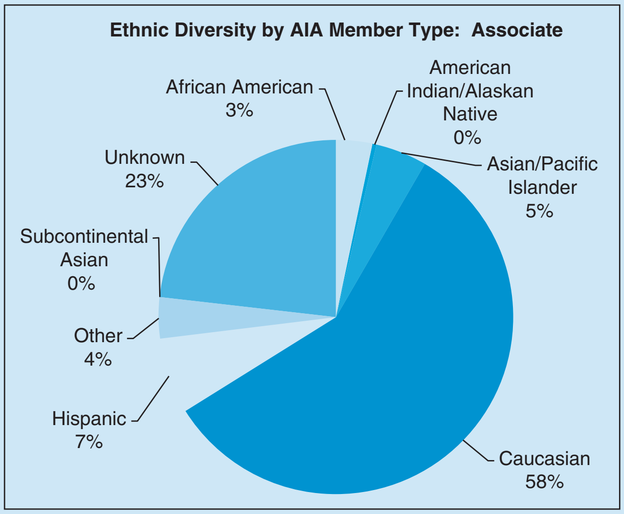
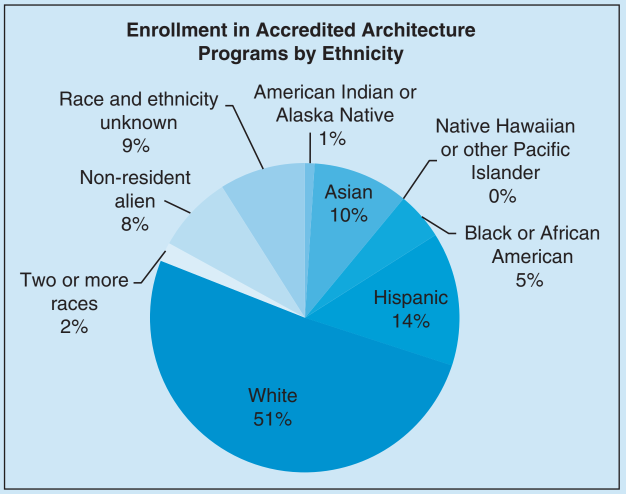


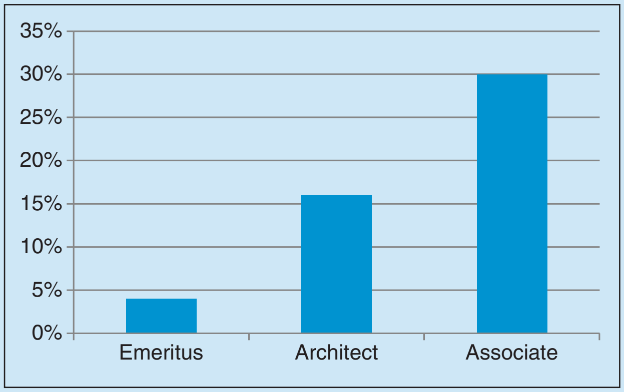
The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

FIGURE 2.5 Ethnic Diversity: AIA Associate Members



NAAB Accreditation Report, 2011

FIGURE 2.7 Enrollment in Accredited Architecture Programs by Ethnicity



The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

FIGURE 2.6 Percentage of Women in AIA Member Categories

At the university level there appears to be evidence of some change, as shown in Figure 2.7. In many architecture programs, women make up 50 percent or more of the students, with the average being about 40 percent. Although gender balance among architecture students has been in place since the mid-1980s, the number of women architect members of the AIA has remained flat at around 16 percent. Judging by the 2012 percentage of minority AIA associate members (30%), minority participation in architecture programs must also be improving. Nevertheless, it clearly still lags behind what is needed to significantly increase ethnic diversity in the profession.

CONCLUSION

A diverse and inclusive workforce is a reflection of a changing world and marketplace. Diversity among clients, especially in the global marketplace, can in itself be a challenge. Diversity and inclusion at all levels brings high value to organizations and promotes the firm's ability to adapt to any situation. In addition, diversity and inclusion will help a firm attract and retain top candidates that can add capacity and competitiveness in the global marketplace.

What follows are two backgrounders that add information and context to the topic of diversity and inclusion:

- *AIA Diversity History Timeline*. Since the early 1990s, the AIA has institutionalized an effort to engage its membership with issues of diversity and inclusion. This brief timeline highlights some of the significant moments in AIA diversity history.
- *Forging a Diverse Culture: The Shepley Bulfinch Experience*. This case study of a diversity-award-winning firm contains practical advice for fostering and implementing a culture of diversity and inclusion.

For More Information

AIA Diversity and Inclusion Initiative: www.aia.org/about/initiatives/AIAS078656.
Beverly Willis Architecture Foundation: http://bwaf.org/
National Organization of Minority Architects: www.noma.net/

BACKGROUNDER

AIA DIVERSITY HISTORY

Marga Rose Hancock, Hon. AIA

In 2011, AIA Diversity and Inclusion commissioned the development and online publication of an AIA Diversity History, excerpted here. What follows is a brief history of activities by AIA directed at study and redress of the underrepresentation of women and racial/ethnic minorities in the profession, with statistical references and participant observations.

Marga Rose Hancock has taken an active role in AIA Diversity initiatives, as a founding member of the AIA Seattle Diversity Roundtable in 1986 and a 1992 appointee to the national Diversity Task Force. In 2011, AIA Diversity and Inclusion commissioned Rose Hancock to develop and publish an online AIA Diversity History.

DIVERSITY IN PROFESSIONAL PRACTICE

Women and people of color have practiced architecture and taken active roles in the profession, but at a rate substantially below their counterparts in other professions. Concern regarding the underrepresentation of these constituencies has engaged AIA leaders: The U.S. civil rights movement of the mid-1960s saw the initiation of policies and programs seeking to address this concern, as detailed in Table 2.2.

Following the Institute's 1857 establishment, in 1888 Louise Blanchard Bethune, FAIA, became the first woman to join the AIA, and in 1923 Paul Revere Williams, FAIA, became the first African American member.

According to U.S. Department of Labor/U.S. Bureau of Labor Statistics (BLS, 2011), compared with law and medicine, architecture lags in the percentage of women and minorities employed in the field (see Table 2.1).

TABLE 2.1 Comparison of Diversity in Architecture to Medicine and Law (2011)

	Percentage of Total Employed			
Occupation	**Women (%)**	**Black/African Americans (%)**	**Asian (%)**	**Hispanic or Latina (%)**
Architects	20.7	1.6	5.5	4.1
Lawyers	31.9	5.3	4.2	3.2
Physicians	33.8	5.3	16.1	6.6

A further comparison: As of May 2012, the BLS also notes, "Fourteen percent of architects and engineers and 34 percent of physicians and surgeons were women, whereas 61 percent of accountants and auditors and 82 percent of elementary and middle school teachers were women."

TABLE 2.2 AIA Diversity Timeline 1968–2011 (excerpted)

1968	In his keynote address to the AIA Convention in Portland, Oregon, Urban League head Whitney M. Young, Jr. challenges the AIA on issues of social responsibility and diversity within the profession: "We are going to have to have people as committed to doing the right thing to inclusiveness as we have in the past to exclusiveness."
1970	AIA/AAF Minority Disadvantaged Scholarship initiated, supporting an average 20 students/year.
1971	Establishment of National Organization of Minority Architects at AIA Convention, Detroit.
1972	AIA presents first Whitney M. Young Award, recognizing "architects and organizations that exemplify the profession's proactive social mandate," to Robert J. Nash, FAIA.
1974	AIA hires Robert T. Coles, FAIA, as Deputy VP for Minority Affairs, to develop "a master plan for minority awareness," and, working with Leon Bridges, FAIA, and Marshall Purnell, FAIA, to establish the AIA Commission on Community Services.
1980	Norma Merrick Sklarek, FAIA, the first African American woman licensed as an architect, becomes the first elevated to the AIA College of Fellows.
1982	Women constitute 3.6% of AIA membership.
1989	"The number of female architects, less than 1,500 in 1970, now approaches 5,000. The number of black architects has grown from about 1,000 to 2,000, remaining at about 2 percent of the total." —Robert Coles, FAIA, "Black Architects: An Endangered Species," *Progressive Architecture* (July 1989)
1992	First meeting of the AIA President's "Task Force on Equal Rights and Proactive Action" in Washington, DC, charged by then AIA President W. Cecil Steward, FAIA, to develop a comprehensive strategic plan to implement the 1991 civil rights policy, for presentation to the AIA Board. Named the Diversity Task Force, this group developed a vision of the AIA in the year 2000 as a multicultural organization.

(continued)

TABLE 2.2 ***(continued)***

1992–93	Susan Maxman, FAIA, serves as the first woman president since AIA's 1857 founding. L. Jane Hastings, FAIA, serves as the first woman chancellor of the AIA College of Fellows.
1994	Diversity Conference I: "Breaking the ICE" (Washington, DC). Keynoter: Charlotte, NC, Mayor Harvey Gantt, FAIA. AIA membership includes 7.3% "all minorities," 10.45% women, 0.99% minority women.
1996–97	Raj Barr-Kumar, FAIA, serves as first AIA president of color.
1996	Diversity Conference III: "Crossing Lines" (Boston, MA). Keynoter: Patricia Carbine, co-founder of *Ms.* Magazine.
1997	Diversity Conference IV: "Beyond the Rainbow" (Seattle, WA), proceeded by "Dancing in Design" National Conference for Women in Architecture organized by Seattle Association for Women in Architecture (AWA). Keynoters: Seattle Mayor Norm Rice, Professor Sharon Sutton, FAIA, and AIA President Ronald Altoon, FAIA.
1998	Diversity Conference V: "Opening Doors," Atlanta, GA. Keynoter: Atlanta Mayor Andrew Young.
2001–02	Gordon Chong, FAIA, serves as first Asian American AIA president.
2005	AIA sponsors study of architecture demographics by Holland & Knight: "Of its members, approximately 2% are Hispanic/Latino, 3% are Asian, and 1% are Black.... As of December 2004, approximately 12% of all of the AIA's architect members are female. The AIA does not collect information on disability or sexual orientation."
2007–08	Marshall Purnell, FAIA, serves as the AIA's first African American president.
2008	First AIA Diversity Plenary "MultiFORMity" in St. Louis brings together individuals representing architecture, other professions, business, academia, associations, and AIA components to identify best practices for implementation by the AIA and its partners in order to move the profession toward a more diverse and inclusive future by improving the recruitment, retention, and promotion of diverse individuals in architecture. The outcome of the plenary, the "Gateway Commitment," leads to the development of a multiyear action plan to address these issues, with a mandate to create a diversity toolkit designed to engage firms on the issue of diversity and inclusion. Leers Weinzapfel Associates selected as first woman-owned firm recipient of the AIA Architecture Firm Award. AIA recognizes Norma Merrick Sklarek, FAIA, as the first woman recipient of the Whitney Young Award. "Only 1.5 percent of America's architects are African American (at a time when the U.S. Census shows that African Americans comprise approximately 12 to 13 percent of the total population)." —Robert Ivy, FAIA, "Room for All Our Talents," *Architectural Record* (May 2008)
2009	Inaugural AIA Women's Leadership Summit, Chicago, IL: "The first national gathering of women who serve as firm principals and in other professional leadership roles drew upon their talents and experiences to describe the issues women face and sought to raise their profile within the profession." Second AIA Diversity Plenary, "Value: The Difference – a Toolkit for Firms." San Francisco plenary brings together AIA Board members, collateral organizations, related organizations, firm representatives, interns, and students to identify tools, resources, and approaches to increase diversity and inclusion within architecture firms. Adoption of the "NOMA/AIA Memorandum of Understanding," and adoption of "AIA Diversity Action Plan, 2009–2013," with strategies to 1) expand the racial/ethnic, gender, and perspective diversity of the design professions to mirror the society we serve; and 2) nurture emerging professionals and influence a preferred future for the internship process and architecture education. "According to the latest figures from the National Architectural Accrediting Board, architecture schools are still dominated by men, though by a decreasing margin. Of all the enrolled and matriculating students of architecture, 59% are men and 41% are women. The gender gap is much wider among faculty, however, with a split of 74% men, 26% women." —Lance Hosey, "Women Rule," *Architect* (December 2009)
2010	AIA hosts Women's Leadership Summit, New York. Diversity Best Practice Awards recognize the contribution of individuals, firms, and AIA component programs to the aim of advancing diversity in architecture.
2011	AIA Women's Leadership Summit, Kansas City

At the local level, many AIA components have initiated and advanced programs to reach out to K–12 youth from underrepresented populations, to support the studies of architecture students at area colleges and universities, and to engage women and ethnic/racial/gender minorities in AIA activity and leadership. Beginning in 2009, AIA Diversity and Inclusion has encouraged and supported such efforts, and also advances in this area by architecture firms, through its Diversity Recognition Program.

As multicultural globalism gains ground, the AIA continues its effort to materialize the social power of architecture and to energize architects from all backgrounds in this manifestation.

For More Information

AIA Diversity Timeline: https://sites.google.com/site/aiadiversityhistory/.

AIA Archives, *Women and Minorities in the AIA*, AIA Historical Directory of American Architects.

Designing for Diversity: Gender, Race, and Ethnicity in the Architectural Profession (U. of Illinois Press, 2002) by Kathryn H. Anthony.

Structural Inequality: Black Architects in the United States (Rowman & Littlefield, 2006) by Victoria Kaplan.

Linda Kiisk, ed., "20 on 20/20 Vision: Perspectives on Diversity and Design" (AIA Diversity Committee and Boston Society of Architects, 2003).

BACKGROUNDER

FORGING A DIVERSE CULTURE: THE SHEPLEY BULFINCH EXPERIENCE

Carole Wedge, FAIA, LEED AP

Carole Wedge is President of Shepley Bulfinch, a national architecture practice. Elected the firm's first woman president in 2004, she has led its cultural transformation and geographic expansion.

Diversity in design and corporate leadership has been central to the transformation of Shepley Bulfinch from a homogeneous, hierarchical environment to one of collaboration and forward momentum.

Our staff today is engaged and empowered, breaking down a permission-driven environment and embracing a culture of inquiry. In physical terms, we have created literal transparency, moving to new workspace with a collaborative model that eliminates offices and, with it, empowering teams and individuals.

MAKING DIVERSITY A PRIORITY

A diverse workplace is like good design: It is a goal reached intentionally through a series of thoughtful, informed decisions, and it is most notable in its absence.

Promoting diversity inherently supports a culture that values differences in opinion and perspective, which in turn supports our strategic goals: A diverse mix of individuals who enrich and broaden the work will advance design and will make us the best firm we can be.

As a business driver, it is important that our demographic mix reflects that of our clients. We consider our ability to listen to our clients and to understand their aspirations as a significant differentiator of a design firm. Creating a high level of comfort—eliminating any sense of the "other"—is vital for our own work environment if we are to convey that to our clients.

The Role of Leadership

What strategies and policies have created a culture of advancement at Shepley Bulfinch that is gender- and color-blind?

It started in a very personal way, as the firm's leaders saw their daughters, who were educated and trained to be intelligent contributors to society, bump up against gender bias. In 1994, the firm made a deliberate, strategic decision to develop opportunities to prepare women for leadership positions in the firm. Our Executive Committee charged the Principal for Personnel with developing a strategic initiative to recruit and advance a more diverse mix of professional staff, to bring a range of new voices, faces, and perspectives to the table. The first director of human resources was appointed that year, and the diversity of the firm today owes much to her efforts over her 15-year tenure.

The Process

While we would like to believe we can have it all, we know better. As a practice whose success rests on the intellectual capital of our staff, it is vital for us to support work-life balance as a priority. To accomplish that, our HR director complemented her ambitious recruitment efforts by working with the Human Resources Committee to establish policies and practices to support, retain, and advance the newly diverse staff. In practice, this has meant policies that make flexibility in support of excellence an integral part of our culture. This included establishing a formal flextime policy; introducing an Employee Assistance Plan; pretax Dependent Care Plan; and providing full benefits for part-time staff.

Flextime has played a particularly important role in the rise of women in leadership: supporting employees' work/family balance, professional development, and opportunities for outreach to underrepresented communities as teachers and mentors. This lets us retain and advance talented staff, whether they are work-study design students, parents of young children, or members of the "sandwich" generation.

Diversity in Practice

The underlying philosophy of our practice is that success and opportunities for advancement come by doing quality work and contributing to a team. At times this has meant working with managers to change their perceptions of how work is done: our HR team monitors this closely and addresses project team issues by facilitating dialogue rather than letting assumptions and prejudgment drive team dynamics. When project schedules or time frames do not align with those of an individual on a flexible schedule, we work to provide flexible assignments that offer alternative opportunities for growth and development.

We have also undertaken staff training on diversity, so that everyone understands which behaviors are acceptable and which are out of bounds, while providing language that helps people communicate directly if a colleague has crossed the line.

Measuring Success by Outcome

Today Shepley Bulfinch is one of few large architecture firms in the United States with a female president, and one of only two so represented on the AIA Large Firm Roundtable. Fifty percent of the firm's staff is female, and 9 of our 18 principals and directors are from groups that are underrepresented in the profession.

We succeed because we model our own success and hold ourselves accountable for promoting diversity both in

(continued)

our firm and in the profession. Based on our own experience, we encourage other firms to take the following steps to provide a diverse workplace:

- *Commitment*: Ensure that leaders of the firm and of project teams are vested in diversity as a goal.
- *Opportunities*: Mentor formally and informally, creating opportunities for success and leadership.
- *Excellence*: Keep merit central to advancement.
- *Resources*: Commit staff/human resources to the program's success.
- *Policies*: Implement and maintain policies that are fair, flexible, and available to everyone.
- *Metrics*: Regularly track progress, monitor disparities, and recalibrate your definition of success.

For More Information

Society for Human Resources Management: www.shrm.org.

The Progress Principle: Using Small Wins to Ignite Joy, Engagement, and Creativity at Work (2011) by Teresa Amabile and Steven Kramer.

Million-Dollar Hire: Build Your Bottom Line, One Employee at a Time (2011) by David P. Jones.

Drive: The Surprising Truth About What Motivates Us (2011) by Daniel Pink.

"From the Ground Up: Growing a Thriving Design Firm," *Design Intelligence* (September/October 2010) by James Follett.

"Three Rs for the New Economy: Reposition, Redevelop, Regenerate," *Design Intelligence* (November/December 2010) by Ernest Hutton, Mark Strauss, and Stephen Whitehouse.

2.2 Demographics of Practice: 2012 AIA Firm Survey

James Chu, MBA

The total number of staff at firms fell significantly between 2008 and 2011. The down economy has also led to a decline of the single-discipline firm, while multidiscipline firms have grown to attain a more diverse portfolio in project types and design specialties offered.

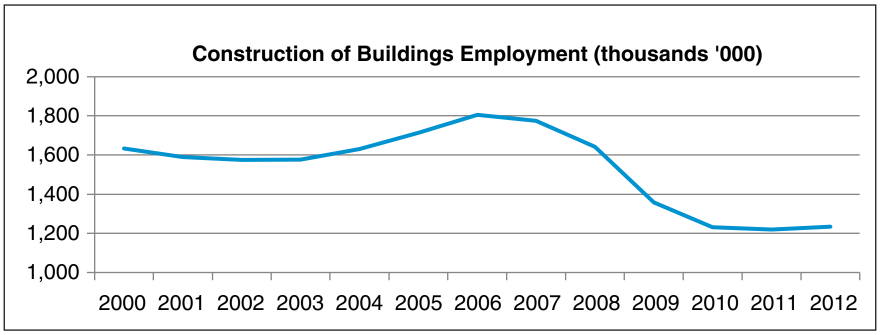
SUMMARY OF FINDINGS

The economic downturn that started around the end of 2007 had tremendous negative ramifications for the construction sector. According to the U.S. Bureau of Labor Statistics (BLS), the construction labor market (Construction of Buildings industry–NAICS Code 236) declined nearly one-third from the height of the building activities (Figure 2.8).

The labor market for the Architectural Services industry (NAICS Code 54131) suffered the same fate, declining nearly 30 percent from the peak in 2008 (Figure 2.9).

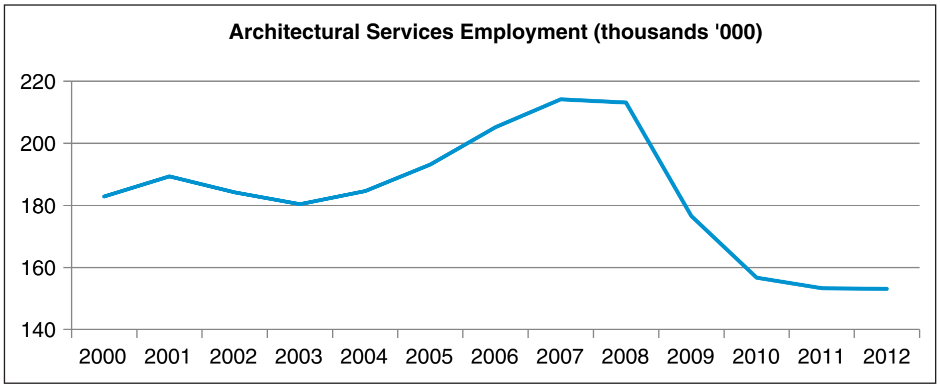
This trend is likely to continue in the short term as instability remains in the global economy. At the time of this writing, the European Union is going through its own financial malaise, while China is showing signs of economic slowdown as well. Hesitation to increase staffing comes with the uncertain economy, and a majority share of the firms reported little gain in the number of staff during 2011. On average, one in five firms reported net loss and 16 percent recounted net gain in full-time staffing at their organizations during 2011.

James Chu joined the AIA in 2005 as the director of research. He has taught and worked in the private and nonprofit sectors in the field of market research. Prior to joining the AIA he was a business consultant representing a state economic development office in Tokyo, Japan.



U.S. Bureau of Labor Statistics

FIGURE 2.8 U.S. Construction of Buildings Employment



U.S. Bureau of Labor Statistics

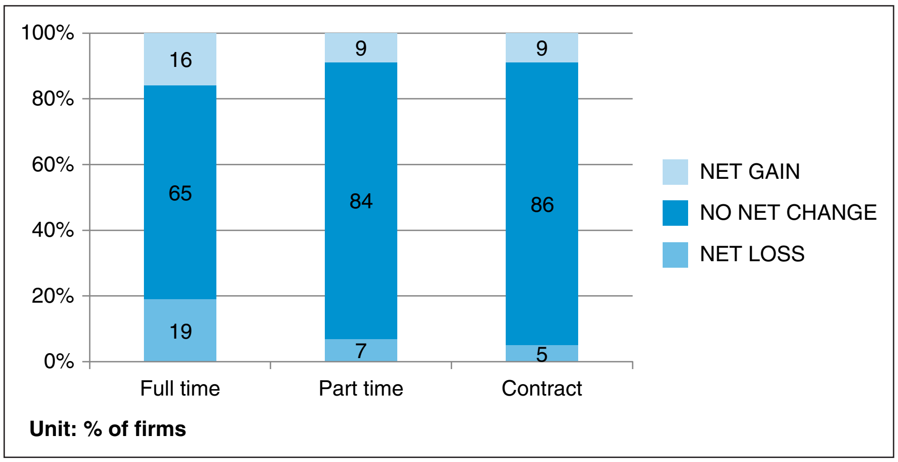
FIGURE 2.9 U.S. Architectural Services Employment

The larger the firm, the greater the variation in the share of staff gained and lost:

- *Firms with fewer than 10 employees*: 75 percent reported there was no change to their full-time staff, while only 10 percent reported gains.
- *Firms with 10 to 49 employees*: 37 percent reported gains, while 32 percent reported loss of full-time staff.
- *Firms with over 50 employees*: 50 percent reported net gains, while slightly over one-third of firms reported a net loss of full-time staffing.

The sluggish economy led to a significantly lower number of hires for contract and part-time employees. Only one in ten firms reported a net gain for contract and part-time employees in 2011 (Figure 2.10).

▶ See Navigating Economic Cycles (7.1) for the AIA 2012 survey findings on the distribution of firms by size.



The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

FIGURE 2.10 Two-thirds of Firms Had No Change in Full-Time Staff in 2011.

PART 1: THE PROFESSION

STAFF AT ARCHITECTURE FIRMS

Nearly 40 Percent of Staff at Firms Are Licensed Architects

▶ Diversity and Practice Management (2.1) includes findings on the demographics of AIA members.

The economic downturn has had a major impact on the size of the architecture industry. On average, the number of staff at architecture firms has declined from about 10 in 2008 to 8 in 2011. Of those two employees lost, on average, one was from the non-design staff and one from the design staff. The loss from the design staff was primarily from nonlicensed architecture personnel.

Overall, almost two in five employees at architecture firms are licensed architects with another 16 percent of staff comprising interns on the path to licensure (Figure 2.11).

An additional 13 percent of staff is nonlicensed architecture staff that is not on the path to licensure. In general, the share of non-architecture staff, which might include engineers, interior designers, and landscape architects, increases with firm size.

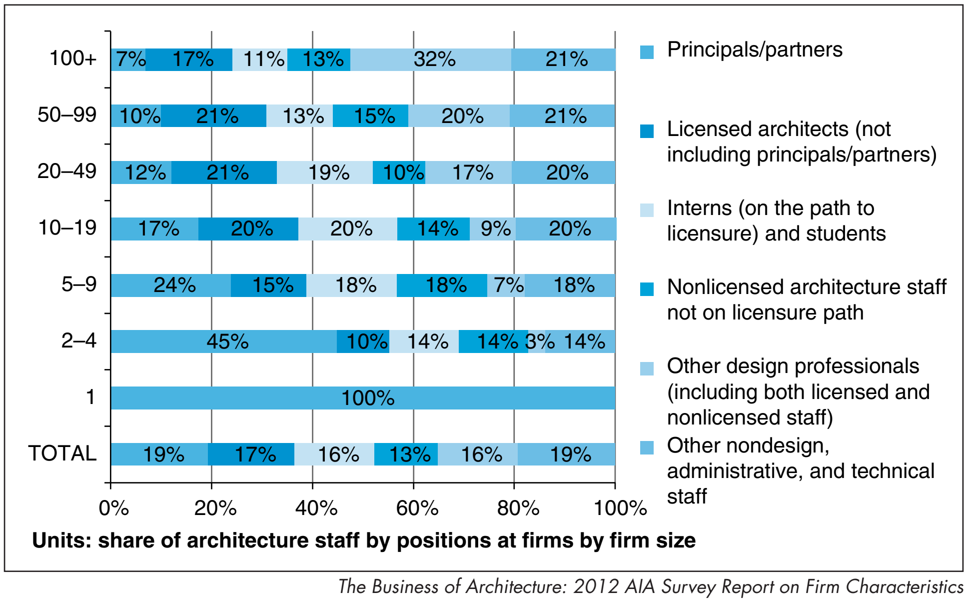
Finally, approximately 20 percent of workers at firms are non-design staff, which includes professionals such as accountants, marketers, information technology, and human resources managers.

Most Firms Use Engineering Consultants

Since the majority of architecture firms are small or midsize businesses, they rely heavily on consultants and part-time staff to provide flexibility.

The 2012 firm survey found that 85 percent of firms regularly hired engineers as consultants in the past three years, by far the most hired group of professionals. However, while firms with 100 or more employees are more likely to have engineers on staff, four in five still use engineer consultants to supplement staff. Approximately three-quarters of firms with 10 to 99 employees use landscape architect consultants, compared to slightly over one-third of firms with 1 to 4 employees. The share of firms that regularly use interior design consultants has increased, on average, 3 percentage points since 2005 and nearly 10 percentage points since 2002.

The types of consultants that firms use also tends to vary by firm specialization. Mechanical, electrical, and plumbing (MEP) engineers are hired as consultants more



The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

FIGURE 2.11 The Share of Non-architect Staff Typically Increases with Firm Size.

TABLE 2.3 The Largest Share of Firms Use MEP and CS Engineers as Outside Consultants

	Total (%)	Residential (%)	Commercial/ Industrial (%)	Institutional (%)
MEP engineers	85	74	93	92
CS engineers	78	81	76	78
Landscape architects	56	50	52	65
Interior designers	31	35	33	29
Sustainability consultants	20	17	17	24
Spec writers	17	13	19	20
Planners	6	4	4	9
Other specialty consultants	27	18	28	35

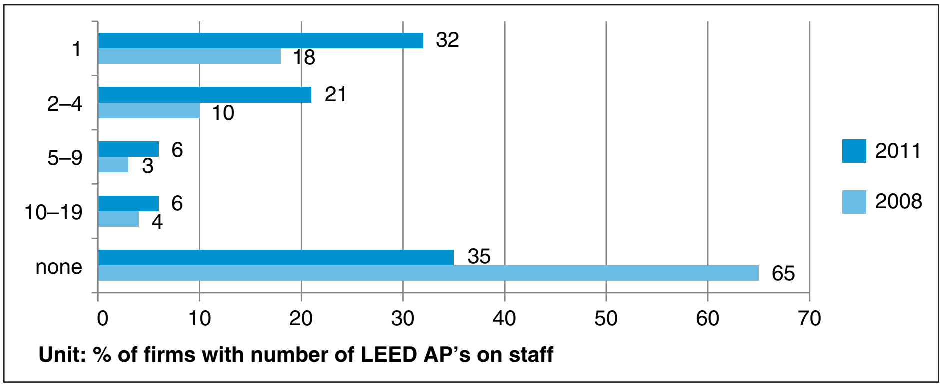
Units: use of outside consultant in last three years, % of firms by specialization
The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

frequently at firms with commercial/industrial and institutional specializations, whereas residential firms are more likely to use civil and structural (CS) engineers as consultants. Landscape architects are also used by many firms that have an institutional specialization, which may include projects like public buildings, museums, and recreational structures. In general, it is more common for firms with a commercial/industrial or institutional specialization to hire code consultants and other specialty consultants, as there are more features to incorporate into their projects, such as security and communication networks (Table 2.3).

LEED AP Certified Staff Nearly Doubles at Firms

Two-thirds of architecture firms now have at least one Leadership in Energy and Environmental Design accredited professional (LEED AP) on staff, versus just one-third in 2008. Ninety percent of firms with 10 or more employees have at least one LEED AP on staff, and more than half of small firms have at least one LEED AP certified staff member, compared to just under one-quarter in 2008.

Nearly two-thirds of large firms have more than 20 staff with LEED AP certifications. On average, firms with 20 to 49 employees have 8 LEED APs on staff, and 3 LEED certified staff typically work at firms with 10 to 19 employees (Figure 2.12).



The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

FIGURE 2.12 **The Number of LEED APs on Staff Nearly Doubles in Three Years.**

▶ The backgrounder on Firm Legal Structure (5.2) discusses the most commonly used structures for architecture firms.

FORMATION OF FIRMS

S Corporation Is Most Widely Employed Business Structure

When starting a business, one of the first decisions the owner has to make is the type of business to create. The business type that is best suited for the firm's situation and objectives may vary by firm size or specialization. Liability protection and tax concerns may also play a major role in this decision.

According to the Internal Revenue Service, 70 percent of all businesses start out as sole proprietorships, since they are relatively easy to start and give the owner discretion to make decisions. On the downside, these firms have unlimited liability for all debts against the business, including personal assets.

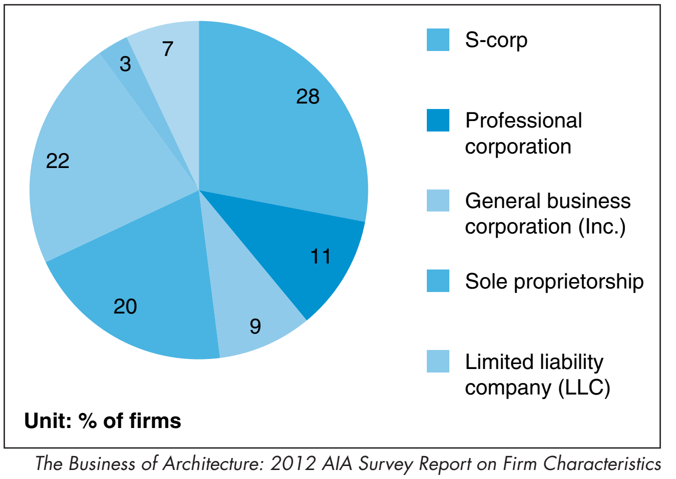
The share of architecture firms that use the sole proprietorship legal structure has continued to decline in recent years, with a drop of 5 percentage points from 2008 to just one in five firms in 2011 (Figure 2.13). The share of firms using the sole proprietorship legal structure has declined significantly since 1997, when nearly half of all firms were classified as such.

As of 2011, the most common legal structure among all firms, with the exception of sole practitioners, is the S corporation, with more than one-quarter (28 percent) of firms reporting having been formed under this legal business structure. The percentage of firms structured as limited liability companies (LLCs), a legal structure that is now permitted in most states, increased moderately to 22 percent, from 17 percent in 2008.

At firms with 50 or more employees, the General Business Corporation (Inc.), also known as a C corporation, is the second choice. Among the firms with 10 to 49 employees, the Professional Corporation (PC), LLC, and the General Business Corporation are evenly divided, averaging around 16 percent for each of the legal business formations.

Nearly Half of All Firms Have Small Business Status

According to the Small Business Administration (SBA), small businesses represent the majority of all employer firms and employ about half of all private sector employees. They pay more than 44 percent of total U.S. private payrolls and have generated 60 to 80 percent of net new jobs annually over the past decade. Different industries will have different criteria for eligibility, primarily based on the annual gross receipts from the business. For more detail on the eligibility and standard described in the National American Industry Classification System (NAICS), visit the U.S. Small Business Administration website (www.sba.gov). The Architectural Services industry is classified under the NAICS 541310.



The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

FIGURE 2.13 The S Corporation Is the Most Common Legal Structure, While Sole Proprietorship Continues to Drop.

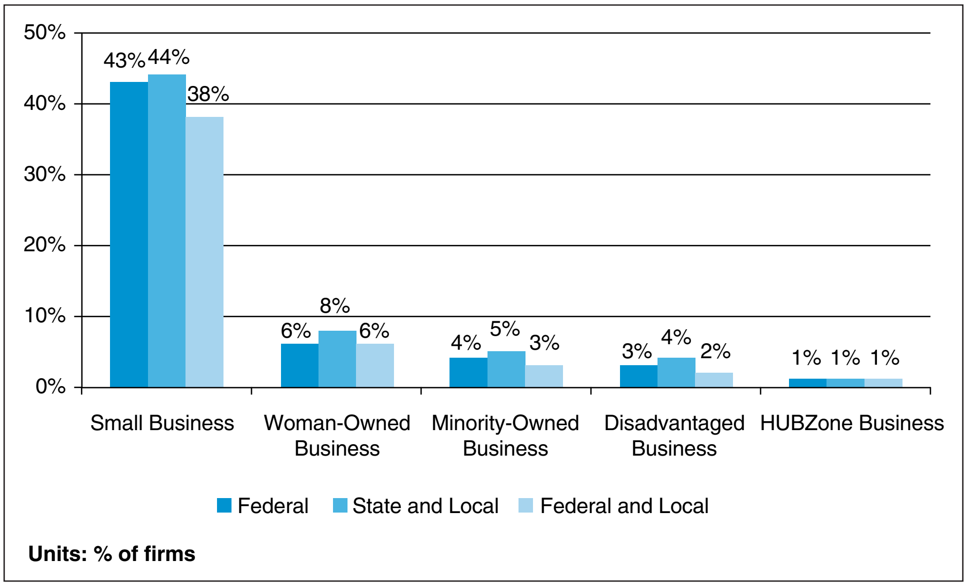


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FIGURE 2.14 Nearly Half of All Firms Are Recognized as Small Business Entities.

Small businesses create more than half of nonfarm private gross domestic product and supplied just over 20 percent of the total value of federal prime contracts in Fiscal Year 2010. More than 4 in 10 architecture firms report that they are recognized as a small business at either the federal or state/local level (Figure 2.14). One-half of architecture firms with fewer than 20 employees report that they are recognized (both federally and at the state/local level) as a small business, while just over one-quarter of firms with 20 to 49 employees are recognized as such.

The share of firms that are federally recognized women-owned business enterprises (WBE) is 6 percent, and the share that are state/local recognized WBEs is 8 percent, both of which are down significantly from 2008 with declines of three and five percentage points, respectively.

Approximately 4 percent of firms are federally recognized minority-owned businesses enterprises (MBEs), while 3 percent of firms are federally recognized as a Small Disadvantaged Businesses or Disadvantaged Business Enterprises (SDBs or DBEs). The HUBZone program (Historically Underutilized Business Zones) helps small businesses in urban and rural communities gain preferential access to federal procurement opportunities. Currently, just 1 percent of firms are recognized either at the federal or state/local level in this category.

▶ See the backgrounder WBE/MBE/DBE/SBE Certification (3.1) for related discussion on certification as a Woman-Owned Business Enterprise (WBE), Minority-Owned Business Enterprise (MBE), Disadvantaged Business Enterprise (DBE), or Small Business Enterprise (SBE).

Formation of New Firms Grows

The weak economy sparked new firm formations. Six percent of existing firms were formed between 2009 and 2011, and almost one-quarter of firms were formed since 2005. More than one-half of firms were formed since 1995.

In comparison, fewer than one-tenth of firms were founded before 1970. However, more than three-quarters of firms with 50 or more employees were established before 1980. Two in five sole practitioners started their firms since 2005. Not surprisingly, firm size is indicative of its longevity, since firms generally need time to grow (Table 2.4).

Number of Offices Decline at Largest Firms

▶ Developing and Managing Multiple-Office Firms (5.9) addresses the challenges of leading and managing a multi-office architecture practice.

The majority of architecture firms have one office, although just over 10 percent have multiple offices (Table 2.5). Approximately two-thirds of firms with 10 to 49 employees and one-quarter of firms with 50 or more employees have one office.

TABLE 2.4 Over One-Third of All Firms Formed After 2000

		Number of Employees						
	2011 (%)	1 (%)	2–4 (%)	5–9 (%)	10–19 (%)	20–49 (%)	50–99 (%)	100+ (%)
2010–2012	6	12	6	3	1	0	0	0
2005–2009	17	27	20	9	5	2	0	0
2000–2004	14	17	16	15	9	6	3	0
1990–1999	25	22	25	26	25	23	9	3
1980–1989	19	13	19	25	28	21	18	9
1970–1979	10	6	10	10	17	16	20	20
1960–1969	4	2	2	5	7	12	18	31
1950–1959	2	1	1	3	4	10	8	6
Before 1950	3	0	1	4	4	10	24	31

Units: % of firms
The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

Two in five of the firms with 100 or more employees have five or more offices. The majority of firms have offices that are located exclusively in the United States, with just 2 percent reporting that they have offices abroad including Canada.

The change in the number of offices was most dramatic at the largest firms between 2008 and 2011. The share of firms with 100 or more employees that have multiple offices and had five or more offices in 2008 has declined significantly, with the majority reporting that they now maintain just two to three offices.

On the other hand, more than one-third of firms with 50 to 99 employees that have multiple offices reported having four or more offices in 2011, versus just over one-quarter who reported the same in 2008.

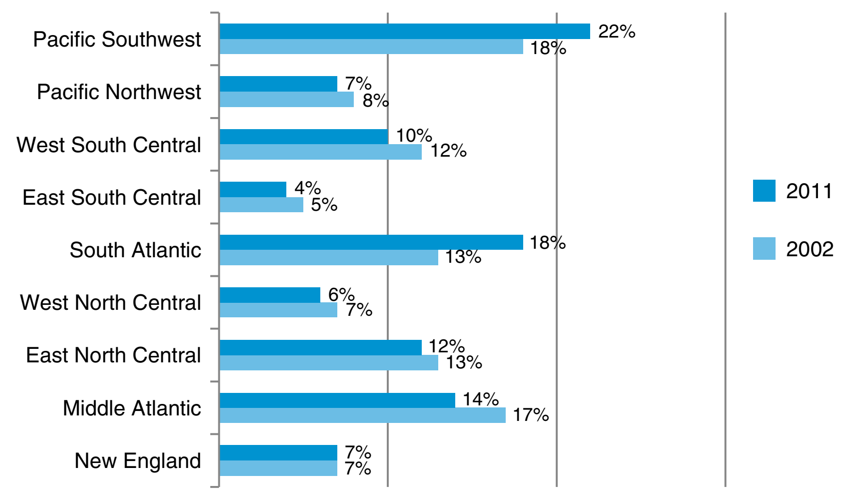
South Atlantic Regional Share of Firms Increases While Middle Atlantic Sees Largest Decrease

The 2012 AIA Firm Survey geographical breakout (based on the U.S. Census: https://www.census.gov/geo/www/us_regdiv.pdf) showed the Pacific Southwest and South Atlantic regions continue to have the greatest share of firms, 22 and 18 percent, respectively. The East South Central region has the smallest share of firms, with just 4 percent, followed by West North Central, with 6 percent. The share of

TABLE 2.5 Multiple Offices at the Largest Firms Decrease Considerably

			Number of Employees			
			2011	2008	2011	2008
Number of Offices	All Firms 2011 (%)	All Firms 2008 (%)	50–99 employees (%)	50–99 employees (%)	100+ employee (%)	100+ employees (%)
5+	2	3	20	18	43	60
4	1	1	16	9	9	7
3	2	2	13	14	20	10
2	7	7	21	26	20	5
1	88	87	30	33	9	18

Units: % of firms
The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics



Units: % of firms

***The geographical (division) breakout is based on the U.S. Census Bureau (4 Regions) and (9 Divisions) state line standard. The description and states included in each region and division can be found in the following link (http://www.census.gov/geo/www/us_regdiv.pdf).**

The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

FIGURE 2.15 The Pacific Southwest and South Atlantic Regions Saw the Largest Increase in the Share of Firms in the Past Decade.

firms in the New England, Pacific Northwest, West South Central, and East North Central regions has remained relatively unchanged in the past 10 years. The largest growth in the last decade was the Pacific Southwest and South Atlantic regions, with an increase of four and five percentage points in the share of firms, respectively (Figure 2.15).

THE PRACTICE

Most Design Specialty Offerings Increase

Nearly all firms (97%) report that they offered architecture services at their firm in 2011, with a significant share also reporting that they offered the design-related disciplines of pre-design services (61%), space planning (57%), interior design (57%), and planning (52%).

The share of firms offering the sustainable/green design specialty grew significantly from 2005 to 2008, but changed little from 2008 to 2011, with nearly half of firms offering this specialty in 2011. The share of firms offering the interior design, space planning, and planning design specialties grew modestly in these three years (Table 2.6).

Fewer than half of small firms reported that they offer sustainable design services, while over two-thirds of the midsize firms, and four in five large firms, do so. Of firms with an institutional specialization, 57 percent report offering sustainable design as a specialty in their practice, in contrast with an average of 45 percent of firms with a commercial/industrial or residential specialization.

Multidisciplinary Firms Continue to Grow

The economy is going through a transformation and so is the architecture industry. The share of architecture firms that describe their practice as single-discipline continued to decline in 2011, falling below 60 percent, as more than one-third of firms report

TABLE 2.6 Despite the Economic Downturn, Share of Firms Offering Most Design-Related Specialties Has Increased

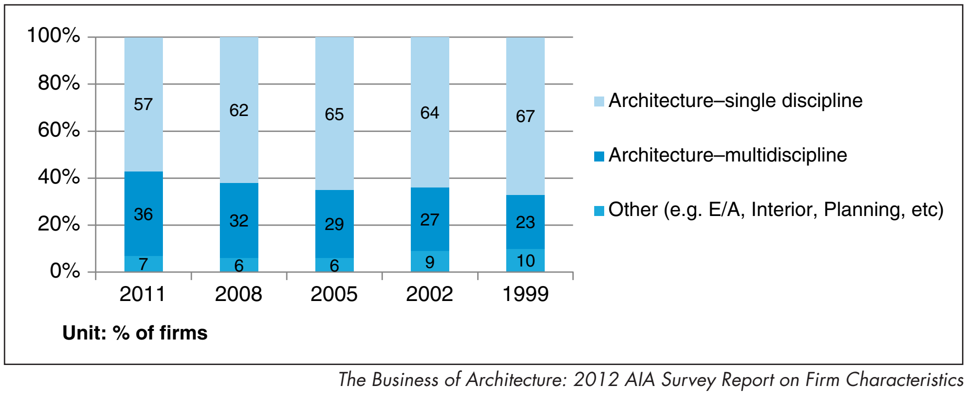
Firm Type	2011 (%)	2008 (%)	2005 (%)
Architecture	97	97	97
Pre-design services	61	n/a	n/a
Space planning	57	54	50
Interior design	57	54	49
Planning	52	50	48
Consulting	n/a	42	44
Sustainable/green design	49	50	31
Historic preservation	30	30	29
Design-build	22	21	20
Construction management	18	17	16
Urban design	17	16	15
Landscape architecture	11	11	10
Engineering	8	8	8
Practice-based research	6	n/a	n/a
Other	7	10	8

Unit: % of firms
The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

that they are now multidisciplinary (with architecture as the lead discipline) versus just over one-quarter a decade ago (Figure 2.16). Firms may tend to add other disciplines to their practice at the peak of the economy, although firms may also try to find additional work by adding other disciplines during an economic downturn, even though they often cannot add any additional staff.

The share of multidisciplinary architecture firms has doubled in the past 15 years, from 18 percent in 1996 to 36 percent in 2011. More than four in five firms with 50 or more employees now characterize themselves as multidisciplinary, although it is firms with fewer than 10 workers that have shown the most growth into multidisciplinary practice (Table 2.7).

In 2011, nearly two-thirds of firms with fewer than 10 employees and one-third of firms with 10 to 49 employees described their practice as single-discipline.



The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

FIGURE 2.16 The Single-Discipline Architecture Firm Continues to Decline.

TABLE 2.7 Multidiscipline Firms Increase Another 10 Percent from Three Years Ago

Firm Type—Architecture	All Firms (%)	Number of Employees 1 (%)	2–4 (%)	5–9 (%)	10–19 (%)	20–49 (%)	50–99 (%)	100+ (%)
Single discipline—2011	57	74	63	49	39	20	11	1
Single discipline—2008	62	79	69	59	41	23	9	7
Multidiscipline—2011	36	17	30	46	54	68	79	86
Multidiscipline—2008	32	12	26	37	51	64	79	80
Other discipline—2011	7	9	7	5	7	12	10	13
Other discipline—2008	6	8	5	4	8	13	12	13

Units: % of firms
The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

BIM Software Used by Slightly More than One-Third of Firms

On average, just over one-third of firms were using building information modeling (BIM) software as of 2011. At the same time, 36 percent of firms do not use BIM software and do not plan to use it in the near future. About one-quarter of firms that are not using BIM software are considering purchase of this tool in the next few years.

The majority of firms with 100 or more employees are using BIM software, while three-quarters of firms with 20 to 99 staff size are doing so.

Two-thirds of firms with 10 to 19 workers are using BIM software, and just over half are currently using this tool in conjunction to billable work. Another one in five in this firm size group are not currently using BIM, but plan to acquire software in the near future (Table 2.8).

The firms using BIM software for billable work indicate that they are most likely to use it for design visualization services (91% of firms), coordinated construction documents (74%), and sharing models with consultants (55%). Larger firms also indicate that resolving conflicts with other disciplines (clash detection) and sharing models with constructors/trade contractors are primary uses of BIM software in their office (Table 2.9). Nonbillable work using BIM software might include but is not limited to training, competition, marketing, archiving older projects, etc.

TABLE 2.8 Less Than One-Third of Firms Using BIM for Billable Work

	Total (%)	Number of Employees 1 (%)	2–4 (%)	5–9 (%)	10–19 (%)	20–49 (%)	50–99 (%)	100+ (%)
Yes, we are using it for billable work	29	16	22	28	54	71	79	100
Yes, but we are not yet using it for billable work	9	9	8	14	10	7	10	0
No, but plan to acquire within the next 12 months	7	7	8	8	8	5	0	0
No, but plan to acquire sometime (not within the next 12 months)	19	17	23	21	13	9	5	0
No, and do not plan to acquire	36	51	39	30	15	8	6	0

Units: % of firms
The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

TABLE 2.9 Design Visualization and Construction Documents Most Widely Used on BIM Software

		Number of Employees						
	Total (%)	1 (%)	2–4 (%)	5–9 (%)	10–19 (%)	20–49 (%)	50–99 (%)	100+ (%)
Design visualization	91	92	91	91	89	94	90	94
Coordinated construction documents	74	63	68	67	83	91	92	97
Sharing models with consultants	55	31	44	55	69	79	83	80
Resolving conflicts with other disciplines (clash detection)	46	28	30	43	55	75	87	86
Sharing models with constructors/ trade contractors	34	22	28	25	37	55	71	66
Quantity takeoffs/estimating	27	30	27	25	22	26	37	31
Energy/performance analysis	24	19	19	17	25	31	58	51
In the learning phase of the software	2	2	4	1	0	1	0	0
Other	3	4	3	1	3	3	6	0

Units: % of firms (those who currently use BIM—multiple selections permitted)
The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

CONSTRUCTION SECTORS SERVED

Majority of Firm Billings Derived from New Construction Projects

With the economic downturn, the share of architecture firm billings from new construction projects declined dramatically from 2008 to 2011. Three years ago new construction projects accounted for nearly two-thirds of firm billings, but by 2011 that share had fallen by 12 percentage points to account for just 53 percent of billings. While new projects still constitute the overall majority of firm billings, renovations, rehabilitations, additions, and other construction projects have markedly increased their share, particularly at midsize and larger firms. At firms with fewer than 10 employees, the majority of their firm billings continue to be from renovations, rehabilitations, additions, and historic preservation, as in the past. Issues that are likely related to the economic downturn have led more clients to request modifications to existing buildings instead of entirely new structures, which were more common in the past (Figure 2.17).

Institutional Projects Make Up Biggest Share of Firm Billings

When considering the distribution of architecture firm billings by project type, institutional projects continue to account for the largest share of billings at all firms (except for the smallest), accounting for an average of 58.2 percent of firm billings (Table 2.10).

One key change from 2008 to 2011 was the decline in the share of commercial/industrial projects, which fell by more than four percentage points in that three-year period. The shares of all types of projects in this sector declined, with the largest loss coming from office projects, where the share of billings fell by more than two percentage points.

A fairly substantial decline of nearly four percentage points can also be found in the share of projects reported as "other construction," which respondents reported included projects like auto dealerships, mixed-use projects, and parking lots/garages.

On the other hand, the share of firm billings from both the institutional and residential sectors increased from 2008 to 2011, with institutional billings climbing by nearly five percentage points. The largest gains in this sector came from education projects (both K–12 and college/university projects), which offset minimal declines in

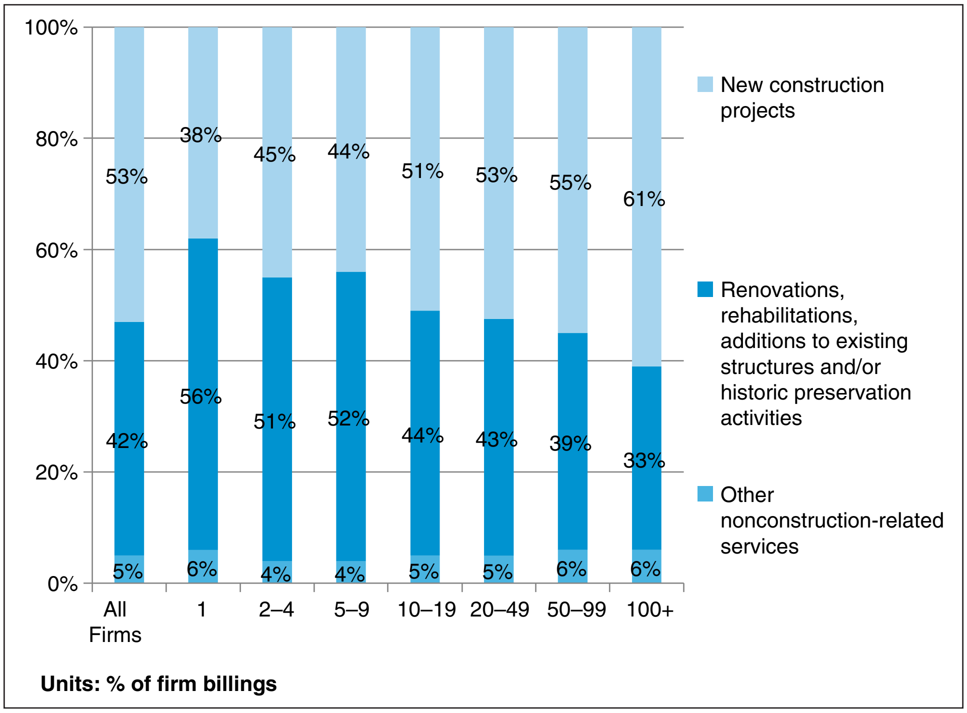


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FIGURE 2.17 New Construction Projects Account for Just Over Half of Firm Billings.

TABLE 2.10 Nearly 60 Percent of Firm Billings Are from Institutional Projects

	2011 (%)	2008 (%)
Single-family residential	6.2	5.5
Multifamily residential	7.5	5.8
Residential Total	**13.7**	**11.3**
Office	9.2	11.3
Retail, food services, warehouses, etc.	7.6	8.4
Hospitality	3.7	4.8
Industrial	3.3	3.6
Commercial/Industrial Total	**23.8**	**28.1**
Education (K–12)	12.4	9.0
Education (college/university)	12.4	9.0
Health care	17.2	18.2
Justice (e.g., corrections, courthouses)	1.6	2.3
Other government/civic (e.g., post office, federal office buildings)	6.4	5.9
Religious	2.0	2.2
Cultural (e.g., museums)	2.0	1.7
Recreational (e.g., sports centers, theme parks)	2.2	2.3
Transportation (e.g., airports, rail, bus, mass transit)	2.2	2.9
Institutional Total	**58.4**	**53.5**
Other construction projects	2.3	6.0
Nonconstruction projects	1.8	1.1

Units: % of firm billings
The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

the share of billings from health care, justice, religious, recreational, and transportation projects.

The increase in the share of billings from residential projects was primarily led by a gain of nearly two percentage points in multifamily projects, although there was a minimal increase in billings from single-family projects as well. While the downturn had a significant effect on residential projects in their earlier stages, demand was once again beginning to increase in 2011.

Of those firms that did report having billings from residential projects in 2011, more than two-thirds of those billings (67%) were from new housing units. An average of 44 percent of total residential billings were reported to be from new multifamily housing units, although the share ranged from less than 10 percent for sole practitioners all the way up to 80 percent for the largest firms.

Only small firms reported that a larger share of their residential billings came from new single-family units than from new multifamily units. And sole practitioners were the only group to report that more than half of their residential firm billings were from additions or renovations, which accounted for less than one-quarter of residential billings at firms with 10 or more employees (Figure 2.18).

The majority of architecture firms can be classified as having had either a residential or an institutional specialization in 2011 (defined as having 50 percent or more of 2011 firm billings from that sector). Smaller firms were more likely to have a residential specialization, while larger firms were more likely to have an institutional specialization.

The share of firms with a commercial/industrial specialization hovered around just 2 in 10 firms, regardless of firm size. The remaining firms are classified as mixed, meaning that they do not have 50 percent or more of their firm billings from any one category.

The share of firms with an institutional specialization has increased by nearly six percentage points since 2008, while the share of mixed firms has declined by nearly the same amount. Firms with a more diversified practice in the past appear to have honed their specialization more, leading to fewer of the more generalist firms with billings from a variety of project types (Table 2.11).

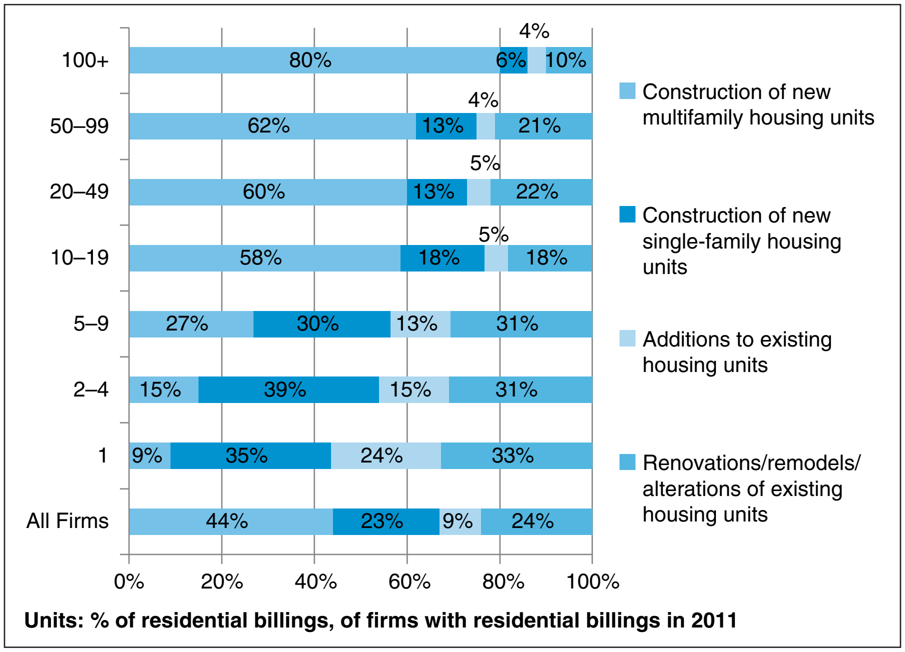

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FIGURE 2.18 **Two-thirds of Residential Billings Involved New Construction.**

TABLE 2.11 Majority of Firms Have a Residential or Institutional Specialization									
			Number of Employees						
	All Firms 2011 (%)	All Firms 2008 (%)	1 (%)	2–4 (%)	5–9 (%)	10–19 (%)	20–49 (%)	50–99 (%)	100+ (%)
Residential	33.5	35.0	47.2	39.0	26.2	13.6	8.8	5.0	3.0
Commercial/industrial	21.7	21.0	20.6	23.6	20.5	19.3	20.3	23.4	26.4
Institutional	32.9	27.0	18.3	24.2	42.1	59.4	64.8	63.2	64.5
Mixed	11.9	18.0	13.9	13.2	11.2	7.6	6.1	8.3	6.1

Units: % of firms with 50% or more of 2011 firm billings in given sector
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Majority Share of Billings from Repeat Clients

Architecture firms report that nearly two-thirds of their firm billings are from basic design services (an average of 64% of billings for all firms). Approximately 10 percent of billings are from planning and pre-design services, 9 percent from nonarchitectural design services, and 8 percent from expanded design services.

Smaller firms report that less of their billings are from nonarchitectural design services and slightly more are from basic design services than for larger firms. But for the most part, the distribution of firm billings by service type has been little affected by the downturn and is relatively the same as it was in 2008.

On average, more than two-thirds of 2011 architecture firm billings (68%) were from projects for repeat clients, an increase of 10 percentage points from 2005 (Table 2.12). Although firms have reported during the downturn that clients have been soliciting bids from more firms than was typical in the past, clients are still more likely work with a firm with whom they already have an established relationship.

Firms with a commercial/industrial specialization reported the largest share of their firm billings from repeat clients (75%), while firms with a residential specialization indicated that nearly half of their billings (45%) were from new clients.

Nearly One-Third of Firm Billings from Government Clients

Clients from state and/or local government entities remain the most common client type for architecture firms of all sizes, accounting for one-quarter of all firm billings in 2011, while at midsize firms they accounted for nearly one-third of their billings (Table 2.13). Small firms reported that nearly half of their billings were from private

TABLE 2.12 Repeat Clients Account for Larger Share of Firm Billings Than in Past					
	All Firms 2011 (%)	All Firms 2005 (%)	Residential (%)	Commercial/industrial (%)	Institutional (%)
Repeat clients, noncompetitive selection	43	48	48	55	37
Repeat clients, competitive selection (interview, proposals, etc.)	25	10	8	20	29
New clients, noncompetitive selection	10	26	21	10	7
New clients, competitive selection (interview, proposals, etc.)	23	16	24	15	26

Units: % of firm billings
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TABLE 2.13 More Than One-Quarter of Firm Billings from State/Local Government Clients

	All Firms (%)	Number of Employees 1 (%)	2–4 (%)	5–9 (%)	10–19 (%)	20–49 (%)	50–99 (%)	100+ (%)
State or local government (including public schools)	25.4	8.6	13.7	25.6	29.6	32.4	30.7	17.6
Other business, commercial, or industrial companies	19.9	11.7	16.7	18.6	13.7	22.1	22.8	21.8
Nonprofit institutions (e.g., private schools, museums, churches)	15.8	10.2	11.4	9.6	11.9	10.8	11.6	29.3
Developers, construction companies	14.4	14.4	14.0	15.3	12.4	16.7	14.1	13.3
Private individuals	12.1	44.2	37.1	22.7	18.5	7.3	4.9	3.6
Federal government	7.0	0.4	1.1	4.0	7.9	6.6	9.1	8.7
Other architects, engineers, design professionals	4.3	8.2	5.1	3.1	3.9	3.5	3.5	5.7
Other	1.2	2.2	0.8	1.1	2.1	0.5	3.3	0.0

Units: % of firm billings
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individuals, but overall private individuals accounted for just 12 percent of billings at all firms.

Business, commercial, and industrial companies are also popular clients, accounting for 20 percent of firms' billings, while nonprofit institutions accounted for 16 percent (and nearly one-third of billings at firms with 100 or more employees). Regardless of firm size, very little work was done for the federal government in 2011.

Pro bono work is relatively common at many firms, with 6 in 10 having provided pro bono work in 2011. Large firms were much more likely to provide pro bono work than small firms, with 67 percent of firms with 50 or more employees providing the service in contrast to 55 percent of firms with 4 or fewer employees. Firms with an institutional specialization were also much more likely to report having offered pro bono work than those with residential or commercial/industrial specializations.

CONCLUSION

In an effort to document emerging trends in the practice of architecture, the American Institute of Architects periodically has conducted comprehensive surveys of its member-owned firms. These *Business of Architecture* reports present benchmarks that allow firms to assess their practices and evaluate their operations in comparison to their peers. In this way, the architecture profession can monitor its current performance while pursuing shared goals for the larger architecture community.

During the survey, conducted in early 2012, firms provided information on characteristics and operations in 2011. The analysis in part compares these results to earlier surveys to assess how the profession is changing. Generally, firm activity is compared and contrasted by the size of the firm (number of employees on payroll), the region of the country, and the construction sector concentration of the practice (residential, commercial/industrial, and institutional) for those firms that received 50 percent or more of their annual revenue from one of these three sectors.

Unless otherwise specified, all information in this report was generated by the American Institute of Architects.

AIA FIRM SURVEY BACKGROUND AND METHODOLOGY

The AIA has surveyed architecture firms since 1988 as part of a commitment to maintain an accurate profile of the business practices of the profession. Last conducted in 2009, the 2012 Firm Survey examined many of the same issues previously explored.

Survey content was developed by AIA staff and volunteer leaders. Sampling, data collection, and tabulation were handled with the assistance of Readex Research, an independent research company.

ABOUT READEX RESEARCH

Readex (www.readexresearch.com) is a nationally recognized independent research company located in Stillwater, Minnesota. Founded in 1947, its roots are found in survey research for the magazine publishing industry, but its specialization in conducting high-quality self-administered surveys has brought it clients from many other markets, including associations, corporate marketers and communicators, and government agencies.

SAMPLE COMPOSITION

The population of interest was all domestic offices of U.S. architecture firms. The sampling frame was developed from three list sources: members of AIA's Large Firm Roundtable, AIA's firm owner/partner members, and participants in the 2009 Firm Survey. When duplicates were removed to include only one individual per location using carrier route and delivery point bar code information, this list included a total of 10,827 offices. Of these, 10,405 had deliverable email addresses on file.

DATA COLLECTION

Tabulated results are based on a total of 2,805 usable responses with a response rate of 27 percent. Because a significant fraction of those invited to participate chose not to do so, the possible effects of nonresponse bias on these results should be considered. Percentages based on all 2,805 responses are subject to a margin of error of ±1.6 percent at the 95 percent confidence level. Percentages calculated on smaller tabulation bases—for example, offices in New England—are subject to more statistical variability.

For More Information

The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics. To purchase the report, please visit The AIA Bookstore: http://www.aia.org/store.

CHAPTER 3

Career Development

3.1 Regulation of Professional Practice

Cornelius R. DuBois, FAIA

Individuals are licensed to practice architecture, and in doing so, to protect the health, safety, and welfare of the public. Licensing regulations vary among the 54 U.S. jurisdictions, and each architect is responsible for understanding, observing, and abiding by the appropriate statutes, rules, and policies.

THE BASIS FOR THE REGULATION OF THE PRACTICE OF ARCHITECTURE

In order to practice architecture, individuals must hold a license in the jurisdiction in which they wish to practice. The regulation of architecture and of other professions in the United States falls under the authority of the 50 states, three territories (Guam, Puerto Rico, and the U.S. Virgin Islands), and the District of Columbia. This authority is left to the states by the Tenth Amendment of the U.S. Constitution, in the Bill of Rights.

Although the licensing laws applying to the practice of architecture may at first appear to be both broad and complex, they exist principally to provide for the health, safety, and welfare of the public. To do so, these regulations set the minimum qualifications determined by a jurisdiction to be necessary to assure the public that the professionals designing buildings for human occupancy have met the appropriate requirements for education, experience (training), and examination. Equally important, these laws

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serve a critical function in consumer protection, to assure the public that when an architect is selected, that individual has met these minimal standards and has therefore demonstrated the requisite competence and integrity required of the profession.

The concept of "minimal" standards should not be misinterpreted to suggest that the bar for qualification to practice is set low. The stakes—the protection of the public—are indeed high. "Minimal" is also intended to mean that regulations should be without superfluous requirements or testing of knowledge and skills that do not relate directly to health, safety, and welfare.

HISTORY OF THE LICENSURE OF ARCHITECTS

Regulation of the practice of architecture is a relatively recent development, especially when one considers for how many centuries architects and proto-architects have been designing buildings. The regulation of some professions, particularly those of medicine (beginning with the Code of Hammurabi in 1700 BCE) and law (300 AD), had been in place and tested for many years before registration laws for architects in the United States came into being.

Regulation of architecture did not happen overnight. The first law was enacted in the State of Illinois in 1897, establishing a licensing board in 1898. Other states gradually adopted their own statutes and set up their own registration boards over the next fifty-plus years, with Wyoming and Vermont as the final states to adopt licensure in 1951. The territories of Puerto Rico, the U.S. Virgin Islands, and Guam subsequently joined the licensing jurisdictions to create, with the District of Columbia, the current total of 54.

Licensing laws are enacted by the legislatures, which establish administrative agencies to implement the laws. The registration board established by statute is typically managed and coordinated by a regulatory agency of the state that may have responsibility for licensing of a great variety of professions (medical, legal, accounting, and others) and occupations.

The regulation of professions is not static. The laws applying to licensing can be revised either when legislation is introduced to amend an existing statute or during a "Sunset" process in those states that mandate a periodic review and justification of the rationale for regulatory requirements. In a Sunset Review, a licensing statute is deemed to have automatically expired unless and until a thorough review has been conducted and it has been determined that the needs of consumer protection and safeguarding the health, safety, and welfare of the public will be served by continuation of the statute in some form. With or without a Sunset Review, the content of an architectural licensing statute is subject to a legislative process—and sometimes to political whims that are not always predictable. As a result of this, the efforts by NCARB and others to encourage uniformity among the jurisdictions counter a pull in the opposite direction as legislative cycles leave their imprint on the laws that regulate architects.

Alongside the statutes are the rules that are developed by the regulatory agencies and the registration boards. Although rules are set outside of the legislative process, they are still subject to a public process requiring, in most cases, a public hearing held by the registration board after proposed rule changes have been published and promulgated.

A generally accepted philosophy of regulation guides the process for both statute and rule: to establish the minimum threshold of regulation necessary to ensure the protection of the public. While the concept of minimum threshold may be subject to personal or political interpretation, this approach offers some assurance to counter the tendency of a statute to accumulate superfluous or inappropriate provisions over time. Whether this is always effective may be questioned, but this principle provides a consistent yardstick that must be held up to set any discussion of amendments or revisions to a licensing law.

Amendment X ("States Rights") of the U.S. Constitution says, "The powers not delegated to the United States by the constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." This is why there are 54 different licensing jurisdictions, each with its own statute, rules, and policies. This provides challenges to professionals seeking to practice in multiple states, and it can mystify, at first, those from other countries with a single licensing or credentialing authority. The National Council of Architectural Registration Boards (NCARB) has developed our system of reciprocal licensure in part as a response to this reality.

Practice Acts and Title Acts

Licensing statutes are termed either "practice" or "title" acts. All architectural licensing laws in the United States are practice acts that describe and regulate practice as well as the use of the title "architect." Other professions may be regulated by title acts only. In such instances, an individual must have met certain qualifications in order to use a specific title. This title may be a subset of a broader title ("Registered" Interior Designer or Landscape Architect, for example), but the statute does not extend to define or regulate practice under that title, is less likely to set up a registration board, and may assign discipline for misuse of the title to an administrative process. Title acts can be amended in a legislature so that they become, in effect, practice acts—or they can be "enabled" in statute so that their conversion can be effected through rule-making by the registration board. Inasmuch as other professions may affect or overlap with the practice of architecture, it becomes critical for architects to be aware of other statutes and how changes in these might affect architectural practice.

Some states, when adopting licensing laws, included grandfathering provisions. Sometimes referred to as "eminence clauses," these allowed active professionals educated and trained under an earlier and perhaps less rigorous framework to continue to practice. In general, among architectural statutes, grandfathering is now a thing of the past. It does arise occasionally when new statutes affecting "allied" or related professions make their way through the legislative process. The rationale for such clauses in new legislation is that an overly aggressive stance can deny some individuals (who may have been in successful practice for years) their means of livelihood. Negotiation of such clauses can also be a political outcome of efforts to gain adequate support for—or to ward off opposition to—new title or practice acts.

ELEMENTS IN COMMON THROUGHOUT LICENSING LAWS

Despite the forces that would seem to pull 54 statutes in 54 separate directions, there are many key elements consistent among virtually all architectural licensing laws, which:

- Establish a board and the rules governing its composition, authority, and operation.
- Define the practice of architecture.
- Set the requirements for licensure and entry into the profession.
- Include exemptions for certain structures not requiring an architect.
- Define professional conduct and misconduct.
- Establish sanctions and the parameter for the application of these when the statute is violated.

Licensing laws may include a range of other elements that are specific to the jurisdiction and not in common with all others, such as requirements for continuing education, for corporate practice, or for supplemental examinations or qualifications for practice. The balance of this article will include detailed discussion of all of these.

THE REGISTRATION BOARD

Board composition varies by jurisdiction. There are "architect-only" boards that only regulate the practice of architecture. Many states have versions of "combined boards." These boards, which are established to achieve greater administrative efficiency, may deal with the regulation of architects and allied or compatible professionals such as professional engineers or professional land surveyors. Others may include myriad other professions or credentialing categories. Not surprisingly, combined boards are found more commonly in smaller states and territories where administrative resources would be stretched if a separate board for each profession were the goal.

In addition to architects who are represented on a registration board (along with engineers and others on combined boards), there are public members. While they may not be as familiar with the practice of architecture as are the professionals, public members hold a critical function on any board, giving boards a balance of opinion and a variety of perspectives. Since architect members, in the position of regulating their own profession, may be subject to at least a perception of a conflict of interest, active public members can counteract this and confer additional legitimacy to the work of the registration board.

Some statutes require that these public members represent specific areas, such as members of the legal profession, educators, or general contractors, while other board positions are opened to any member of the public.

In 2012 there were over 400 individuals (many of whom are architects) serving on architectural registration boards in the United States, none of whom are compensated for their considerable time and voluntary effort. In most cases, the board members have all been appointed by the governor for terms that vary in length from state to state and which may or may not allow for renewal of term. The appointment process can be complex, sometimes (but not always) political, and complicated by considerations of diversity (regional, gender, ethnic, and other) within a given jurisdiction.

The 54 registration boards constitute the membership of the National Council of Architectural Registration Boards (NCARB), which represents the regulatory functions of the profession as one of the five "collateral" architectural organizations. The boards formulate the rules and policies of NCARB, and working with the boards, NCARB establishes national standards for the licensure and credentialing of architects. The other four collateral organizations are the American Institute of Architects (AIA), the American Institute of Architecture Students (AIAS), the Association of Collegiate Schools of Architecture (ACSA), and the National Architectural Accrediting Board (NAAB), each serving different aspects of the profession.

DEFINITION OF THE PRACTICE OF ARCHITECTURE

Every licensing law (usually at the beginning of the statute and often within a section on "definitions") contains a definition of the practice of architecture. A few states take the most direct approach and adopt the *NCARB Legislative Guidelines and Model Law, Model Regulations* without modification. Others use the NCARB document as a template for their statutes, modifying to suit local conditions and politics and reviewing and adapting to revisions and updates as they may be implemented through the resolution process held at the NCARB Annual Meeting.

The practice of architecture is not typically defined by means of an exclusive list of items of practice but is, rather, a collective definition. Architects do many things in the course of programming, designing, creating documentation, and administering the construction of buildings, and elements of these are shared with other occupations. In the course of their work, architects accept a unique professional responsibility that is not shared with others. Interests from other professions, trades, or occupations may seek to limit the definition of architectural practice when a licensing statute is subject to amendment or undergoing a Sunset Review process. The outcome may be a definition of practice that is at variance with that in the *NCARB Legislative Guidelines* or it may be in the form of specific exemptions.

There is a long history of the interface of the definition of the practice of architecture and that of engineering. In some states, a clear distinction is established between the activities of the two professions, while in others engineers may engage in aspects of architectural practice—or specific building types—if it falls within their "area of expertise." Likewise, architects may be permitted to "engineer" (that is, to calculate and size) structural elements in some instances, such as for smaller residential buildings. In either case, an added consideration will be the willingness of a code official to accept such work when permitting a set of construction documents.

Statutes respecting other allied professions such as landscape architecture and interior design may also overlap or conflict with the definition of the practice of architecture. An architect practicing in a new jurisdiction would be well advised to scan the corresponding statutes and rules for these to confirm that there are no potential conflicts.

Another consideration that must be weighed is that some of these professions may be regulated only via title acts instead of practice acts.

As with the overlapping practices of architecture and engineering, the ability of other professionals to stamp and submit construction documents for building permit approval will always be subject to some degree of discretion on the part of the building official. In a state where there is no statewide building code, the window of what is and what isn't acceptable may vary from one municipality or county to the next.

USE OF THE TITLE

The privilege to use the title "architect" in any form is specific to a licensing jurisdiction, and an individual licensed to practice in one jurisdiction may not use the title in another until he or she has been granted a license there.

Not only is the title "architect" regulated, but so is use of the title in combination with other terms and in the form of what is commonly called "the derivative." Not only is this a subject that can vary significantly from state to state, but individual jurisdictions, through the legislative or rule-making process, also may make changes in these provisions from time to time. This is a particularly sensitive issue affecting interns. A few states allow the use of "intern architect," while a greater number allow only "architectural intern" (use of the derivative). Still other jurisdictions allow neither, in which case an intern is an intern.

While an intern proceeding diligently through the Intern Development Program for three years or more may be flying under the radar screen, using a title on resumes, business cards, and firm marketing materials that is contrary to what is allowed, carelessness can get an intern into difficulty when actually applying for a license. This can result in fines or other sanctions, as well as delays in issuing the license. The fact that some of the offending material may have been produced by the firm for which the intern is working (possibly without the intern's knowledge) may not obscure the fact that it is the individual intern who is ultimately responsible.

Registration boards also take different approaches with respect to the use of the title by nonprofessionals. The general rule is that a term, such as "software architect," which is highly unlikely to be misconstrued as referring to someone providing actual architectural services, may be disregarded by a board, while other terms may be seen as more suspect.

The term "holding out" is commonly applied to someone representing that they are an architect without holding a license in that jurisdiction. The term is applicable, whether or not the individual is already licensed in another state or has no qualifications whatsoever. Some states offer what are termed "fishing licenses," allowing a professional to temporarily use the title while actively pursuing a specific project. These often require the architect to be affiliated with a local firm in order to be granted this status.

Some states also allow for "emeritus" or "retired" architect status, allowing continued use of the title in some form. It has often proved difficult to establish a regulatory rationale for such titles, since they serve more of a purpose of conferring or acknowledging status than of protecting the public or the consumer.

Examples of Violations of Use of the Title "Architect"

Violations of the use of the title can come in many forms, some of which are referred to in the discussion above, and professionals may inadvertently find themselves paying the price, even when there has been no intent to deceive the public. An architect from another state may prematurely use the title on a proposal, or may even do preliminary work on a project before receiving a license. Interns may use the disallowed title ("intern architect" or "architectural intern") on resumes, business cards, marketing materials, listings on awards, or magazine articles. A firm may list an intern as "project architect," when "project manager" or some alternative would be more appropriately consistent within the licensing statute. Out-of-state firms and individual practitioners may find themselves referenced inappropriately in the press, or they may directly violate the statute by entering a competition in a jurisdiction where a license is required.

Although a design firm may be called to task in some of these situations, requiring an appearance before the board, it is ultimately the individual who must take responsibility for how he or she is represented to the public. If called before the registration board, an honest account is without question the best approach.

Licensing boards must also contend with complaints about misuse of the title by nonprofessionals. There may be deliberate misuse of the title by disguising it in combination with other terms, such as "design architect" or "architectural renderer" (where the derivative is not allowed). In these cases, boards take seriously their responsibilities to protect the public and the consumer while not unnecessarily tying up their or the administrative department's time with frivolous or pointless complaints.

Licensing boards do not view the use of "AIA" after someone's name as an inappropriate use of the title—unless the title has clearly been used or manipulated (such as "AIA architect") so that it may appear as an attempt to mislead the public in a state where the individual is not licensed.

USE OF THE STAMP OR SEAL

Licensing statutes require that every architect have a stamp or seal in his or her possession. Depending on the jurisdiction, this may be in the form of a rubber stamp or an embossing seal. Some boards require verification that the licensee has indeed acquired the stamp. The particular requirements (dimensions, required text) are typically included in the rules of the registration board and not in the statute. These rules, from one jurisdiction to another, are evolving with respect to electronic documents and whether these can be "stamped" electronically, with or without an encrypted signature.

The use of the stamp on a set of documents (both drawings and specifications) submitted for a building permit signifies that the architect has been in "responsible control" of the preparation of the drawings. Responsible control is defined in the *NCARB Legislative Guidelines and Model Law, Model Regulations*, and tends to be consistently applied throughout the United States. The architect must stamp only those documents prepared under his control: The NCARB Model Law makes it clear that "Reviewing, or reviewing and correcting, technical submissions after they have been prepared by others does not constitute responsible control." In other words, an architect has no business stamping and signing someone else's shop drawings.

The comparable term in engineering is "responsible charge," which essentially means the same thing. Each of the architect's consultants must stamp their documents prepared under their own responsible charge. All changes to the drawings after the building permit issue must also be stamped and signed (and in many cases, dated) by the architect and the engineers, respectively.

Building departments, which are ultimately responsible for the acceptance or rejection of the construction documents, may refer to the "Architect of Record." This terminology may not appear in the licensing statute, but it essentially implies the same thing. A building department may require a stamp on other documents, such as a written response to a plan correction notice. The architect must comply with these requirements. However, a stamp should never be used for extraneous purposes; for example, on a certification required by a lender on a project.

The term "plan-stamping" refers to the inappropriate use of a stamp by an individual not in responsible control of the preparation of the documents. This is a serious violation of any statute, and it is discussed below in the section on discipline.

Interchangeable Terminology: The terms "registration" and "licensure" are used interchangeably. "Registration board" and "licensing board" are also used in this article, as are "states" and "jurisdictions." The states, territories, and the District of Columbia have "licensing statutes" and "registration boards." The one term that does not lead to interchangeability is "architect." There is no acceptable use of a term such as "unlicensed architect."

QUALIFICATIONS FOR LICENSURE

Licensing statutes define the qualifications for licensure, dealing in different ways with the same three topics—education, experience, and examination:

- *Education*. While the majority of jurisdictions now accept only a NAAB-accredited degree as a prerequisite to licensure, a declining number of jurisdictions allow a lower threshold for education. The bar may be set at: a minimum four-year pre-professional degree, such as a Bachelor of Science in Architectural Studies; a four-year degree in an unrelated field; a two-year associate's degree from a community college or technical college; and in some cases, a high school diploma.

- *Experience.* The second area of requirements for licensure applies to experience. Typically, this means completion of the Intern Development Program (IDP). When a state allows a lower education threshold it will usually require a longer term of internship (experience) before an individual without an accredited degree can qualify for the Architect Registration Examination® (ARE®). These jurisdictions may also allow some parallel means to documenting experience that is nevertheless based on and parallel to IDP.
- *Examination.* This is the final step. The licensing jurisdiction must determine when the individual has qualified to take the ARE, in some cases allowing early eligibility to take portions of or the entire exam before completion of the experience requirement. Whereas in the past, the "three legs of the stool" (education, experience, examination) were seen as being assembled sequentially, it is now not unusual to have candidates begin to acquire qualified experience while still enrolled in a degree program and to begin the exam before completing the experience requirement. In all cases, however, a jurisdiction will not issue a license until all steps have been successfully completed.

Upon successfully meeting their registration board's education, examination, and experience requirements, a candidate for licensure will then have to complete that board's application and fulfill any additional requirements of that jurisdiction. These will certainly require the payment of a fee, but there may also be a supplementary exam covering local conditions or a jurisprudence exam, typically a take-home open-book test of the candidate's knowledge of local licensing laws and rules. Only upon completion of all requirements will a license then be issued.

There are potential disqualifications for licensure, such as past felony convictions including specific convictions for sex-related offenses or for failure to pay child support.

Foreign-Educated and Trained Professionals

Individuals educated in other countries, and even those who have been practicing as architects in their home country, have additional hurdles to clear in order to become licensed to practice in any of the 54 jurisdictions. This may include obtaining an EESA-NCARB evaluation (performed by Education Evaluation Services for Architects) of a foreign-educated architect to determine in what areas additional education might be required. In this evaluation, the candidate's transcript (in English) is weighed against the NCARB *Education Standard*. Some states also accept individuals licensed in other countries who have demonstrated competence through the NCARB Broadly Experienced Foreign Architect Program. Other jurisdictions will not allow a foreign-educated individual to take the ARE unless he or she acquires a NAAB-accredited degree.

The difficulty of understanding the wide variation of applicable regulations is made more daunting by the fact that many foreign-educated professionals come from countries where there is a single licensing authority and a single set of rules.

RENEWAL OF A LICENSE

Licensing requirements include different renewal cycles or terms. These can be one-, two-, or three-year cycles. Although a licensing board may send out renewal notices, it is incumbent upon the individual to know when a license is due to expire. Some jurisdictions allow for a grace period for overdue renewals, and this may include an additional fee penalty. In a jurisdiction where no grace period is allowed, or where a license has lapsed beyond the period allowed, an individual is likely to have to start the licensing process all over again.

In many states, mandatory continuing education (MCE) is now a requirement for re-licensure.

The renewal form, likely to be available online, will typically include a series of questions, including those relating to whether the licensee has been the subject of disciplinary action related to a stamp held in another jurisdiction or whether another license has been voluntarily relinquished (this may be indicative of a stipulated agreement to resolve a disciplinary action). When the fee has been paid and an architect's stamp is renewed, the licensee will receive a new license to post on the wall as well as a new wallet card.

▶ The accompanying backgrounder on continuing education provides a detailed discussion of MCE requirements.

RECIPROCITY

There are two principal means of obtaining a license in a jurisdiction beyond the original one in which an architect was registered. The first, and the most common, is referred to either as "comity" or "endorsement." Even though the terms have slightly different meanings, they are essentially the same thing. The technical meaning of comity is accepting as a courtesy the qualifications for licensure from another state. Even when comity is applied, most jurisdictions will require the applicant to have a certified NCARB Council Record, which is then forwarded to the state in addition to filling out the application form and sending in a fee. In a state using the term "endorsement," the process will be the same.

▶ See the backgrounder on NCARB Certification (3.2) for related information.

The second means for reciprocal licensure is where a registration board will accept the NCARB Certificate on its own. This includes those states that will accept applicants who have qualified for NCARB certification via the Broadly Experienced Architect (BEA) program or the Broadly Experienced Foreign Architect (BEFA) program. The option applies to architects without a NAAB-accredited degree who have been licensed in another state for a minimum period of time (6 to 10 years, depending on the level of education attained). Through this process, the architect must demonstrate equivalent learning through practice in order to fulfill each of the requirements specified in the *NCARB Education Guidelines*. The BEFA option applies to architects licensed by a foreign credentialing authority. The BEFA process requires establishment of an NCARB Record, preparation of a dossier to demonstrate experience, and a personal interview.

For a number of reasons, especially pertinent to applicants under the BEA program, it often proves valuable for architects to retain a license in the first state in which they were registered. In a new state, the same rules pertaining to new licensees are likely to apply with respect to supplemental or jurisprudence exams, and some jurisdictions also include an affirmation that the architect has passed a seismic exam or taken the ARE after a certain date (1965) at which seismic content was included.

EXEMPTIONS

Perhaps no subject engenders more heated discussion of licensing statutes in the legislative arena than that of exemptions to the requirements that buildings be designed by architects. The reasons for these exemptions, which exist across the spectrum of jurisdictions, are often philosophical, practical, or purely political.

There are several types of exemptions, the most common being those for buildings not intended for human habitation or occupancy (for instance, some agricultural structures). The next most common are for residential structures, defined either by size, height, the number of occupants or families, or construction cost. These vary widely among the jurisdictions and are subject to push and pull every time an architectural licensing law is opened up to legislative and public scrutiny. Anyone designing a structure that is exempt because of size or cost must be especially attentive to the definition applying to that exemption. For example, how is cost defined? The final cost of a project might exceed a preliminary estimate and thus place the structure out of the protection of the exemption.

THE ARCHITECT IN RELATION TO OTHER PROFESSIONS

Architects practice in a broader context of related and allied professions. There are corresponding exemptions in the regulation of other professions, just as architectural licensing laws have exemptions for others to engage in aspects of practice that might fall under the definition of the practice of architecture. As architects continue the trend of expanding services both horizontally and vertically, they must become particularly attentive to the full breadth of the law and not just what is found in architectural licensing statutes.

In addition to exemptions for types of buildings, there may be exemptions for categories of practice: A statute, in deference to the Supremacy Clause of the U.S. Constitution (which says that the federal government must operate free of interference by the states) may be specific that federal employees are exempt from the requirements of the licensing statute. Also, as discussed earlier, there may be partial or full exemptions for other professions to engage in architectural practice in some form.

Likewise, the licensing statutes of these other professions may allow reciprocal exemptions for architects, for both title and practice. A simple example is when an architect is allowed to engage in site design even though this may also fall into the description of the practice of landscape architecture. Another might be when an architect is allowed to describe "interior design" services when a title act for interior designers also exists. These nuances require architects to be aware of not only their own licensing laws but also those applying to related fields.

Finally, there is an important paradox relating to exemptions and exempt structures: One does not have to be an architect in order to design an exempt structure. However, if a nonarchitect is holding out as an architect while advertising for or designing an exempt structure, they will likely be found in violation of the statute.

CORPORATE PRACTICE

Some jurisdictions require firms as well as individuals to be registered in some form. In some states the firm name must be registered with (and approved by) the licensing board. This may require an annual fee.

Beyond the mechanics of corporate registration, corporate practice requirements in licensing laws may comprise several, sometimes complex, areas. One of the most common governs the composition of firms. Depending on whether a firm is a sole proprietorship, a partnership, a professional corporation, or another type of entity, there may be a requirement for a certain number of the firm's principals or directors to be—or for a minimum percentage of stock ownership to be held by—architects licensed in the jurisdiction.

Firm names may also be regulated, and an architectural practice from another state may discover that it is operating under a name that is not acceptable in a new state. Firm name requirements may govern the use of what are termed "fictitious business titles," and may require a formal approval by the regulatory agency. "Fictitious" may be a confusing term for an architecture firm that sees itself as anything but imaginary, but it applies to a firm name that does not indicate the ownership of the firm. For instance, a firm called "Architectural Partnership" doesn't include the names of the actual partners in its title and is thus a fictitious business title.

Other provisions may limit how long a firm can keep the name of a deceased or retired partner or principal. Architecture practices may find themselves removing the name of a deceased partner or resorting to initials in order to comply with regulations in their home states or in order to practice without reincorporation in multiple jurisdictions. Similarly, a firm with only a single registered architect cannot use "Architects" in its title.

Regardless of what a licensing statute regulates with respect to corporate practice, there are likely to be other restrictions and requirements to set up a business in the state. The administration of these usually resides with the secretary of state's office. A firm must decide (factoring both legal and accounting advice) whether or not to register with the secretary of state in a new jurisdiction, and in some cases it may even be necessary to reincorporate under a different structure just to be able to practice at all in the state.

NCARB.ORG

The website of the National Council of Architectural Registration Boards, NCARB.org, is an invaluable source of information on licensing requirements, including documents such as the *Rules of Conduct* and the *Legislative Guidelines and Model Law/Model Regulations*. The site also offers a Registration Requirements Comparison Chart and provides links to the sites of the individual registration boards. Please refer to the "For More Information" section at the end of this article for specific links to documents."

Other regulations affecting corporate practice may apply. Some have requirements for the services of an architect to be retained during the construction period or for work to be performed only with a signed agreement. Such rules are not only important to understand, but they also may offer tangible benefits to practice in that state.

▶ The backgrounder on Firm Legal Structure (5.2) further addresses business entities.

COMPLAINTS

Any member of the public (whether a client, a building user, or another architect) can file a complaint with a licensing board. Once received, the complaint is reviewed first by the staff and then by the board, which will choose among several courses of action:

- *Dismissal.* A complaint can be dismissed either with or without prejudice, which has a bearing on whether the complaint can be brought up again if more information or evidence becomes available.
- *Investigation.* The board can send complaints either to staff investigators or to consultants (often other architects) to look into the matter in detail, reviewing drawings and other documents and then making a recommendation to the board.
- *Referral to the state attorney general's office.* A complaint against a nonlicensee may not fall under the actual jurisdiction of the board, in which case the attorney general's office can pursue an action, resulting in a sanction such as a cease-and-desist order.
- *Deferral.* Boards may hold off on taking an action after reviewing the complaint, sometimes until a separate civil or criminal suit is resolved.
- *Disciplinary action.* The board may take an action after reviewing the complaint.

The duty to file complaints does not fall solely on members of the public. Indeed, architects have a duty to report violations of the statute, whether this has been committed by an architect or an unlicensed individual. Architects also have a responsibility to self-report life safety issues, including those that result in insurance claims. This duty to report may be either when an event occurs or in the course of filling out the license renewal form.

The responsibility to report violations of the statute is one that architects are often uncomfortable with. An architect must, however, consider the possible consequences (to the public or to the occupants of a building) should a violation of a licensing law not be reported.

DISCIPLINE

As discussed above, there are two basic types of violations considered by licensing boards:

- *Violations by untrained and unlicensed individuals.* Discipline in such cases may not fall under the purview of the licensing board and must be referred to another agency, such as the state attorney general's office.
- *Violations by trained individuals*, either those licensed and already practicing in the jurisdiction or those who are not yet licensed there.

Those not yet licensed may have an application already in process, or they may be interns "moonlighting" (performing services outside of their regular employment and without a license). In these and in similar instances, the registration board has a purview and may ultimately grant a license pending payment of a fine and acknowledgment of the violation per a stipulated agreement.

Perhaps the most common instances leading to major disciplinary actions are those involving plan-stamping or misuse of the title (holding out). Registration boards, with the advice and guidance of their administrative agencies or state attorneys, have a range of options from which to choose, including:

- A letter of admonition that becomes part of the public record
- Fines, within the level of authority given to the board by statute or rule

- Cease-and-desist orders issued by the state attorney general's office
- Requirements for specific remedial education (such as a course in ethics)
- Suspension of a license for a specific period
- Revocation of a license
- Imprisonment: for instance, if an individual refuses to obey a cease-and-desist order

Board rules usually spell out the due process established for complaints. These define the steps that must be followed: complaint, investigations, hearing, decisions or referral, possibly negotiation, and ultimately appeal.

Discipline levied in one licensing jurisdiction can have a direct effect on a license held in another state. NCARB maintains a disciplinary database that can be accessed by licensing boards, either in the course of investigating a complaint or when a license is renewed and an architect has checked off a box indicating discipline in another jurisdiction. The outcome can be that a license may be revoked or suspended if a violation in one state is comparable to what would have been a violation in another. This general rule is important, for example, when a violation of a corporate practice requirement in one state might not be applicable in another. A felony conviction in one state, however, is almost certain to apply across state lines.

There are other, potentially grave, business consequences of performing work without a license. These include the difficulty of recovering fees for work performed once it has been discovered that someone has been practicing without a license. Courts have typically been reluctant to grant relief to the professional in such cases, when an architect has brought suit to collect against a client who has refused to pay.

BOARD RULES AS OPPOSED TO STATUTES

Licensing boards also maintain Rules of Procedure as well as written Policies. The Rules spell out the details not covered in the statute, and they often include the details applicable to qualifications for licensure, such as:

- Equivalent process and documentation to be followed in the few states that do not require IDP
- Rules for allowing early examination
- Requirements for design and use of the stamp
- Rules regarding the wall license and wallet card
- Conformance to an ethical code

Most boards develop their own ethical code based in whole or in part on the *NCARB Rules of Conduct*. A few states simply adopt these by reference.

The details applying to Mandatory Continuing Education (MCE) are also included in the board's rules. These will specify the process by which MCE must be documented as well as the categories of continuing education that are allowed and disallowed.

The rules of a registration board can be amended by the board through a public rule-making process. Such a process will include requirements for promulgation of language proposed for new rules, time for a public comment period, and adequate notice for the public hearing that must be managed by the board. Board policies, on the other hand, detail board and staff procedures that are not subject to the formalities of rule-making. These can be acted upon independently by the board, with the staff of the regulatory department.

THE U.S. ARCHITECT AND GLOBAL PRACTICE

More U.S. architects are practicing or seeking to practice in some form in countries around the world. As much as regulation varies in our country from one jurisdiction to the next, global regulation appears in even more forms. Some countries don't regulate at all, while others credential the title only. In some cases, the title of "architect" may be granted upon graduation from an architecture degree program. In the face of confusing—and occasionally ambiguous—regulation abroad, many architects wisely choose the option of teaming with a local firm instead of attempting to operate solo in another country. As with our own requirements, a foreign country may not accept education here as comparable to what is approved in that location, and if there is an examination requirement, that test will most likely be given in the language of that country. International practice is still in many ways an untested and rapidly evolving area, making attention to the particulars of architectural regulation especially important.

Rules and policies are important parts of the total framework for the regulation of practice. Any architect searching for a topic in the licensing law and coming up empty should go next to these documents to find the answer.

CONCLUSION

The regulation of architects, for which the overarching purpose is to protect the public health, safety, and welfare, is a complex world, covering many aspects of individual and corporate practice. The dynamics of regulation among the 54 separate jurisdictions can seem confusing, but it is important to consider that this complexity—and indeed richness—reflects our society, our national history and the U.S. Constitution, regional particularities, and the evolving conditions in which architects practice. It is the responsibility of each professional to keep pace with this context and to understand the laws and rules of the jurisdictions in which he or she practices or wishes to practice.

For More Information

NCARB Legislative Guidelines and Model Law: http://www.ncarb.org/Publications/~/media/Files/PDF/Special-Paper/Legislative_Guidelines.pdf.

NCARB Rules of Conduct: http://www.ncarb.org/Publications/~/media/Files/PDF/Special-Paper/Rules_of_Conduct.pdf.

Broadly Experienced Foreign Architect (BEFA) program: http://www.ncarb.org/en/Getting-an-Initial-License/Foreign-Architects.aspx.

Broadly Experienced Architect (BEA) program: http://www.ncarb.org/Certification-and-Reciprocity/Alternate-Paths-to-Certification/Broadly-Experienced-Architect-Program.aspx.

EESA-NCARB evaluation process: https://www.eesa-naab.org/home.aspx.

BACKGROUNDER

WBE/MBE/DBE/SBE CERTIFICATION

Katy Flammia, AIA

Women-owned, minority-owned, and small design firms may access business opportunities by becoming certified as a Woman Business Enterprise (WBE), Minority Business Enterprise (MBE), Disadvantaged Business Enterprise (DBE), or Small Business Enterprise (SBE). Understanding the definitions, processes for certification, and opportunities will help to determine if certification is a good strategy for a firm.

Katy Flammia is an architect in Boston. Her firm, THEREdesign, specializes in the design of branded environments for corporate, hospitality, and academic clients and has been certified as WBE, MBE, and DBE since 2007.

INTRODUCTION

State and local governments have established goals for awarding a portion of design and construction contracts to minority- and women-owned and small business enterprises. The purpose of these goals is to encourage the growth of these businesses and their greater participation in the economy.

The process for awarding contracts, the amount of the goal (% MBE or WBE participation required on each contract), qualification requirements, and method of certification varies from state to state, from year to year, and from awarding agency to agency. Because it is impossible to give exact numbers or qualifying information, this article will offer general definitions and will outline a strategy for determining if certification is right for a firm. It will also cover how to find the information needed to pursue certification and, most importantly, what to do once certified.

IS A FIRM ELIGIBLE?

Woman- or Minority-Owned Business Enterprise (WBE or MBE)

A firm must meet the following requirements:

- Minimum 51 percent woman or minority ownership of the firm.
- Some states have personal net worth limits for company owners.

(continued)

- Some states may have a size standard. Check state requirements.
- Certification required.

Disadvantaged Business Enterprise (DBE)

A firm must meet the following requirements:

- Minimum 51 percent woman or minority ownership of the firm.
- The personal net worth of the business owner may not exceed $1.32 million (excluding business equity and personal residence).
- Certification required.

Small Business Enterprise (SBE)

- The U.S. Small Business Administration defines "small" by industry. Most state and local governments follow the SBA guidelines when certifying SBEs. In 2012, the limits were as follows:
- Architectural services: $7 million average annual revenues over 3 years
- Interior design: $7 million average annual revenues over 3 years
- No personal net worth limit for company owners

IMPORTANT CONSIDERATIONS

Before starting the certification process, do some research about what contracts are being offered by government and corporate entities that require or encourage the use of minority-owned, woman-owned, disadvantaged, or small businesses.

What Kind of Work Does the Firm Do? What Is the Firm's Specialty?

For example, if a firm specializes in housing or K–12 and higher educational facilities, projects on which the firm's services will be needed will be offered by state and local governments.

On the other hand, if the firm designs private residences or specializes in hospitality or retail, it is much less likely there will be contracts issued that require or encourage the use of firms with MBE, WBE, DBE, or SBE certification.

What Size Is the Office, and What Size Projects Does the Firm Design?

If a firm is very small, it may be very hard to acquire large contracts for projects such as school buildings or housing developments. Nevertheless, this doesn't mean the firm shouldn't get certification and team with other firms on large projects or try for small projects. Small projects are often grouped together under an indefinite scope contract. These are awarded by an agency to several firms that are then "on call" for projects as they come up. Another good strategy is to team with larger firms as a subconsultant.

- Create a marketing plan identifying the types of projects that align with a firm's strengths and business direction.
- Research which agencies, municipalities, and corporations are offering those sorts of contracts the firm does.
- Determine what agencies require or encourage using minority-owned, woman-owned, and disadvantaged and small businesses.
- Begin the certification process once firm leaders are satisfied that there are plenty of opportunities for the firm.

CERTIFICATION PROCESS

Woman- or Minority-Owned Business Enterprise (MBE or WBE)

Most states, agencies, and corporations require a third-party certification. Many states have an agency that does the certification, and the process is free. This often means the firm is only certified in a particular state.

There are other organizations that certify for a fee. The Women's Business Enterprise National Council (WBENC) is an example. This certification is nationally accepted, but a firm will need to determine if the organization's certification is recognized by the contracting agency/corporation.

Go to a state government's website to learn about the process.

There is generally a relatively long list of documents firm owners will need to provide. Typical documents include company tax returns, copies of proposals or contracts, paystubs, or W2s.

The state may require an interview. Someone from the certifying agency will come to a firm's office and ask firm owners and staff about their work. The purpose of this visit is to establish that:

1. The company actually is a real business.
2. The woman or minority owner actually runs the firm and is not only an owner in name.

The entire process can take a few months to complete. Certification needs to be renewed every one to three years.

Disadvantaged Business Enterprise (DBE)

DBE certification is a federal program and is distinct from most states' WBE/MBE certification. It can sometimes be applied for simultaneously, reducing repetitive paperwork. There are similar requirements to the WBE and MBE certification, but in addition firm owners will need to provide:

- Personal tax returns
- Personal financial statement

DBE certification is generally up for renewal every one to three years.

Small Business Enterprise (SBE)

This is a self-certification process, as follows:

- On the Small Business Administration website, look up the firm's NIACS number and determine whether the company is within the limit for the industry.
- Get a Data Universal Numbering System (DUNS) number at http://fedgov.dnb.com/webform/.
- Register with the System for Award Management Site (SAM). This has replaced the Central Contractor Registry (CCR) and is a database that awarding agencies use to find firms and learn about the services they offer.

Certification generally needs to be renewed annually.

GETTING WORK AFTER CERTIFICATION

Being certified only gives a firm an enhanced opportunity to compete for work. Now the firm must put a marketing plan into action.

Many states have online resources listing contracts posted by the purchasing agency. Some offer an e-mail subscription to receive solicitations. Others require someone to check regularly for opportunities.

Some agencies may require that a firm submit and keep current a master file or a standardized document with information on the business.

Few of the designations give a firm access to work as "set-asides," meaning that projects or a certain percentage of a project can be given only to qualified participants. All of the designations discussed may only give a firm a small bump up among all the qualified applicants. Firm owners will still need to market, network, and pitch their company's services. It's important to meet the decision makers and become acquainted with members of designer selection boards.

If working as a subconsultant is the goal, let prime contractors know about the firm's services. Create marketing materials that list the firm's services and all certifications. Make it easy for "primes" to invite the firm onto their teams.

Most importantly, the firm needs to do very good work. In some areas, contractors have used these certifications to gain contracts and have underperformed, causing certification to sometimes be stigmatized. To counteract this, firms need to build a body of excellent work and a strong reputation.

Tips

- Entering into the world of government contracts is like learning a new language. It definitely requires a time and resource investment.
- Accept that it takes time and effort in the beginning to make the company known.
- Remember to market just as for any other work the firm is trying to get. Those who assume the phone will start to ring as soon as they get certified often give up and think the effort was useless.
- There are literally hundreds of resources for assistance. Many of these are free. The hardest part is narrowing down which events, training activities, and mentors are best for a firm leader to attend.
- Be very careful about companies promising to get the firm contracts. They are usually selling expensive services. Start with a state's local programs and with the Small Business Administration. Look for websites that have the .gov address; these are usually the legitimate sites.
- Don't take on more than the firm can handle at once. Choose two or three agencies or project types and go deep rather than broad. Once the firm is established in an agency or field, then branch out.
- Seek advice from firms who have been doing government work. Many times an allied professional, such as a landscape architect or an engineer, is a good resource. Getting work is all about teaming, so sharing leads can be very useful.

OTHER DESIGNATIONS

Small Disadvantaged Business (SDB)

The 8(a) Business Development Program is much like the WBE, MBE, and DBE, but with a very low net worth threshold. Unlike the other programs, this program has project set-asides that are given to qualified participants of this program. A firm ages out after eight years of participation or outgrows the program when the firm earns more than the program limits, whichever comes first.

Hubzone-business areas are specially designated inner-city neighborhoods employing local workers. There are also other designations that might offer opportunities, such as Veteran-Owned and Disabled-Veteran-Owned.

For More Information

Small Business Administration: http://www.sba.gov/.
Minority Business Development Agency: http://www.mbda.gov/.
Women's Business Enterprise National Council: http://www.wbenc.org/.
National Women Business Owners Corporation: http://www.nwboc.org/.
8a Certification: http://www.sba.gov/content/8a-business-development/.
System for Award Management Site (SAM): https://www.sam.gov/sam/.
Small Business Enterprise Self-Certification: http://www.sbaonline.sba.gov/contractingopportunities/officials/size/table/index.html.

BACKGROUNDER

MANDATORY CONTINUING EDUCATION

Cornelius R. DuBois, FAIA

A majority of licensing jurisdictions now include requirements for mandatory continuing education (MCE) as a condition for renewal of a license to practice architecture. As with licensing laws in general, the requirements for MCE vary, and it is up to the licensee to track and comply with those in each jurisdiction.

THE RATIONALE FOR MANDATORY CONTINUING EDUCATION

Architects live and practice in a rapidly changing world. The body of knowledge required for the practice of architecture is always changing.

The licensing exam (the Architect Registration Exam®, or ARE®) evolves periodically in a process designed to keep pace with these changes. The goal is to see that individuals are examined on the knowledge and skills that have been determined to be necessary for practice. This process, called the Practice Analysis, is undertaken by the National Council of Architectural Registration Boards (NCARB) every five to seven years. The principal outcomes of the process are to define the specifications for the ARE®, inform the Intern Development Program (IDP), and guide NCARB's response to the 2013 National Architectural Accrediting Board (NAAB) Accreditation Review Conference (ARC). The results of the Practice Analysis are also used to understand the continuing education needs of architects and to inform NCARB's continuing education policies.

While the most direct rationale for MCE is to provide a means for architects to demonstrate that they have kept abreast of changes in the knowledge required to practice, legislative discussion often requires more specificity. Architects and the registration boards that grant licenses to practice architecture have recognized that many architects practicing today were originally qualified through earlier versions of the ARE that did not include all of the content that is in the most current version of the exam. Continuing education requirements can thus be viewed as a means to attempt to see that all architects in practice have demonstrated that they have met the same standards for knowledge and skills that apply to new licensees taking the exam today.

Mandatory Continuing Education is a practical and economical alternative to requiring practitioners to take the ARE all over again or for each state to devise its own psychometrically valid and legally defensible supplemental exam. As is found in many professions, the basic rationale for MCE requirements is therefore one of simple logic and acceptance of the fact that current practice requires broader and different knowledge than it may have in the past. Materials, systems, equipment, construction methods, building codes, and technology change. Continuing education requirements are in place to help architects keep pace with those changes.

MCE Cycles

Registration boards today follow different schedules and cycles for license renewal, some of which tie to a calendar year while others do not. A cycle may tie to general regulatory administrative practice within a state and may thus be more difficult to change. A resolution passed at the NCARB 2011 Annual Meeting established the calendar year as the recommended period for MCE reporting, and NCARB is actively encouraging its member registration boards to amend their rules and statutes for greater consistency. Achieving this ambitious goal will take time because some of the changes in each jurisdiction will have to move through the legislative process.

CATEGORIES OF MANDATORY CONTINUING EDUCATION

The U.S. licensing jurisdictions (the 50 states, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands) have different requirements for the types of MCE that qualify for credit. Generally, these fall into four categories:

- Health, Safety, and Welfare (HSW)
- Sustainable Design (SD)
- Accessibility (ADA)
- Other (Non-HSW)

Many jurisdictions require only HSW subjects. The rationale for this is tied directly to the reason that architects are licensed to practice in the first place—to protect the health, safety, and welfare of the public and to provide for consumer protection.

The specific categories allowed for HSW credits are usually defined in the rules of each board. These typically include sessions and seminars that have been jointly qualified for Continuing Education Hours (CEHs) or Learning Units (LUs) by the AIA and NCARB for HSW content. But there are also categories that may not be allowed, such as service on a professional, community, or municipal board or committee. Self-reporting of HSW MCE activities is usually not allowed.

Some jurisdictions offer a form of comity, so that if an individual has met the MCE requirements of another state they are deemed to have met this state's requirements as well. As boards work to align their procedures and implement NCARB's new model regulations for MCE, requirements will become more consistent across the country.

CONTINUING EDUCATION TERMINOLOGY

There is a potentially confusing lack of consistency in the terminology applied to continuing education hours. The AIA uses LUs (Learning Units) in its Continuing Education System, while NCARB, many licensing jurisdictions, and some providers use CEHs (Continuing Education Hours). Dual acronyms for the same thing is one matter; however, some jurisdictions, employing the customs of regulatory agencies that may be administering continuing education requirements for multiple professions, use other terms, such as PDUs (Professional Development Units) or PDHs (Professional Development Hours). Essentially, these all refer to the same thing, where one credit hour is acquired during an activity (seminar or self-study) of at least 50 minutes.

ACCEPTABLE PROVIDERS

Generally, course content from the following provider organizations will be approved, with each jurisdiction having its own specific requirements:

- AIA Components, through AIA/CES (Continuing Education System)
- AIA/CES program registered providers
- NCARB (Monographs)
- Some state boards offer a limited number of their own courses.
- Registered providers to the state registration boards
- Institutions offering NAAB-accredited architecture degree programs
- State and local governments and agencies
- Many other organizations, such as the U.S. Green Building Council (USGBC), Urban Land Institute (ULI), and American Planning Association (APA)

DOCUMENTATION OF MCE

Architects must keep thorough records as they complete continuing education activities. This is especially important when an architect is licensed in multiple jurisdictions, each with a different set of requirements. It is often critical to obtain a certificate from the course or session provider—preferably as soon as possible after the course has been completed. Some online courses allow one to take a quiz, and a certificate is then generated immediately upon passing the quiz. Most jurisdictions, when auditing registrants, require submittal of certificates of completion for all continuing education units claimed for renewal of a license.

Either the certificate or some other documentation of the course should indicate the "learning objectives" of the program. If, for some reason, this has not been provided, the architect should prepare a record that notes learning objectives for all continuing education. Some states require additional documentation, and this may be on a form that is unique to that jurisdiction. For instance, an architect may be required to describe how the course met learning objectives and how this is likely to benefit his or her practice.

Most states verify conformance with MCE by auditing a certain percentage of the registrants for license renewal. Even if the odds of being audited in a given jurisdiction might be statistically small, the consequences of being unable to validate and verify one's continuing education record with the proper documentation are serious. If an audit indicates that a registrant has failed to demonstrate an adequate number of the required units or hours, or if that documentation is incomplete, the registrant may be allowed a grace period in which to either provide the appropriate documentation or complete additional continuing education courses to meet the requirements.

STATE REQUIREMENTS FOR MCE AND THE AIA CONTINUING EDUCATION SYSTEM

Participation in the AIA's Continuing Education System (AIA/CES) is a major benefit to an architect complying with the MCE requirements of licensing jurisdictions. Some jurisdictions allow submittal of the AIA transcript as verification of CEH. Where this is the case, the transcript must be sorted for the correct time period and for HSW courses where these are the only credits allowed.

Even where the transcript cannot be attached and sent along with the application form, the individual can print out his or her transcript and then transcribe the information onto the form required by the jurisdiction. As greater uniformity is achieved, more jurisdictions may allow the AIA transcript to be used directly, but for the immediate future an architect should plan on completing separate paperwork on the often unique forms provided by each jurisdiction.

As long as calendar cycles for license renewal and documentation for continuing education vary from state to state, architects may have to strategize the timing of their learning activities so that adequate credits show up in the right "window" for a particular jurisdiction. Some jurisdictions, committed for now to renewal cycles that set to a midyear date such as July 1, have implemented cycles for documentation of MCE that are tied to the calendar year, thus making it much easier on registrants who are also tracking their AIA membership requirements for CEUs.

Many architects belong to other associations or hold certifications that have their own continuing education requirements. Often, a course that qualifies for one program will also fulfill those for another.

CONCLUSION

Requirements for Mandatory Continuing Education are rapidly evolving, and more jurisdictions can be expected to include requirements in their statutes and rules. MCE is a natural manifestation of an increased emphasis in our society and the profession on life-long learning and should be valued accordingly. Architects should see continuing education requirements as an opportunity to enrich their professional knowledge and to better serve clients and the public.

3.2 Intern Development

Harry M. Falconer Jr., AIA, NCARB, and Catherine Berg

Completing a period of professional internship is essential to an architect's development—and is an important component of the licensure process. Gaining practical experience under the guidance of experienced professionals is invaluable to aspiring architects and prepares them for independent practice.

► See AIA Continuing Education System (3.4) for further discussion of AIA/CES.

THE EXPERIENCE COMPONENT OF LICENSURE

Architects are responsible for the health, safety, and welfare of the people who live or work in the buildings and environments they design. It is because of this significant responsibility that an individual must be licensed in order to practice architecture or use the title of architect. Licensure signifies to the public that an individual has completed the education, experience, and examination necessary to practice architecture.

Only individuals who are licensed by one of the 54 architectural registration boards may call themselves architects.

Gaining experience in the profession is an essential step on the path to become an architect (see Figure 3.1). It is a key component of licensure and offers an important opportunity to develop the knowledge and practical skills necessary to practice architecture.

WHO IS AN INTERN?

The term "intern" refers to any individual in the process of satisfying a registration board's experience requirement. This includes anyone not registered to practice architecture in a U.S. jurisdiction, graduates from professional degree programs accredited by the National Architectural Accrediting Board (NAAB), architecture students who acquire acceptable experience prior to graduation, and other qualified individuals identified by a registration board.

The Intern Development Program (IDP)

Through the IDP, interns learn about the daily realities of architecture practice, acquire comprehensive experience in basic practice areas, explore specialized areas of practice, develop professional judgment, and refine their career goals.

Upon completion of the program, an intern should essentially be able to complete the design of a building from start to finish and manage the project through all phases, from programming to project closeout. This means having the ability to fulfill tasks such as performing site analysis, establishing project cost and feasibility, preparing schematic design documents, applying sustainable design principles, performing code analysis, and preparing construction documents. At the completion of the IDP process, interns should be able to demonstrate knowledge and skills in a wide range of areas, such as basic engineering principles, site design, constructability, and contract negotiation. These are just some of the many tasks and knowledge/skills that the IDP identifies as essential for the independent practice of architecture as a licensed professional.

► Regulation of Professional Practice (3.1) and the backgrounders on the Architect Registration Examination and NCARB Certification (3.2) further discuss the process of achieving licensure.

MANY OPPORTUNITIES TO EARN EXPERIENCE

The IDP is designed with both rigor and flexibility in mind, identifying the experience interns will need and providing a range of opportunities to earn the required experience. It's the nature of the profession that no two interns' experiences will be exactly alike; however, upon completion of the IDP, all interns should possess the knowledge and skills required for the independent practice of architecture as a licensed professional.

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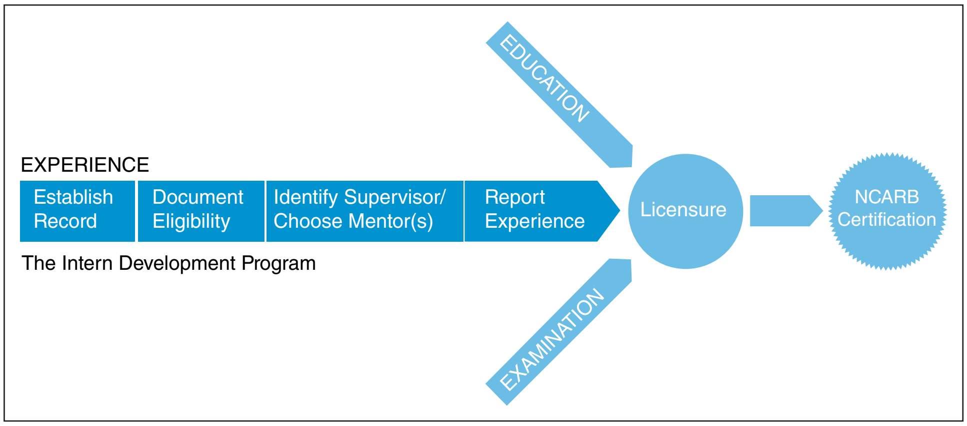


Kenji Bohlin, NCARB

FIGURE 3.1 Path to Licensure: Experience Requirement

Learning First-Hand from Architects

All interns must spend a period of their experience in an architecture firm, working under the supervision of an architect. Learning the practice of architecture directly from architects is integral to the development of emerging professionals.

The collaborative and mentoring relationship between intern and supervisor provides a structured environment for making the transition from school to the profession. Working in a firm under an experienced architect gives interns a grounding in the fundamentals, opportunities to exercise critical thinking, and the chance to experience firsthand how the business of architecture works.

PATH TO LICENSURE

Along the path to licensure, there are a number of choices available to aspiring architects—from selecting a professional degree program, to determining how and where to fulfill internship requirements, to deciding when to take the examination and where to seek initial licensure. Each of the key components of licensure—education, experience, and examination—plays a critical role in an architect's development, and proactively planning for how to satisfy requirements is an important way to take charge of one's career and make the most of each experience along the way.

The architectural registration board in each jurisdiction controls licensure and determines the requirements for initial and reciprocal registration in that jurisdiction. Reciprocity is when a registered architect in one jurisdiction applies for registration in another jurisdiction by presenting documentation that he or she meets that jurisdiction's registration requirements. Checking with an individual board is the best way to verify current requirements.

EDUCATION

In most jurisdictions, earning a professional degree from a program accredited by the National Architectural Accrediting Board (NAAB) is the most accepted way—and often the only way—to satisfy the education requirement for licensure.

EXPERIENCE

All registration boards require a minimum period of internship in order to fulfill experience requirements for licensure. The Intern Development Program (IDP) is required in most jurisdictions and identifies the experience needed for the independent practice of architecture.

EXAMINATION

The Architect Registration Examination® (ARE®) is required in all 54 U.S. jurisdictions and assesses whether a candidate has the knowledge, skills, and ability required for competent practice upon initial licensure. The ARE evaluates the skills that are necessary for protecting the public health, safety, and welfare.

A jurisdiction's architectural registration board ultimately determines whether a candidate has met the requirements for licensure. In addition to the education, experience, and examination requirements, there may be other jurisdictional requirements that must be met in order to complete the licensure process.

Once architects have achieved licensure, they may earn NCARB certification, which helps facilitate reciprocal registration in other jurisdictions.

Interns looking to gain international experience may also earn a portion of their IDP experience working abroad for an architecture firm, under the supervision of an architect who is credentialed by a foreign authority.

Beyond Traditional Practice

Architects can be found in a wide range of professional environments where their skill sets are in demand. In recognition of the opportunities to go beyond traditional practice, there are additional professional settings in which interns can earn experience:

- Working under registered professionals in related professions, such as landscape architecture or engineering
- Working under the direct supervision of a licensed architect in an organization that's not engaged in the practice of architecture, such as a facilities management company

Academic Internships

Interns also earn IDP credit through qualifying academic internships, giving them a jump start in fulfilling program requirements while still in school. Any internship that is integrated into an academic program, whether it be as a requirement or as an elective, is considered an academic internship.

SUPPLEMENTAL EXPERIENCE

The IDP specifies a variety of ways interns can earn experience outside of a traditional setting.

Taking advantage of options to earn supplemental experience demonstrates an intern's initiative and proactive approach to augmenting his or her professional development. Some activities can be completed under the supervision of mentors, providing an invaluable opportunity to deepen relationships and to broaden professional networks. Supplemental experiences like pro bono Leadership and Service, and service to Community-based Design Centers, offer interns the opportunity to engage the greater community. In addition, the work that results from experiences such as design competitions can contribute toward the intern's professional portfolio.

Supplemental experience options include interactive, online, and self-directed activities. Unless otherwise noted, nearly all of these experiences can be completed whether or not the intern is employed, and depending on the opportunity, will earn credit for either core or elective hours.

INTERACTIVE EXPERIENCE

- *Leadership and service*. Interns need to earn a minimum number of hours through pro bono leadership and service in support of an organized activity or a specific organization. The experience may be design industry–related (e.g., Habitat for Humanity); education-related (e.g., English for Speakers of Other Languages [ESOL] teacher, critic at design review); related to strengthening of the community (e.g., soup kitchens, civic participation); or related to a regulatory or professional organization (e.g., volunteering for the AIA or the Green Building Certification Institute).
- *Site visit with mentor*. Interns can earn core hours by visiting construction sites with their mentors. Site visits allow interns to see the progress of a job over time and engage in a dialogue with their mentors. The experience is meant to be interactive, with opportunities to discuss how issues related to the specific project were resolved and why particular decisions were made.
- *Community-based design center or collaborative*. Interns can earn core hours in most IDP experience areas for volunteer service in support of a preapproved charitable organization. The work must be in support of "building" or "planning" projects. NCARB provides a list on its website of organizations it currently recognizes.
- *Design competitions*. Under the supervision of a mentor, interns can earn core hours for completion and submission of a design competition entry for a "building" or "planning" project. Entering design competitions creates regular opportunities for the intern and mentor to interact, and offers a great way to earn core IDP hours across all related IDP experience areas.
- *Teaching or research employment*. Elective hours may be earned through teaching or research employment in a NAAB-accredited program under the direct supervision of a person experienced in the activity.

- *Design- or construction-related employment.* Under the direct supervision of a person experienced in the activity (e.g., design of interior space; engaging in building construction; working for a general contractor), interns can earn credit for employment in design- or construction-related activities.

ONLINE EXPERIENCE

- *Emerging Professional's Companion (EPC) activities.* The EPC was jointly developed by the AIA and NCARB and provides free, web-based experience opportunities outside of the studio or work environment. EPC chapters are aligned with IDP experience areas and include activities that are identified as qualifying for either core or elective credit.
- NCARB's *Professional Conduct* monograph. Interns can earn core hours by reading NCARB monographs and passing the related quizzes. NCARB monographs are written by experts in their fields and explore topics relevant to architecture practice. Interns can download PDFs of the monographs at no charge through their NCARB Record.

SELF-DIRECTED EXPERIENCE

- *AIA Continuing Education System.* Interns can earn experience by completing AIA-approved continuing education resources and programs. One AIA learning unit equals one IDP elective hour.
- *Green Building Certification Institute (GBCI) LEED AP credential.* Interns can earn elective hours by obtaining the GBCI LEED AP credential (with or without specialization).
- *Construction Specifications Institute (CSI) Certification Programs.* Interns can earn experience for completing any of these CSI certification programs: CSI Certified Construction Documents Technologist; CSI Certified Construction Specifier (CCS); or CSI Certified Construction Contract Administrator.

IDP REQUIREMENTS

The IDP has a set of requirements that all interns must satisfy in order to document completion of the program. The *IDP Guidelines* provide a comprehensive overview of all IDP requirements, including information relevant for those serving as supervisors or mentors for interns.

NCARB Record

Establishing an NCARB Record is essential for documenting the IDP. Throughout an architect's career, the NCARB Record serves as a detailed, verified record of his or her education, experience, and examination used to establish qualification for licensure and certification. Interns interested in earning NCARB certification, which facilitates reciprocal registration, can save money simply by keeping their NCARB Record active while they complete the steps for licensure.

Eligibility

To earn IDP experience, interns must establish an eligibility date, which can be based on either education or experience. In some cases, students may be able to begin documenting IDP experience after high school graduation.

Experience Settings

Interns earn IDP experience hours in "experience settings." The experience setting is defined by the type of organization, the work performed, and who verifies the experience. Interns can earn the required experience across a range of settings, and a number of experience opportunities can be completed whether or not employed.

Supervision

Interns work under the direct supervision of an IDP supervisor who is responsible for verifying the intern's experience. "Direct supervision" can include supervising interns through a mix of personal contact and remote communication; and in certain settings, supervisors need only be licensed in any U.S. jurisdiction (not necessarily where their office is located). In most experience settings, the supervisor must be a licensed architect; however, in certain settings, a professional from another discipline, such as landscape architecture, engineering, or construction, may act as an IDP supervisor.

Experience Categories and Areas

The required experience categories and areas in which an intern must gain experience have been derived from the NCARB Practice Analysis of Architecture. Each experience area is weighted based on its importance to the independent practice of architecture. The distribution of hourly requirements across the experience areas is designed to align the IDP with current practice.

Reporting

Interns report their experience hours through an online reporting system. To help facilitate more accurate reporting, interns are required to submit their experience in reporting periods of no longer than six months, and to file the reports within two months of completing the reporting period. Reporting at regular intervals helps both the intern and the supervisor better plan, track, and discuss the intern's progress through the IDP.

HISTORY OF THE IDP

In 1976, NCARB introduced the Intern Development Program (IDP) after working with the American Institute of Architects (AIA) to develop a more structured internship for emerging professionals, to ensure they were exposed to the necessary areas of practice. Administered by NCARB, the program was increasingly adopted by jurisdictions as the sole or chief means to satisfy their experience requirement for licensure.

In order to keep pace with the profession, NCARB makes any updates to the program based on empirically derived data. Since 2005, NCARB has conducted several studies to inform the IDP and align it with current practice. Most significant among them is the NCARB Practice Analysis of Architecture, which is conducted by NCARB every five to seven years. The Practice Analysis surveys the profession to identify the tasks and knowledge/skills that are important for recently licensed architects, practicing independently, to safeguard the health, safety, and welfare of the public.

NCARB and the AIA continue to work together in many ways to support the IDP and emerging professionals. The IDP Advisory Committee (IDPAC) was created by NCARB and the AIA to serve in an advisory capacity on matters related to the IDP. It was formed to bring representatives of appropriate architectural stakeholder organizations together to discuss issues of mutual interest and concern regarding the Intern Development Program. The Committee coordinates the internship-related activities between and among NCARB and the AIA, the Association of Collegiate Schools of Architecture (ACSA), the American Institute of Architecture Students (AIAS), and the Society for Design Administration (SDA). Reports and recommendations made on behalf of the IDPAC are advisory to the Boards of Directors of both AIA and NCARB. Results of its deliberations provide feedback to the participatory organizations to increase the effectiveness of all aspects of the IDP.

THE NATIONAL COUNCIL OF ARCHITECTURAL REGISTRATION BOARDS (NCARB)

NCARB, a nonprofit organization, is a federation of the architectural licensing boards in each of the 50 states, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands. These 54 boards constitute NCARB's membership. NCARB protects the public health, safety, and welfare by leading the regulation of the practice of architecture through the development and application of standards for licensure and credentialing of architects. NCARB is responsible for establishing, interpreting, and enforcing national standards for architectural licensure.

NCARB has a variety of roles in the licensure process, including the development and administration of the Intern Development Program (IDP), the Architect Registration Examination® (ARE®), and NCARB certification, which facilitates reciprocal registration. A range of services is offered by NCARB to support emerging professionals as they progress along the path to licensure. While there are fees in place to help cover the cost of providing these services, NCARB's fee structure takes into account the realities of those just getting started in the profession. The list of services includes the following:

- Compiling, evaluating, and securely storing a comprehensive and confidential Record of credentials to assist the intern's path to licensure
- Developing and administering the IDP
- Developing and administering the ARE
- Creating tools to assist interns in completing the internship and examination process
- Transmitting an intern's Record in support of examination or initial registration
- Visiting AIA chapters and firms across the country to support interns on the path toward licensure and certification
- Engaging interns on relevant NCARB committees to contribute to the process of creating NCARB standards for registration
- Supporting the IDP Coordinator Program

PROFESSIONAL NETWORK OF RESOURCES

IDP Supervisors

IDP supervisors play a vital role in the profession by supporting intern development and supervising the intern's progress through the IDP. By offering their knowledge, guidance, and support to emerging professionals, architects add to the long-term quality and efficacy of the profession.

Serving as an IDP supervisor also contributes to the architect's own professional growth through development of mentoring, leadership, and communication skills. While architects have much to pass on to interns, interns bring a diverse set of skills, along with fresh ideas and perspective, to the table as well.

IDP supervisors have direct supervision over the work performed by the intern, foster a professional relationship that is grounded in direct professional association, and verify the intern's experience. In recognition of the global and increasingly "virtual" ways that business is conducted today, "direct supervision" can include supervising interns through a mix of personal contact and remote communication (e.g., e-mail, online markups, webinars, and Internet).

IDP supervisors:

- Supervise the intern on a daily basis.
- Have control over the work performed.
- Provide reasonable opportunities for the intern to gain the required IDP experience.
- Regularly assess and provide timely feedback on the quality of the intern's work.
- Periodically certify the intern's experience reports, and discuss career goals and overall progress in the IDP.

In most cases, an IDP supervisor must be an architect registered in a U.S. or Canadian jurisdiction; in certain experience settings, a professional from another discipline may act as a supervisor, such as a registered engineer, landscape architect, or construction project manager. For complete details regarding supervisor roles and requirements, see the NCARB *IDP Guidelines*.

A range of resources and support are available to IDP supervisors, including but not limited to regular communications that share important program updates as well as best practices; in-person outreach events hosted by firms and local AIA chapters; and the IDP Firm Awards, sponsored by AIA and NCARB, which honor firms that foster a positive internship environment.

IDP Mentors

A mentor is a loyal adviser, teacher, or coach. Architects looking for a way to give back to their profession and share their expertise with emerging professionals may wish to become an IDP mentor. It's an important opportunity to shape and develop future practitioners—and often, mentoring provides professional growth and unexpected rewards for the mentor as well, as the learning exchange can work in both directions.

Interns entering the IDP are encouraged to identify mentors who can offer professional guidance and support as they progress through the program. Mentors should be professionals whom the intern can count on to make a long-term commitment to his or her professional growth.

To serve as a mentor for the IDP, an architect must be licensed to practice in a U.S. or Canadian jurisdiction; however, the mentor does not have to be registered in the jurisdiction where the intern is located.

While the IDP supervisor is responsible for verifying the majority of the intern's experience, there are several types of supplemental experience opportunities that may be verified by a mentor. These include:

- Participating in design competitions
- Conducting visits to construction sites with the mentor
- Completion of AIA *Emerging Professionals Companion* (*EPC*) activities
- Performance of pro bono leadership and service

IDP Coordinators

▶ See the backgrounder on the IDP Coordinator Program (3.5) to learn more about becoming an IDP coordinator.

The IDP Coordinators Program provides an extensive resource network and facilitates the flow of information to emerging professionals. IDP coordinators are committed to the profession, many serving voluntarily as a point of contact and professional resource for current and future interns. These individuals often have the opportunity to be the first introduction to the licensure process; as such, they play a significant role in educating and guiding interns along the path to licensure. While responsibilities vary depending on their specific role, all coordinator positions share a common responsibility to serve as a knowledgeable information resource for interns on the required components of licensure (education, experience, and examination).

IDP coordinator positions include the following:

- *Educator coordinators* serve as on-campus resources, interacting with students on a regular basis and helping provide the first introduction to the IDP and the licensure process. They assist students in the documentation of IDP eligibility and serve as information resources on the key components of licensure. Educator coordinators will often organize events that help expose students to the licensure process, such as inviting representatives from NCARB to conduct presentations on earning IDP experience, taking the ARE, and applying for licensure and certification.
- *State coordinators* are volunteers who serve as knowledgeable conduits familiar with both the IDP and the licensure process and can provide emerging professionals with the information necessary for the transition from internship to licensure within the context of state regulatory requirements, reciprocity, and NCARB certification. Up-to-date on the latest information about the IDP, state coordinators act as resources for interns and the larger architectural community in their states and often give presentations at schools or AIA component events.
- *Auxiliary coordinators* are self-appointed volunteers with a vested interest in pursuing licensure or encouraging others to do so. They are often associated with firms, local AIA components, state boards, or AIAS chapters. Many architecture firms have an auxiliary coordinator who serves as the in-house expert on all things IDP. In some cases, an auxiliary coordinator may be an intern who has opted to lead a group of coworkers to seek their license.

All coordinators receive resources and training provided by both NCARB and the AIA. Training materials as well as online and in-person training opportunities help coordinators stay current with the latest information about the IDP and other required components of licensure, and help them learn how to serve as a guide and mentor to students and interns. The NCARB website has an IDP coordinators page that provides a full position description for each type of coordinator role, as well as contact information for state and educator coordinators.

Firms

The IDP is most beneficial to the profession when both interns and firms are fully engaged in the process. A forward-thinking firm culture recognizes the value of investing in an intern's professional development and understands that doing so offers both short- and long-term benefits to the firm, its clients, and ultimately the profession. While both supervisors and mentors play a critical role in intern development, the intern's firm can also significantly influence the internship experience.

Firms that encourage interns to become licensed and that support them through the process often find it easier to locate and hire new talent—and to keep valuable, trained employees. They view support of interns as an investment in the organization's future. When interns are embraced by the firm's culture, they are much more likely to be engaged in its mission and support its success. The creativity and skills that interns bring to the table can influence success as a team and firm both now and in the future. Some firms also believe that having more licensed professionals on staff can make the firm more marketable to potential clients.

No matter the size of the organization, focus of practice, or location, there are many ways for firms to encourage and support interns on their path to licensure. Organizations that are supportive of their staff taking on supervisory roles with interns often find rewards such as improved morale, a broader perspective, and a deeper connection to the people who are the future of the profession. All levels of experience can benefit from the information exchange that takes place when interns are an integral part of the firm.

To recognize and honor firms that foster a positive internship environment, NCARB and AIA cosponsor the IDP Firm Awards:

- *The IDP Firm Award* celebrates those firms that, by their active mentoring and engagement with interns, demonstrate a dedication to the field and its future. Twelve criteria across five categories form the basis of the award, and span all aspects of the internship experience. The five categories include mentoring, supervising, training opportunities, commitment to the IDP, and support of the ARE. A firm that demonstrates its commitment to each category establishes itself as a steward on the path to licensure.
- *The IDP Outstanding Firm Award* is awarded to those firms that, in addition to satisfying the five categories necessary for qualification for the IDP Firm Award, show an unsurpassed and proactive approach to the development of the intern experience. Organizations engaged in exceptional activities in the architecture community and in the establishment of a positive firm culture are encouraged to apply for this distinction.

WAYS FOR FIRMS TO SUPPORT INTERNS: REAL-WORLD IDEAS THAT WORK

- *Appoint an in-house IDP auxiliary coordinator* to assist staff and interns with their licensure path needs. Coordinators can provide information and training, help monitor intern progress, and even offer guidance to supervisors and mentors on how to fulfill their roles.
- *Have a structured internship policy in place* that ensures interns are exposed to as many areas of architecture practice as possible, especially those areas that may not be part of an intern's everyday role.
- *Be supportive of staff who take on supervisory or mentoring roles* with interns. Ensure they understand the IDP and the level of support and guidance they will need to provide interns.
- *Offer CE and other training opportunities.* Some firms provide scholarships to fund continuing education or set up "lunch and learn" meetings; others send interns to conferences for professional development.
- *Encourage staff to form networking and support groups* with other interns in the office. Some firms appoint a "buddy" for incoming interns who can serve as an internal expert and resource as the intern makes the transition from education to internship.
- *Assign mentors* who will meet regularly with interns to see how they are progressing in the IDP and toward licensure.
- *Encourage interns* to ask questions and take advantage of learning opportunities, and provide ways for them to grow and stretch their skills.

HOW TWO FIRMS SUPPORT INTERNS AND THE IDP

Two winners of the IDP Outstanding Firm Award discuss their commitment to the IDP and intern development.

SEAY SEAY & LITCHFIELD, MONTGOMERY, AL

Seay Seay & Litchfield (SS&L) understands the enormous learning curve that young professionals face as they leave the confines of architecture education and embark on a career in the profession. To help interns successfully make the transition, SS&L developed a multifaceted system of mentorship that fosters professional growth, personal growth, and office camaraderie. Each intern is assigned an in-office mentor who offers guidance and provides regular feedback, and is also encouraged to have official mentors outside the firm. The firm's culture promotes an environment in which all members of the firm are actively engaged in the growth of its interns.

Beginning on day one of employment, interns are tasked to a project currently under construction that is being supervised by an upper-level member of the firm. Interns at SS&L typically hold three to five project management roles during the time required to complete the IDP. These roles are comprehensive, beginning with contract negotiation and ending with construction administration through completion of a built project.

SS&L's intern development also includes a "lunch and learn" seminar series, participation in design charrettes, formal supplemental education, and regular project management forums. Interns are encouraged to join civic groups in the community, and they also have opportunities to give in-house presentations on their work.

> Pride in the successful fulfillment of their projects creates leaders with a strong backbone for creative and responsible architecture.
>
> *—Jim H. Seay Jr., AIA, LEED AP, firm owner and principal-in-charge, SS&L*

> From day one, we were involved in a range of projects in all phases of development. Through the vast arrays of experiences provided to us, and the mentoring relationships that the firm fosters, our talents were nurtured, and in the end we found ourselves fully prepared to practice architecture.
>
> *—former SS&L interns*

CLARK NEXSEN, NORFOLK, VA

Clark Nexsen places a great deal of importance on mentoring. The firm runs an in-house mentoring program that's part of its operating structure and open to all staff—interns are especially encouraged to participate. Feeding into the mentoring program is a "skills matrix" of core competencies that interns complete when they start at the firm (Table 3.1). The matrix identifies areas of proficiency and necessary/desired development; it is used in performance reviews and referenced during project assignments to help identify development opportunities.

TABLE 3.1 Sample Skills Matrix

	Employee		
Construction Documents	**Doug**	**Karla**	**Jim**
Project Phase Kickoff	C	A	B
Dimensioned Floor Plans	C	A	B
Enlarged Floor Plans	C	A	B
Plan Details	C	A	B
Fire Safety Plans	C	A	B
Roof Details	C	A	B
Reflected Ceiling Plans	C	A	B
Develop Specifications	C	A	C
Review Mechanical Equipment Layouts	D	A	C
Invoicing	–	B	D
Contract Modifications	–	B	D
Obtain Construction Documents Approval	–	B	–
Code Review—Final Check	–	B	–
Final Construction Cost Estimate	–	C	–

A = Mastered skills and able to teach
B = Able to complete without oversight
C = Can complete task with oversight
D = Identified skill goal
– = Little to no experience/skill with task

Source: Clark Nexsen.

An IDP auxiliary coordinator on staff functions as a firm-wide resource, ensuring that all supervisors are knowledgeable about IDP requirements and meeting with interns regularly to provide important program information and guidance. The Clark Nexsen Academy offers a wide range of educational activities, including in-house continuing education events (e.g., "lunch and learns," presentations by in-house or external experts) and field trips to projects under construction and completed by its firm and others.

Clark Nexsen supports interns' progress toward licensure in several ways. It covers NCARB Record fees through the completion of the ARE, and thereafter pays all fees related to professional registration, including NCARB certification. For interns preparing to take the ARE, the firm helps facilitate and organize study events, provides study resources, covers the full cost of all ARE divisions passed, and offers paid time off to interns to take ARE divisions.

> It was evident during my time completing the IDP that Clark Nexsen fundamentally believed that the continual development of its interns was mutually beneficial for both the firm as well as the interns. This approach created many opportunities to gain exposure and experience from the wide variety of projects completed within our office, and rapidly accelerated my progression as an architect.
>
> *—former Clark Nexsen intern (now architect)*

Interns

Interns have a role to play in their own success as well. Taking a proactive approach to internship can include:

- Taking time to review and understand the *IDP Guidelines*.
- Understanding jurisdictional requirements for licensure and reciprocity.
- Carefully identifying a supervisor and choosing mentor(s) who are committed to providing guidance and support along the path to licensure.
- Choosing employment with organizations that will provide a supportive internship environment—speaking to other interns currently employed in the firm is a good way to find out whether it provides interns with opportunities and a well-rounded experience.
- Making a plan for how to complete the IDP and stay on track toward licensure.
- Regularly documenting IDP experience and reviewing progress with supervisors and mentors.
- Self-advocating with supervisors or mentors if having trouble gaining experience in a specific area.
- Asking questions, and taking advantage of any and all learning and development opportunities, both inside and outside the organization.

The internship experience can also be greatly enhanced by peer-to-peer support among interns. Interns can serve as both a support and a valuable information resource to one another as they progress through the IDP and toward licensure. When there are multiple interns at a firm, they can join together and form a networking and support group. Branching out into the larger community by attending local or regional AIA component meetings or other architecture-related events offers opportunities to network and connect with other interns and professionals. Interns can also join together to enter design competitions, or do site visits with a mentor, to earn supplemental IDP experience.

▶ Professional Development and Mentoring (8.4) further addresses the importance of training, mentoring, and appraisal programs that support a firm's strategic plans.

ONE INTERN'S PATH THROUGH THE IDP

Anthony Laney, an intern at Rockefeller Partners Architects, Inc. (RPA) in El Segundo, CA, talks about his experience completing the IDP.

WHAT FACTORS DID YOU CONSIDER WHEN PLANNING FOR YOUR IDP EXPERIENCE?

Aware of the diverse range of experience areas necessary for the completion of the IDP, I sought employment with a handful of firms that assumed responsibility for projects from inception through construction. I considered the company size because small firms are often more nimble and require their employees to excel in a wide range of responsibilities. In an effort to thoroughly comprehend topics such as site analysis and construction observation, I pursued firms that invested primarily in local projects. Lastly, during my interviews, I sought to discern the priority of the IDP process within the culture of the firm. My deliberate decision to work at a small, local, full-service architecture firm significantly influenced the entirety of my IDP experience.

WHEN AND WHERE HAVE YOU FULFILLED YOUR IDP EXPERIENCE REQUIREMENTS?

During the past three and a half years, I've fulfilled my IDP requirements at RPA. I was hired immediately after graduation from architecture school and have currently completed 5,538 of the 5,600 hours required to complete the IDP experience requirements.

HOW HAS YOUR FIRM SUPPORTED YOU AS AN INTERN?

In the most fundamental sense, RPA has invested in and prioritized my learning experience. Rather than simply building on the skills I developed in architecture school, the firm has trained me in areas that were completely new to me—challenging me beyond the scope of digital design, and inviting me to learn about the intricacies and complexities of project management, construction science, and business leadership. RPA allowed me to shadow the firm principals in a wide spectrum of tasks. Although I am their most junior staff

(continued)

member, RPA has chosen to focus on my future potential, deliberately and consistently inviting me to participate in a wide range of CAD-free activities including marketing seminars, design conventions, client meetings, contractor evaluations, and financial strategizing.

HOW HAS YOUR SUPERVISOR HELPED SUPPORT YOUR PROGRESS THROUGH THE IDP?

My IDP supervisor, who is the senior partner of RPA, has guaranteed that my hours are spent on a diverse range of tasks. He is very mindful of the IDP categories that need more attention and intentionally places me on projects to target these areas. He also actively tracks my progress through the IDP, reviewing past experience reports and projecting future opportunities that will help me satisfy requirements.

IS THERE ANYTHING YOU WISH YOU HAD KNOWN WHEN YOU STARTED THE IDP?

I wish I had intentionally pursued the "harder-to-get" categories from the beginning of my employment. Though the 1,200 hours of construction documents seemed daunting, this was a relatively easy category to fulfill because I consistently contributed large quantities of time toward this experience area. On the other hand, the project cost and feasibility area, as well as the construction phase: observation area, require a fraction of the hours, but will be among the last areas for me to complete. These experience areas are relatively specific and will demand more attention and support from my supervisor in order for me to get the required hours.

DID YOU HAVE MENTORS? IF SO, HOW HAVE THEY BEEN HELPFUL TO YOU?

A commitment to mentorship is described in the first paragraph of my employment contract. Protégé development is at the core of RPA's priorities. Beyond offering guidance about the IDP, my mentor has helped to direct and inspire my career decisions, and has encouraged me to pursue teaching and extracurricular building projects outside the office.

HOW DO YOU THINK YOUR IDP EXPERIENCE IS PREPARING YOU FOR YOUR CAREER AS AN ARCHITECT?

Though I ultimately aspire to become an expert in a particular segment of design, I value the well-rounded foundation that has been laid over the past three and a half years. I am grateful for the balanced and healthy range of responsibilities that have been assigned to me for the sole purpose of enabling me to complete my IDP experience. I have also grown to appreciate the mindfulness that comes from knowing where your time is being invested. Having carefully recorded and categorized my hours, I've developed a more effective understanding of my career trajectory and future goals. As I'm aware of my progress, I can coherently manage my career course.

DO YOU HAVE ANY ADVICE FOR INTERNS ON HOW TO GET THE MOST OUT OF THE IDP?

I advise young graduates to include the IDP among the many factors to consider when interviewing for a job. The success of one's IDP experience is so closely tied to a firm's culture and structure. True mentorship is an invaluable component of professional growth and career advancement. Seek a firm that's willing to take risks with their junior staff members—and try to accurately assess the value that your future employer places on long-term relationships, mentorship, and protégé development.

Finally, I recommend that interns strive to connect their ARE study regimen with the IDP categories that they're currently engaging. A tall pile of study materials becomes less overwhelming when topics are linked to the assignments that are on your desk. I have benefited from a study system that leverages the knowledge of my colleagues and the projects that I interact with each week.

For More Information

NCARB licensure requirements for each U.S. jurisdiction, including those for reciprocal registration: www.ncarb.org.

The NCARB IDP Guidelines: http://ncarb.org/en/Experience-Through-Internships/~/media/Files/PDF/Guidelines/IDP_Guidelines.pdf.

The *Emerging Professional Companion* (*EPC*): www.epcompanion.org.

The Green Building Certification Institute LEED AP credential: www.gbci.org.

Construction Specifications Institute certification: www.csinet.org.

AIA IDP Firm Award Guidelines and criteria: www.aia.org/IDPFirmAward.

BACKGROUNDER

ARCHITECT REGISTRATION EXAMINATION® (ARE®)

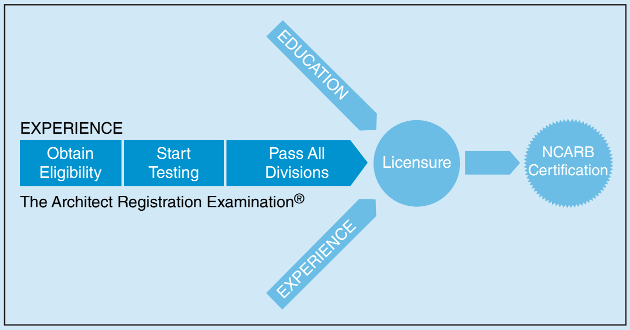
Erica J. Brown, AIA, NCARB

The Architect Registration Examination® (ARE®) assesses a candidate's knowledge, skills, and abilities to perform the various services required for the independent practice of architecture.

Erica J. Brown is director of the Architect Registration Examination for the National Council of Architectural Registration Boards (NCARB). She oversees the development, administration, and management of all divisions of the exam. She is licensed to practice architecture in Indiana and holds the NCARB Certificate.

Each U.S. jurisdiction sets its own requirements for initial registration. In addition to fulfilling education and experience requirements, a candidate must meet his or her jurisdiction's examination requirement (see Figure 3.2). All fifty-four U.S. jurisdictions require the completion of the Architect Registration Examination (ARE) to satisfy their examination requirement.

Developed and administered by the National Council of Architectural Registration Boards (NCARB), the ARE concentrates on those skills necessary for protecting the public health, safety, and welfare. Figure 3.2 illustrates the ARE process on the path to licensure.



Kenji Bohlin, NCARB

FIGURE 3.2 Path to Licensure: Examination Requirement

HISTORY OF ARCHITECTURE EXAMINATION

Licensure examinations weren't always standardized across states and jurisdictions. Previously, each registration board prepared its own test specifications and questions, and set its own passing standards. Because the examination process varied from jurisdiction to jurisdiction, an effective system for reciprocal licensure was not possible.

To address this need for standardization, NCARB worked with its Member Boards to create the first nationally recognized exam for architects in 1965, and in the ensuing years, continued to make significant improvements to the exam. In 1997, after extensive research and development, all exam divisions were delivered and scored by computer, making the ARE more accessible to candidates and providing the flexibility to test year-round. By establishing a single examination that all jurisdictions rely on, the process for achieving reciprocity was streamlined.

It is worth noting that in addition to the ARE, some Boards require candidates to pass jurisdiction-specific, supplemental exams in order to satisfy the examination requirement for licensure.

EXAMINATION OVERVIEW

The ARE is developed and regularly reviewed and validated by subject matter–expert architects, and conforms to standards established by national testing organizations. A strong research and development culture drives the ARE, with significant annual investments being made by NCARB into its continual development and evolution. In all cases, the process is rigorous, time-consuming, and necessary to ensure the ARE remains legally defensible and psychometrically valid.

Every five to seven years, NCARB conducts a practice analysis of architecture by surveying the profession to identify the tasks and knowledge/skills necessary for independent practice. Findings from the practice analysis serve as the basis for updating the ARE test specification.

Any modifications to the exam are made after deliberate, studied, and controlled evaluation. Exam updates are made for two essential reasons: to ensure questions reflect current architectural practice and to use technology that accurately assesses the ability of candidates to practice architecture independently.

The following information is current as of 2012 but is subject to change, since the exam is in a continual state of development. For the most current information about the ARE, contact NCARB or visit its website.

Format and Focus of the Examination

In addition to testing for competence in specific subject areas, NCARB is aware of the responsibilities an architect may have for coordinating the activities of others involved in the design/construction process. The ARE attempts to determine a candidate's qualifications not only in performing measurable tasks, but also in exercising the skills and judgment of a generalist working with numerous specialists. In short, the

(continued)

objective of the exam is to reflect the practice of architecture as an integrated whole.

The examination includes seven divisions:

- Programming, Planning & Practice
- Site Planning & Design
- Building Design & Construction Systems
- Schematic Design
- Structural Systems
- Building Systems
- Construction Documents & Services

Six of the seven divisions contain a section of multiple-choice items and a separate section including one or more graphic vignettes, which are problems used to assess candidates' knowledge, skills, and abilities in the different facets of architectural practice, such as site zoning and structural layout. One division contains only graphic vignettes. It is recommended that candidates use the free practice software provided by NCARB to become familiar with the software interface used for the graphic vignettes in the examination.

Eligibility

While all jurisdictions require the ARE to satisfy their licensure examination requirement, candidates will want to understand and stay informed of the requirements specific to the jurisdiction where they plan to seek initial licensure. For example, some states allow concurrent completion of the Intern Development Program (IDP) and the ARE, so candidates should contact the individual registration board to verify when they can become eligible to begin testing.

Candidates are responsible for maintaining their eligibility status. Once made eligible to take the exam, candidates must take at least one division every five years in order to maintain their eligibility to test.

Exam Administration

Candidates may take the exam divisions in the order of their choosing and must pass all divisions to complete the ARE. The ARE is administered exclusively on computers through a network of approximately 300 test centers across the United States, its territories, and Canada.

Rolling Clock

Under the terms of NCARB's rolling clock policy, candidates must pass all divisions within five years; a passing grade for any division of the ARE will be valid for five years, after which time the division (or any equivalents) must be retaken unless all divisions have been passed. Candidates should also be aware that there is a mandatory six-month waiting period before one can retake a failed division of the exam; candidates may sit for other exam divisions during this waiting period. In addition to NCARB's rolling clock policy, jurisdictions may have their own retake limit/exam validity time frame, so candidates should contact their jurisdiction directly to determine their exam status under the jurisdiction's rules and policies.

Resources

NCARB provides a number of resources, accessible on its website, to help candidates plan and prepare to take the ARE; however, it is ultimately the candidate's responsibility to acquire the knowledge and skills necessary to demonstrate competency. The NCARB *ARE Guidelines* are essential reading for anyone preparing for the exam. They include further detail on the exam, the rolling clock policy, exam eligibility information, and the steps to take and complete the ARE. NCARB also offers free Exam Guides and Practice Programs to help candidates study and practice for each division of the exam.

Preparation Tips

Planning for the ARE is critical. There are a number of steps candidates can take to prepare for the examination:

- Take time to review and understand the requirements for the jurisdiction where seeking initial licensure. If in doubt, contact the jurisdiction directly to get clarification on its requirements.
- Review the *ARE Guidelines* to understand eligibility rules and other requirements.
- Be proactive, and create a plan for taking the exam: Determine when and where eligible to sit for it, what order to take the exam divisions in, and how to prepare.
- Use the exam guides and practice programs provided by NCARB. Additional references are listed in the back of the exam guides—many of these resources include professional publications that are commonly available in libraries and offices.
- Form a study group with other candidates, either through work or locally. Regional AIA chapters may be able to connect candidates with one another as well.
- Discuss plans with supervisors or mentors for preparing and taking the exam.
- Take advantage of the resources, support, and benefits firms may offer interns taking the exam.

For More Information

Architect Registration Examination: www.ncarb.org/ARE.aspx.

Registration requirements for each U.S. jurisdiction: www.ncarb.org.

BACKGROUNDER

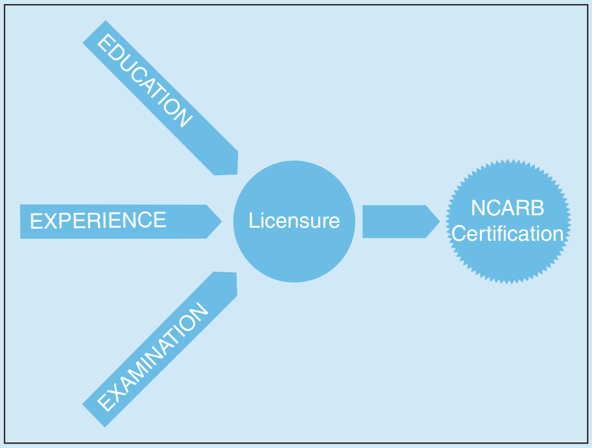
NCARB CERTIFICATION

Douglas Morgan

Architects must be licensed in each jurisdiction in which they seek to practice. The NCARB Certificate, administered by the National Council of Architectural Registration Boards (NCARB), is a recognized professional credential that helps facilitate reciprocal registration for licensed architects among U.S. and Canadian registration boards.

Douglas Morgan is the Director of Records for the National Council of Architectural Registration Boards (NCARB). With over 20 years of records management experience, Morgan has modernized and transformed NCARB records management to provide effective regulation and enhanced customer service to NCARB Record and NCARB Certificate holders.

After initial licensure, an architect can pursue NCARB certification, which helps facilitate reciprocal registration in other jurisdictions (see Figure 3.3). Reciprocity (also commonly referred to as "comity" or "endorsement") is achieved when applications for licensure in additional jurisdictions are approved based on jurisdictional review and acceptance of verified documentation showing that the architect has satisfied all of the requirements for reciprocal registration.



Kenji Bohlin, NCARB

FIGURE 3.3 Path to NCARB Certification

The NCARB Certificate is the most common and widely accepted means of gaining reciprocity, with more than half of U.S. registration boards requiring it for reciprocal registration. It certifies that an architect has met the national standards of eligibility for licensure established by the boards and recommends registration of the architect without further qualification.

NCARB certification helps streamline the process and reduce the amount of time needed to receive a reciprocal license in most states. The reality of architectural practice today is that many firms, whether large or small, practice in multiple jurisdictions. Because it expedites reciprocity, certification can help architects or their firms more quickly mobilize in pursuit of new business or meet expanding client needs across state lines. Some jurisdictions also allow the benefit of soliciting work or participating in a design competition prior to licensure if the architect holds an NCARB Certificate.

When applying for reciprocity, NCARB-certified architects pay a Record transmittal fee and request transmittal of their NCARB Record, which is sent by NCARB to the jurisdiction of interest. The fee includes the services provided as part of the Record storage, verification, and transmittal processes, and also helps subsidize the cost of programs that NCARB provides to the profession, such as the Architect Registration Examination.

Those who have an active NCARB Certificate may use the letters "NCARB" after their name, indicating that they have earned and maintain this recognized professional credential and are licensed architects.

STANDARD PATH TO CERTIFICATION

Earning NCARB certification is a relatively straightforward process. The architect needs to establish and hold an active NCARB Record in order to apply for certification. The NCARB Record is a detailed, verified record of architecture education, experience, and examination used to establish qualification for licensure and certification. The architect must also meet the following requirements:

- Be of good character as verified by employers and an NCARB Member Board where the architect is registered.
- Document completion of a professional degree in architecture from a program accredited by the National Architectural Accrediting Board (NAAB).
- Document completion of the Intern Development Program (IDP).
- Have passed the Architect Registration Examination® (ARE®) or its then-current predecessor.
- Hold an active registration in good standing in a U.S. jurisdiction.

ALTERNATE PATHS TO CERTIFICATION

Architects who don't hold a professional architecture degree from a NAAB-accredited program, or those credentialed by a foreign authority, may qualify for NCARB certification through the Broadly Experienced Architect (BEA) Program or the Broadly Experienced Foreign Architect (BEFA) Program. While most jurisdictions accept an NCARB Certificate

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through these programs for reciprocal licensure, it is important for each BEA and BEFA applicant to confirm to specific registration requirements, including those for reciprocity, with the individual jurisdiction in which they would like to be licensed.

Broadly Experienced Architect (BEA) Program

The BEA Program provides eligible architects registered in a U.S. jurisdiction an alternative to the education requirement for NCARB certification. Eligible architects can demonstrate their learning through experience by meeting the requirements of the *NCARB Education Standard*, which approximates the requirements of a professional degree from a NAAB-accredited program. The BEA Program requires establishment of an NCARB Record and preparation of an education dossier to demonstrate learning through experience, and may also require an education evaluation.

Broadly Experienced Foreign Architect (BEFA) Program

Architects credentialed by a foreign authority are eligible to apply for an NCARB Certificate through the BEFA Program. The multistep BEFA process requires establishment of an NCARB Record, preparation of a dossier to demonstrate experience, and a personal interview. An architect intending to pursue this alternative should complete and submit the BEFA Eligibility Verification form prior to applying for an NCARB Record.

Alternatives to the Intern Development Program (IDP)

Architects who did not complete the IDP may retroactively document the IDP for purposes of NCARB certification. This is the most prudent course of action and offers the best chance of securing future reciprocity, as many jurisdictions specifically require the completion of the IDP to gain reciprocal licensure.

A second alternative is available and fully explained in the NCARB *Certification Guidelines*; however, it is worth noting that some jurisdictions may not accept this alternative and may require formal IDP documentation for reciprocal licensure. To use this alternative, applicants must be licensed by a U.S. jurisdiction for five consecutive years, must verify that their experience as an architect met the intent of the IDP, and must have that experience verified by one or more other architects. This alternative does not apply to architects licensed after January 1, 2011.

For More Information

NCARB certification and reciprocity: www.ncarb.org or by contacting NCARB Customer Service at customerservice@ncarb.org.

NCARB *Certification Guidelines*: www.ncarb.org/en/Certification-and-Reciprocity/Certification-Overview/~/media/Files/PDF/Guidelines/Cert_Guidelines.ashx.

NCARB Education Guidelines: www.ncarb.org/Studying-Architecture/~/media/Files/PDF/Guidelines/EDU_Guidelines.pdf.

Registration requirements for each U.S. jurisdiction, including those for reciprocal registration: www.ncarb.org.

To study architecture is to study all things.

—John Ruskin

Architects are broadly qualified to practice in a wide variety of roles and settings within the architecture profession and building enterprise.

—David Haviland, Hon. AIA

The building of a career is quite as difficult a problem as the building of a house, yet few ever sit down with pencil and paper, with expert information and counsel, to plan a working career and deal with the life problem scientifically, as they would deal with the problem of building a house, taking the advice of an architect to help them.

—Frank Parsons, 1909

3.3 The Career Paths of an Architect

Lee W. Waldrep, Ph.D.

This article describes career designing—a process of developing a career that parallels the architectural design process—and the roles an architect can pursue both in the architecture profession and outside traditional practice. As well, it outlines those career paths beyond architecture, often referred to as nontraditional careers.

After the rigors of an architecture education, work experience, and examination, becoming an architect may seem the simple and direct path for a career. However, other paths exist not only for the new graduate but also for the experienced architect wanting or needing to make a change.

Currently the assistant director at the School of Architecture at the University of Illinois at Urbana-Champaign, Lee W. Waldrep has 20 years of experience in higher education. With degrees from American University, ASU, and Michigan, he is the author of *Becoming an Architect: A Guide to Careers in Design,* 2nd edition (Wiley 2010).

As the father of vocational guidance Parsons states, the building of a career—the process of career development—is a difficult but important task. Yet few individuals prepare for their careers in a thoughtful, careful, and deliberate manner. Instead, many often fall into a career, while others make random career choices that show little commitment to their occupation. This approach frequently leads to dissatisfaction.

CAREER DESIGNING

Deliberately designing one's career path maximizes career success at any point on a career. As with architectural projects, careers can be planned. Actually, designing a career is parallel to designing a building. Programming, schematic design, design development, working drawings, and construction are replaced in the career designing process with assessing, exploring, decision making, and planning.

Assessing

When an architect designs a project, programming is the first step in the process. As William Pena points out in *Problem Seeking*, the main idea behind programming is the search for sufficient information to clarify, understand, and state the problem. In a similar manner, when designing a career, the process begins with assessing.

Know thyself.

—Inscription over the Oracle at Delphi, Greece

Assessing involves learning about yourself. Assess where you want to be; analyze what is important to you, your abilities, the work you would like to do, and your strengths and weaknesses. Just as programming assists the architect in understanding a particular design problem, assessment helps determine what a person wants from their career. This ongoing process must be revisited throughout a person's entire career. The details of assessment include examining values, interests, and skills.

Values

Values are feelings, attitudes, and beliefs held close to the heart. They reflect what is important to a person; they tell you what you should or should not do. Work values are the enduring dimensions or aspects of work that are regarded as important sources of satisfaction. Values traditionally held high by architects include creativity, recognition, variety, independence, and responsibility.

As a quick inventory, circle which of the following you value most in your work:

- Social contributions
- Creativity
- Excitement
- Working alone or with others
- Monetary reward
- Competition
- Change and variety
- Independence
- Intellectual challenge
- Physical challenge
- Fast pace
- Security
- Responsibility
- Making decisions
- Power and authority
- Gaining knowledge
- Spiritual/Transpersona
- Recognition

Your responses provide insight on a career path within the profession. For example, an architect who valued contributions to society most highly might look for opportunities for work in public interest design.

▶ Socially Responsible Design Overview (4.1) addresses public interest design.

Interests

Interests are those ideas, events, and activities that stimulate enthusiasm; they are reflected in choices you make about how you spend your time. In simplest terms, interests are activities that an individual enjoys doing. Typically, architects have a breadth of interests because the field of architecture encompasses artistic, scientific, and technical aspects. Architects enjoy being involved in all phases of the creative process—from original conceptualization to a tangible finished product.

To determine your interests, complete the following exercise: In 10 minutes of continuous writing, never removing pen from the paper or fingers from the keyboard, answer the question: *What do I like to do when I am not working?*

Career development theory dictates that an individual's career path should follow their interests; if they do, they will see success.

Skills

Skills or abilities can be learned. There are three types of skills—functional, self-management, and special knowledge. Having a functional skill means being able to perform some specific type of activity, action, or operation with a good deal of proficiency. According to the Bureau of Labor Statistics, an architect needs the following skills: analytical, communication, creativity, critical-thinking, organizational, technical, and visualization. Self-management skills speak to one's personal characteristics, while special knowledge are skills you have that may not necessarily pertain to your career.

The importance of knowing one's skills is echoed by Richard Bolles in *The Quick Job Hunting Map*: "You must know, for now and all the future, not only what skills you have, but more importantly, what skills you have and enjoy." With respect to skills, think back over the past five years. What were your five most satisfying accomplishments? Next to each, list the skills or abilities that enabled you to succeed. Similarly review your failures to determine traits or deficiencies you want to overcome. Knowing your skill set is important as it helps you direct your career path.

A variety of techniques may be used to conduct an assessment. The few listed here are simply to get started; others include writing an autobiography and undertaking empirical inventories or psychological assessment with the assistance of a career adviser. Regardless of the method you choose, only you can best determine what skills you have acquired and enjoy using; the issues, ideas, problems, and organizations that interest you; and the values that you care about for your life and career. By assessing yourself, you will better be able to make decisions related to your career path.

Exploring

Students spend four or more years learning how to dig data out of the library and other sources, but it rarely occurs to them that they should also apply some of the same new-found research skill to their own benefit—to looking up information on companies, types of professions, sections of the country that might interest them.

—Albert Shapero

Schematic design follows programming in the design process. Schematic design generates alternative solutions; its goal is to establish general characteristics of the design, including scale, form, estimated costs, and the general image of the building, the size and organization of spaces. In addition, schematic design identifies major issues and makes initial decisions that serve as the basis of subsequent stages.

In career designing, exploring is parallel to schematic design. It develops alternatives or career choices. Career exploration is the process of accumulating information about the world of work. Its goal is to obtain career information on a plethora of careers or specializations within a particular career. Even if you already have chosen architecture as a career, it is still a valuable and necessary process. Instead of exploring careers, you can explore firms, possible career paths within architecture, and other areas that affect your architectural path; understanding exploration will help you be flexible and adaptable when the economy or other factors require it.

To begin, collect career information from a variety of sources, both people and publications. Conduct an *information interview*—interviewing someone to obtain information. People to interview might include a senior partner in a local firm, a faculty member, a classmate or colleague, or a mentor. Other ways to explore are through attending lectures sponsored by the local AIA chapter or a university, volunteering time through a local AIA committee or other organizations of interest, becoming involved with a mentor program, and observing or shadowing someone for a day.

As Shapero states, use research skills to access any and all information on a career. Visit your local library and inquire about the following publications: *The Dictionary of Occupational Titles (DOT)*, *Occupational Outlook Handbook (OOH)*, *Guide to Occupational Exploration (GOE)*, and *What Color Is Your Parachute?* Ask a reference librarian to identify other resources that might find valuable. In addition, investigate resources at your local AIA chapter or the library/resource center at an area architecture program.

Decision Making

The heart of the design process is design development. Similarly, decision making is the heart of the career development process. Design development describes the specific character and intent of the entire project; it further refines the schematic design and defines the alternatives. Decision making means selecting alternatives and evaluating them against a predetermined set of criteria.

What most people want out of life, more than anything else, is the opportunity to make choices.

—David P. Campbell

How you make decisions? Do you rely on gut-level reactions? Or do you follow a planned strategy of weighing alternatives? Whatever your method of deciding, be aware of it. While some decisions can be made at the drop of a hat, others, including career designing, require more thought.

Decision making can be difficult and time-consuming, but knowing the quality of decisions is affected by the information used to make them, you quickly realize that making informed decisions is an important skill to learn. Decision making is making the decision based on what you learned from assessing and exploring.

Both exploring and decision making are critical steps to successful career designing. Once a decision is made and a path chosen, the next step, planning, is about taking action to realize your goals.

Planning

Planning is key to fulfilling your career goals. After the owner/client decides on a design for a potential building, the next step is the development of plans. These plans—construction documents, specifications, and construction schedules—all play an important role in realizing the design. As part of the career development process, planning ensures that a successful career will be realized.

If you do not have plans for your life, someone else does.

—Anthony Robbins

Planning is bringing the future into the present so that we can do something about it now.

—Alan Lakein

In his book *The 7 Habits of Highly Effective People*, author Stephen Covey states that a mission statement focuses on what you want to be (character) and to do (contributions and achievements) and on the values or principles on which being and doing are based. To start the planning process, draft your mission statement by asking yourself: What do I want to be? What do I want to do? What are my career aspirations? Review the mission statement example below:

> I desire to act in a manner that brings out the best in me and those important to me—especially when it might be most justifiable to act otherwise.

After you have crafted your mission statement, the next step is to develop goals that will lead to its fulfillment. Goals are future-oriented statements of purpose and direction to be accomplished within a specified time frame. They are stepping stones in achieving long-range aims and should be specific and measurable. Write down your goals. It has been said that the difference between a wish and a goal is that a goal is written down.

Once you establish your goals, you are ready to develop the action plan that will help you accomplish them. Action plans are steps on the path toward your goals; they are stepping stones in achieving related short-range intentions. Look at your accomplished goals. What steps must you take to accomplish them? As with career goals, write down your action plan, including specific completion dates.

The final step in planning is to review your action plans and goals regularly. Cross out the goals you have accomplished and revise, add to, or delete others. Be honest with yourself. Are you still committed to achieving your goals? You can change them, but remember that the magic road to achievement is *persistence*. Abandon goals only if they have lost meaning for you, not because they are tough or you have suffered a setback.

Now that you understand the career designing process—assessing, exploring, decision making, and planning—you can implement it. This process is never-ending and cyclical as you progress through your professional career. As soon as you have secured an ideal position in a firm, you will wish to assess your new life situation and make adjustments to your career design accordingly. Designing your career is one of the most important tasks during your lifetime.

CAREER PATHS

Careers in Architecture

Pursuing architecture prepares an individual for a vast array of career possibilities. Many of these are within traditional architecture practice, but many are also available in related career fields.

Within the traditional architecture firm, graduates may obtain a beginning position as an intern and progress to junior designer, project architect, and, eventually, associate or principal. Getting to the top does not happen overnight; it can take a lifetime. Aspiring professionals may pursue their careers in traditional firms regardless of their size (small, medium, or large) or may choose to work in a different setting, such as a private corporation, a government agency, or a university—or, after obtaining professional licensure, may choose to start their own firms.

► Entrepreneurial Practice: Starting an Architecture Firm (5.2) discusses why and how to start one's own firm.

Architectural Practice

How does a career in architecture begin? How does a person progress from graduation to become an architect? Following the AIA Definition of Architect Positions, the path seems linear, progressing from an intern to architect; once licensed (and depending on the firm), the path continues to architect I (3–5 years) and architect/designers III (8–10 years). From there, the path progresses to project manager, department head or senior manager, junior principal/partner, and concludes with senior principal/partner.

► Intern Development (3.2) discusses the IDP in detail.

Of course, the path of a career in architecture is not strictly linear; however, it is helpful to understand these titles with the knowledge and responsibility associated with them, as outlined in Dana Cuff's *Architecture: The Story of Practice*. Upon entry into the profession, the intern is building upon their educational foundation through practical experience under the supervision of an architect; and the intern is tracking their experience in the Intern Development Program (IDP), an essential step in becoming an architect. Once licensed, the architect is demonstrating competence, gathering responsibility, and gaining autonomy and management tasks. When at the full-fledged stage, the architect is gaining fiscal responsibility on a widening sphere of influence.

The entering graduate does face challenges. Given the gap between education and practice, what happens in the studios of schools is much different than the studios of the firms. For this reason, architecture students are strongly encouraged to seek intern positions in architecture firms during their academic years.

Those seeking licensure will find it essential to secure employment within an architecture firm to gain the necessary experience under the direct supervision of an

AIA DEFINITION OF ARCHITECT POSITIONS

- *Senior Principal/Partner*: Typically an owner or majority shareholder of the firm; may be the founder. Titles include president, chief executive officer, or managing principal/partner.
- *Mid-Level Principal/Partner*: Titles include executive or senior vice president.
- *Junior Principal/Partner*: Recently made a partner or principal of the firm. Title may include vice president.
- *Department Head/Senior Manager*: Senior management architect or nonregistered graduate; responsible for major department(s) or functions; reports to principal or partner.
- *Project Manager*: Licensed architect or nonregistered graduate with more than 10 years of experience; has overall project management responsibility for a variety of projects or project teams, including client contact, scheduling, and budgeting.
- *Architect/Designer III*: Licensed architect or nonregistered graduate with 8 to 10 years of experience; responsible for significant aspects of projects; responsible for work on minor projects. Selects, evaluates, and implements procedures and techniques used on projects.
- *Architect/Designer II*: Licensed architect or nonregistered graduate with 6 to 8 years of experience; responsible for daily design or technical development of a project.
- *Architect/Designer I*: Recently licensed architect or nonregistered graduate with 3 to 5 years of experience; responsible for particular parts of a project within parameters set by others.
- *Intern*: Unlicensed architecture school graduate under supervision of an architect.
- *Entry-Level Intern*: Unlicensed architecture school graduate in first year of internship.
- *Student*: Current architecture student working during summer or concurrently with school.

architect and meet the requirements of the Intern Development Program (IDP); however, in recognition of opportunities to go beyond traditional practice—such as working under registered professionals in related professions like landscape architecture, or working under an architect outside of a firm setting—interns can gain experience in other work settings.

When seeking employment, one should consider firm size as a factor when considering where to work; in large firms, an intern will be exposed to a broad scale of projects and a full-service firm, but may be limited in their exposure to aspects of practice. In a small firm, the intern will see the full spectrum of projects, but the projects may be limiting in scope and size. Where one works at the start of their career can have an impact on their future career trajectory in architecture.

Within what is typically referred to as traditional practice, there are firms that develop specialties. While they are still architecture firms, these specialties provide opportunities to showcase talent or strong interest. Examples of such specialties include programming, design, specifications, construction contract administration, or sustainability.

Some firms focus on particular building types, such as healthcare, religious, justice facilities, housing, interiors, sports facilities, educational, and institutional. One firm—for instance, Animal Arts in Boulder, Colorado—focuses on facilities related to animals, including veterinary hospitals, shelters, and pet resorts. As a specialist in healthcare, an architect can become a certified healthcare architect with the American College of Healthcare Architects (ACHA). Certain Knowledge Communities of the AIA that focus their energies on building types or specialties include the Academy of Architecture for Health, the Academy of Architecture for Justice, the Committee on Architecture for Education, and the Interfaith Forum on Religion, Art and Architecture, among others.

Another means to expand a career within the profession is through supplemental architectural services. Because of the recent economic downturn, the AIA created the Supplemental Architectural Services program, a series of detailed essays and slide presentations to offer assistance to architects in expanding their consulting services.

SUPPLEMENTAL ARCHITECTURAL SERVICES

Supplemental architectural services can:

- Help architects generate income.
- Increase the value of the firm through diversification.
- Help attract new clients or keep the firm involved with existing patrons.
- Be used as special projects for young professionals to nurture their development.

The AIA has identified 48 supplemental architectural services, listed below. More information on each of these—required knowledge and skills, why clients need the deliverables, associated tasks, and the AIA Contract Document that can be used in conjunction with the service—can be found at the AIA Architects Knowledge Resource, Supplemental Architectural Services (http://www.aia.org/practicing/akr/AIAB089194).

- Accessibility Compliance
- Architectural Acoustics
- Building Measurement
- Code Compliance
- Commissioning
- Contract Administration/Construction Contract Administration/Design and Construction Contract Administration
- Construction Defect Analysis
- Construction Documentation—Drawings
- Construction Documentation—Specifications
- Construction Management
- Construction Procurement
- Demolition Planning Services
- Detailed Cost Estimating
- Digital Architecture Survey Technologies
- Energy Analysis and Design
- Energy Monitoring
- Environmental Graphic Design
- Expert Witness Services
- Facility Evaluation Services
- Facility Management/Facility Support
- Furniture, Furnishings and Equipment Services/FFE Design
- Geotechnical Services
- Historic Preservation
- Indoor Air Quality Consulting
- Interior Design/Architectural Interior Design
- Land Surveying Services
- Lighting Design
- Model Construction
- Move Management
- On-Site Project Representation
- Parking Planning Services
- Postoccupancy Evaluation
- Program Management Services
- Programming
- Project Financing and Development Services
- Record Drawing
- Regional or Urban Planning
- Renderings
- Research Services
- Security Evaluation and Planning Services
- Seismic Analysis and Design
- Site Analysis/Site Evaluation and Planning
- Space Planning
- Strategic Facility Planning
- Sustainable Building Design
- Urban Design Services
- Value Analysis
- Zoning Process Assistance

Outside Traditional Practice

Beyond traditional practice, architects work in a number of other settings. While no exact statistics are kept, it is estimated that one in five architects work outside private practice.

- *Corporations and institutions.* Do you want to work at McDonald's? It may come as a surprise that McDonald's hires architects, as do many businesses and corporations. Corporate architects may serve as in-house architects, but in most cases they represent the interests of the corporation to the outside architects they hire. Depending on the industry, they may be involved with all phases of a project.
- *Government and public agencies.* Federal, state, and local governments commission more than one-quarter of construction annually. As such, opportunities exist for architects in public agencies. Many departments of government, including the military, employ architects. In addition to traditional tasks, architects manage facilities and projects and oversee construction. Emerging professionals may find it difficult to start a career in a public agency, but such careers can be extremely worthwhile.

Employers of public architects (as represented on the 2012 Advisory Group of the AIA Public Architects Knowledge Community) include the State of Ohio, Texas A&M University, the U.S. Army Corps of Engineers, Thomas Jefferson National Lab, the City of Dallas, and the Judicial Council of California.

- *Education and research.* For some architects, a substantial career path is teaching and research. According to the National Architectural Accrediting Board (NAAB), there are over 6,064 faculty members within the accredited programs of architecture in the academic year 2011–2012, most of whom are adjunct faculty. Additionally, with over 300 programs in architectural technology at the community college level, many more opportunities exist for architects to teach at this level. In addition to teaching, architects serving as faculty will pursue research interests to test ideas that connect education and practice. Aside from teaching future architects, many faculty members also maintain a practice.

► See Research in Practice (14.1) and Participating in Architecture Education (3.6) for further discussions of architecture research and education.

Beyond Architecture

An architecture education is excellent preparation for many career paths beyond architecture. In fact, the career possibilities with an architecture education are truly limitless. Anecdotal estimates suggest that only one-half of architecture graduates pursue licensure. By applying the ideas listed earlier in "career designing," one can launch a successful career beyond architecture.

As a profession, architecture offers a myriad of possibilities for rewarding careers.

—Irene Dumas-Tyson

I am certain that architectural graduates who are in command of the powerful problem-defining and problem-solving skills of the designer will be fully capable of designing their own imaginative careers by creating new definitions of meaningful work for architects that are embedded in the social landscape of human activity and life's events.

—Leslie Kanes Weisman

Career paths beyond traditional practice tap into the creative thinking and problem-solving skills developed from an architecture education. The interest in these paths is growing; the results of the most recent AIA/NCARB Internship and Career Survey of interns and emerging professionals indicate that nearly one-fifth of the respondents do not plan on pursuing a traditional career in architecture, although they still plan to obtain their license.

Over the last four years, Archinect, an online forum for architecture, has featured over 25 architects who have applied their backgrounds in architecture to other career fields through its "Working Out of the Box" series. While most are still connected to design in some form, the range of career fields is quite diverse: filmmaker, organic farmer, artist, design director at a resort hotel chain, user experience designer, information designer, and design technology consulting. Also, the reasons for pursuing these are varied and typically not tied to the recent economic downturn.

For purposes of his doctoral thesis, Robert Douglas, FAIA, studied nontraditional careers (maverick architects) and found those that he studied credited "design thinking" as helpful in their careers beyond architecture. From his research, architecture graduates and architects pursued careers in law, investment banking and real estate development, computer software, lighting design, film production and set design, cultural policy, architectural criticism and journalism, facilities planning, land planning and management, industrial and product design, arts programming, structural engineering, highway design, public arts installation, architectural photography, painting and sculpture, and clothing design.

A June 2008 issue of *Columns*, the AIA Pittsburgh magazine, entitled, "It's a Wonderful Life," highlighted architects who built new careers after first having one as an architect. First, the article outlines the path of actor Jimmy Stewart, who graduated from Princeton University having studied architecture but instead pursued acting (hence the title of the article). Next, it highlights four individuals who, after successful careers as architects, moved to new career paths—development, needlepoint (fiber art), community design, and construction supervisor. In each case, they discuss how their education and background in architecture paved the way for their new chosen career.

- *Related design professional (landscape architecture, interior design, urban design).* Given the parallel education of design, it is clear why some architects pursue the related career fields of landscape architecture, interior design, and urban design. Many architects pursue careers in interior architecture or space designing, while other

▶ Architect-Led Design-Build and its accompanying backgrounder Architects as CM for Small Projects and Small Firms (9.5) further address the architect's role in design-build project delivery.

pursue the profession of landscape architecture to design outdoor spaces. Still others combine their talents in design to focus on urban design.

- *Engineering and technical.* As architecture is both an art and a science, many architects will pursue careers in engineering or more technical fields. Many with a joint degree in architecture and engineering will pursue civil or structural engineering, but there are other opportunities that exist if there is an interest in the technical side of the profession.
- *Construction.* Because of the connection between design and construction, many architects have pursued careers in construction as construction managers, general contractors, and/or related associates. Architecture firms have expanded their services to include design-build and construction management, bridging the two disciplines.
- *Art and design.* Because much of what architects do is considered an art, it is no surprise that many architects pursue careers in art and design; this extends from fine arts (painting) to applied arts (graphic design and furniture design). Some will determine a way to combine their background in architecture more directly with art, while others truly move away from architecture to pursue their art.
- *Architectural products and services.* Perhaps less obvious are careers in architectural products and services. As these manufacturers market and sell their products and services to architects, who better to serve in these positions but those trained as architects? With an interest in and talent for sales, opportunities exist for a rewarding and fulfilling career.
- *Other.* As stated in the quote from Irene Dumas-Tyson, an education in architecture offers myriad career possibilities. But what other career paths are open to architecture graduates, emerging professionals, or architects? The true answer: There are over 25,000 occupations as defined by the Bureau of Labor Statistics that potentially highlight skills and fulfill passion. Truly, the only limitation to possible career paths is one's imagination.

Real estate. More recently, more architects have become involved with real estate development, the creation of communities, and the repositioning of land or buildings into a higher or better use. For architects wishing to expand their influence on the building process, real estate may be a good fit, as it connects multiple disciplines (engineering, architecture, planning, finance, marketing, law, and environmental impact).

Katherine S. Proctor, FCSI, CDT, AIA, former director of student services at the University of Tennessee, shares her perspective:

> For an individual interested in the career of architecture, the possibilities are endless. I have seen students graduate and become registered architects, professional photographers, lawyers, bankers, business owners, interior designers, contractors, and artists. The education is so broad, with a strong liberal arts base, that it provides a firm foundation for a wide array of exploration. This comes from the content of the curriculums but also from the methodology. The design studio, which is the core of the curriculum, provides a method to take pieces of intellectual information and apply it within the design process. The movement from thinking to doing is powerful. The ability to integrate hundreds of pieces of information, issues, influences, and form and find a solution is a skill that any professional needs to solve problems, whether they are building issues or life issues.

EMERGING CAREERS

The future is not a result of choices among alternative paths offered by the present, but a place that is created—created first in the mind and will, created next in activity. The future is not some place we are going to, but one we are creating. The paths are not found, but made, and the activity of making them changes both the maker and the destination.

—John Schaar, Futurist

Most would agree that the architecture profession is changing; as a result of this change, opportunities are being created to expand the profession beyond what it is now. For example, sustainability has already created new emerging career paths for architects.

Many within the profession have pursued becoming a Leadership in Energy Efficient Design Accredited Professional (LEED AP). As outlined by the Green Building Certification Institute, those credentialed as LEED APs are building industry professionals who have demonstrated a thorough understanding of green building and the LEED® Green Building Rating System™ developed and maintained by the U.S. Green Building Council (USGBC).

Technology such as building information modeling (BIM) will continue to play an increasing role within the architecture profession and will also create new career paths.

SUCCEEDING IN THE BUILT ENVIRONMENT

H. Alan Brangman, AIA

H. Alan Brangman is associate vice president of facilities, real estate, and university architect, Howard University, Washington, DC.

I became an architect because I have always had a fascination with building things. I initially went to school at the University of New Hampshire to study civil engineering. At the beginning of my sophomore year I met an art professor who had been a former instructor at Cornell University. He suggested that I transfer to Cornell. My degree is the Bachelor of Architecture.

My greatest challenge as an architect has and continues to be convincing other professionals that architects are capable of doing much more than just architecture. As the university architect at Howard University, my job responsibilities are more in line with those of a principal in a real estate development firm. I am responsible for implementing and monitoring programs and processes to achieve short-term and long-term Howard-wide strategic and operational goals as they relate to facilities and real estate. I am also responsible for the hiring of design and planning consultants and for providing program, planning, and design oversight for all university facilities, as well as monitoring construction projects on campus.

Initially, I pursued a nontraditional career path because I had an interest in something more than just designing buildings. I spent nine years with the Oliver T. Carr Company, a real estate development company in Washington, D.C. That opportunity opened my eyes to the breadth of the built environment and provided me with a much more global perspective on place making.

When I started my career in real estate development, I had been counseled to consider obtaining an MBA. I did not want to commit the time required to return to graduate school. I decided to pursue the path of learning through experience. Since I had been schooled as an architect and architects are taught to solve problems, I was able to manage any of the issues that were part of my job responsibilities quite well. After getting a few years under my belt, I obtained the Real Estate Development Primer Certificate from Harvard Graduate School of Design and Wharton School of Business as a way of confirming what I had learned. It worked.

BEYOND ARCHITECTURE

OUTSIDE TRADITIONAL PRACTICE

- Academic Dean/Administrator
- Architectural Historian
- Corporate Architect
- Facilities Architect
- Professor
- Public Architect
- Researcher
- University Architect

RELATED PROFESSIONAL

- Interior Designer
- Landscape Architect
- Urban Designer

ENGINEERING AND TECHNICAL

- Architectural Acoustics
- Building Pathologist
- Cartographer
- Civil Engineer
- Computer Systems Analyst
- Construction/Building Inspector
- Illuminating Engineer
- Marine Architect
- Structural Engineer
- Urban Planner

CONSTRUCTION

- Carpenter
- Construction Manager
- Construction Software Designer
- Contractor
- Design-Builder
- Estimator
- Fire Protection Designer
- Land Surveyor
- Project Manager

REAL ESTATE

- Property Assessor
- Real Estate Agent
- Real Estate Developer

(continued)

ART AND DESIGN

- Architectural Illustrator
- Architectural Photographer
- Art/Creative Director
- Artist
- Clothing Designer
- Exhibit Designer
- Filmmaker
- Furniture Designer
- Graphic Artist/Designer
- Industrial/Product Designer
- Lighting Designer
- Museum Curator
- Set Designer
- Toy Designer
- Web Designer

ARCHITECTURAL PRODUCTS AND SERVICES

- Product Manufacturer Representative
- Sales Representative

OTHER

- Architectural Critic
- Author/Writer
- City Manager
- Environmental Planner
- Golf Course Architect
- Lawyer
- Preservationist
- Public Official

Firms have emerged that are assisting architecture firms in creating virtual designed environments. Additional career options, such as BIM management and facilitation, are being created as a result of technology.

Other influences that are creating new career opportunities for architects are integrated project delivery (IPD) and other alternative project delivery methods; international practice; and public interest design.

To adequately prepare for your future in architecture or beyond, consider reading *The New Architect: A New Twist on the Future of Design* (Greenway Communications, 2007) by James P. Cramer and Scott Simpson.

CONCLUSION

As stated by David Haviland, Hon. AIA, "Architects are broadly qualified to practice in a wide variety of roles and settings within the architecture profession and building enterprise." To maximize one's path, the chapter highlighted "career designing"—the process of assessing, exploring, decision making, and planning.

Further, the chapter outlined the myriad possible career paths of an architect, both within traditional practice (extending from intern to architect to principal) as well as careers outside traditional practice and beyond architecture. Finally, emerging and potential trends for design professionals were listed.

For More Information

AIA Supplemental Services program, a series of detailed essays and slide presentations: www.aia.org/practicing/akr/AIAB089194.

Archinect: http://archinect.com/.

The New Architect: A New Twist on the Future of Design (Greenway Communications, 2007) by James P. Cramer and Scott Simpson.

Occupational Outlook Handbook: www.bls.gov/ooh/.

What Color Is Your Parachute? A Practical Manual for Job-Hunters and Career-Changers (Ten Speed Press, 2013) by Richard N. Bolles: www.jobhuntersbible.com/.

The Dictionary of Occupational Titles (DOT): www.occupationalinfo.org/.

3.4 AIA Continuing Education System

John Lape, AIA, FCSI, CCS, CSC

The AIA Continuing Education System (AIA/CES) is a thriving, multifaceted, lifelong professional development program and the largest source of education specifically targeted to architects.

The American Institute of Architects Continuing Education System (AIA/CES) was developed to help members further their continuing education needs plus meet the requirements for state licensure and membership in the AIA. AIA/CES was approved at the AIA convention in Boston in the early 1990s and began as a pilot program in 1994. It started as a voluntary trial requirement and then, in January 1996, continuing education became a requirement for all architect members of AIA.

AIA/CES MISSION

As stated in the AIA/CES 2012 Providers Manual, "The AIA/CES mission is to support AIA members in mastering new knowledge and skills to meet the changing requirements of the profession and to responsibly meet a role that society entrusts to architects. AIA/CES supports its continuing education mission through its Approved Provider Program, which consists of a network of AIA/CES Approved Providers. AIA/CES hopes to inspire and guide approved providers to consistently deliver quality education courses for architects."

AIA/CES: AN EVOLVING PROGRAM

It is interesting to note how the program has evolved, as evidenced by three quotations from the years 2000, 2011, and 2012.

FROM 2000 AIA FIRM LEADERSHIP SUMMIT

"It is a continuing education system developed by the AIA that emphasizes learning and records professional learning as a requirement for architect membership. It enables the architect to keep current, master new knowledge and skills, plan for the future, and responsibly meet the role society entrusts to a professional. In doing so, it has the potential to be one of the primary forces in the improvement and revitalization of our profession."

FROM CES MANUAL, 2011

"First developed in 1994, the AIA/CES is a continuing education system developed by the AIA to organize and track professional development activities required for AIA membership. AIA/CES enables members to keep current on issues in the field, master new knowledge and skills, plan for the future, and responsibly meet the role society entrusts to a professional architect. By making available learning opportunities in every area of knowledge relevant to today's architect, the AIA/CES program has grown into a major force in the improvement and revitalization of the architecture profession in the twenty-first century."

(continued)

John Lape started his small architecture firm in Portland, Oregon, in 1988. He has served on numerous continuing education committees and advisory groups and was 2012 chair of the national AIA Education Committee. Lape has presented at many Providers Conferences and National Conventions, and he is an AIA/CES provider.

FROM CES PROVIDERS MANUAL, 2012

"The AIA Continuing Education System is a thriving, multifaceted, lifelong professional development program and the largest source of education specifically targeted to the design and building industry. This course was developed by the AIA to help members meet their state mandatory continuing education (MCE) requirements and to help fulfill their AIA continuing education requirements for membership renewal. Most state licensing boards with MCE requirements recognize the AIA/CES as the primary source of continuing education for their licensed architects. In addition, AIA/CES tracks continuing education courses taken by members and records them on their transcripts as a service and as a benefit of AIA membership."

The first quotation, from 2000, talks about the "potential" of the AIA/CES program to be *one* of the primary forces in the improvement and revitalization of our profession. There is no mention of the state licensing mandatory continuing education requirements. By 2012, that "potential" has been met as the program is described as a "thriving, multifaceted, lifelong professional development program and the *largest* source of education specifically targeted to the design… industry." AIA/CES is no longer described as being "one of the primary sources," but is widely recognized in 2012 as "*the* primary source" for architects' continuing education.

CONTINUING EDUCATION OVERVIEW

Architecture used to be referred to as an "old man's profession." This reference was only partially due to the apparent domination of seasoned (and male) practitioners. The primary reason for this perception was that it can take many, many years to acquire the experience, technical knowledge, and design expertise to truly contribute to the profession.

Even before formalized continuing education, it was well known that to be relevant and competitive in the industry, a commitment to continued learning was critical. While AIA membership is still dominated by more seasoned practitioners, the playing field has been leveled somewhat with the advent of computer technology and the Internet. The post–baby boom generations have grown up in a vastly different, and more communicative and collaborative learning environment than their elders.

CONTINUING EDUCATION REQUIREMENTS FOR LICENSURE

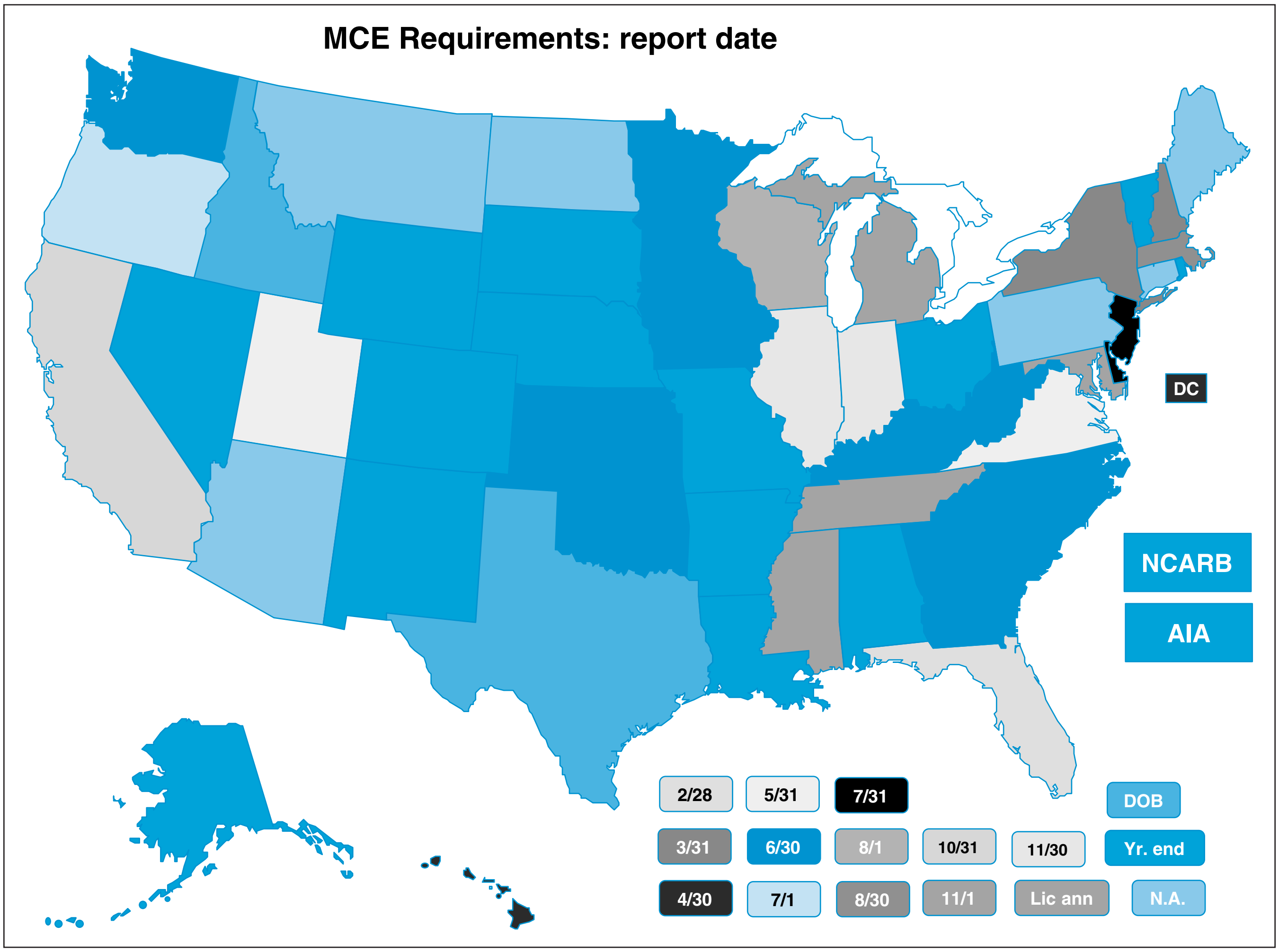
Currently, architectural boards in 42 states, the District of Columbia, Puerto Rico and Guam, 11 Canadian Provinces, and 19 countries have implemented mandatory continuing education (MCE) for an architect's state licensure renewal. Each architect must register and meet each state's licensing board standards in order to practice in that state. On average, AIA member architects are licensed to practice in four states, often with varying MCE requirements.

▶ The backgrounder on Mandatory Continuing Education (3.1) contains further information about continuing education requirements to maintain licensure.

The AIA/CES program is currently the only continuing education tracking specifically designed for architects to meet their state MCE requirements and the AIA's continuing education requirements. AIA/CES staff has worked closely with all of the state boards of architecture that require continuing education for licensure renewal (see Figure 3.4). Most state boards' mandatory continuing education requirements recognize the AIA/CES system as a primary source for architectural continuing education.

HOW AIA/CES WORKS

The AIA's online "Discovery" system is the backbone of the AIA Continuing Education System. Discovery provides general information about the AIA/CES program and about state and provincial mandatory continuing education requirements.



John Lape

FIGURE 3.4 **Mandatory Continuing Education Requirements Report Date Map**

Information and application forms needed to become a Registered CE Provider are also available. Discovery provides password-protected access that allows AIA members to view their continuing education transcripts. The site also gives AIA members access to a wide range of information about continuing education classes. In addition, Discovery is the portal that Registered Providers use to register courses and report attendance. Enhancements to CES Discovery are continuing as an ongoing process.

Types of Credits

In 2011, over one million member credits were registered in the CES Discovery system. All AIA architect members are required to acquire a minimum of 18 credits per calendar year. While there is no standard for state MCE as of 2012, the National Council of Architectural Registration Boards (NCARB) passed their Model Law and Model Regulations in June of 2011, which recommends that states require 12 Health, Safety, and Welfare (HSW) credits per calendar year. The majority of states require an average of 12 credits per year (24 credits for a two-year cycle).

Some states have requirements for continuing education that include specialized training, such as a minimum number of credits in accessibility design and in building codes. California, for example, requires a minimum of five accessibility design credits within a two-year renewal cycle.

As of 2012, AIA/CES tracks three types of credits:

- *Learning Units (LUs)*: The base measure for credits, with one hour of general education equaling one LU credit. There is no requirement for general education in NCARB'S model law and model regulations, which support the professional responsibility of architects to safeguard the general public. Nevertheless, the AIA/CES program recognizes the need to encourage architect members to get a broad range of education. This general credit type is expected to remain a part of the AIA/CES system, in part to enhance the standing of the AIA membership.
- *Learning Unit/Health, Safety, Welfare (LU/HSW)*: A specific type of credit that can only be obtained from Registered Providers conducting approved courses. Health, Safety, and Welfare (HSW) is a term borrowed from the building code, where it refers to protecting the "health, safety, and welfare" of the general public through building regulations. In the AIA/CES system, the term is carefully defined and has been expanded to include topics such as design, urban planning, all types of regulations, ethics, finishes, furnishings, historic preservation, insurance, and other legal considerations to protect owners and the general public. NCARB's Model Law and Model Regulations definition of HSW was aligned with the AIA/CES definition in 2011.
- *Learning Unit/Health, Safety, and Welfare/Sustainable Design (LU/HSW/SD)*: Implemented as a pilot program to track sustainable design (SD) as a subset of HSW credits. This pilot program was introduced to encourage education in and application of sustainable design principles. Sustainable design is becoming increasingly mainstream, with the term evolving to mean high-performance building design and other applications of environmentally responsible design. It is expected that the AIA will allow the SD credit to sunset at the end of 2012.

AIA AND NCARB DEFINITION OF "HEALTH, SAFETY, AND WELFARE"

Health, Safety, and Welfare (HSW) in architecture is anything that relates to the structural integrity or soundness of a building or building site. A course must meet three primary criteria:

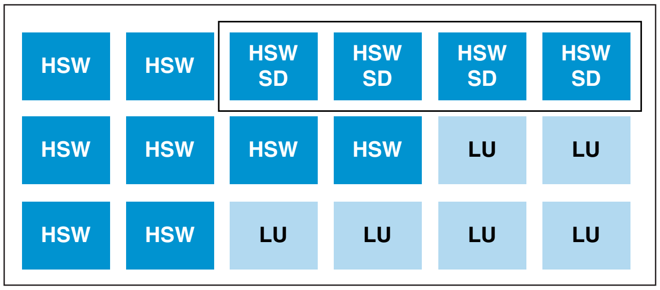
1. Course content must directly support at least one of the definitions of HSW:
   - *Health*: Aspects of architecture that have salutary effects among users of buildings or sites and address environmental concerns.
   - *Safety*: Aspects of architecture intended to limit or prevent accidental injury or death among users of the buildings or sites.
   - *Welfare*: Aspects of architecture that engender demonstrable positive emotional responses among, or enable equal access by, users of buildings or sites.
2. Content must include one or more acceptable HSW topics from a lengthy list.
3. At least 75 percent of the course content must pertain to HSW.

AIA/CES Minimum Requirements

As of 2012, AIA architect members are required to complete a minimum of 18 credits of continuing education per calendar year for membership renewal. Of those 18 LU hours, at least 12 hours are to be in health, safety, and welfare (HSW) topics. Of those 12 HSW hours, at least 4 hours must be on topics related to sustainable design (SD), as illustrated in Figure 3.5.

It should be noted that while a transcript meeting minimum requirements would show 18 total credits with 12 LU/HSW credits and 4 LU/HSW/SD credits, these requirements could be met in a variety of ways. For example, all 18 credits could be LU/HSW/SD. Or 18 credits could be made up of 6 LU/HSW/SD, 6 LU/HSW, and 6 general LU credits.

The AIA will continue to require more than the NCARB suggested minimum of 12 credits for its members. Part of the motivation for this requirement is to clearly elevate the knowledge base of AIA member architects, creating a distinction from those architects who are not AIA members. Primarily, AIA wants to encourage members to continually acquire diversified professional knowledge. Non-HSW topics such as practice management and architectural history strengthen an architect's practice and the profession.



AIA/CES

FIGURE 3.5 AIA/CES Minimum Requirements

Self-Reporting

Effective January 2012, the CES program no longer permits LU/HSW or LU/HSW/SD credits to be self-reported. NCARB and most states' MCE requirements also do not permit HSW credits to be self-reported. Self-reported education can be either self-guided (such as taking a tour of an architecturally significant building or reading an architectural book or by taking a course of any type from a nonregistered provider). Both AIA and NCARB have significant concerns that this type of learning is nonstructured, is not led by a knowledgeable source, and that the learning is not verifiable.

Another challenge relating to self-reporting is that many architects attend commercially oriented classes offered by vendors, often about proprietary systems. These sessions, while educational, are often primarily oriented toward sales. While there is a need for practitioners to understand products and building systems in architecture, these sessions do not qualify to AIA/CES credits because they are not impartial, do not offer reliable knowledge, and are often not presented in an education-oriented environment. For example, a firm may be designing a high-rise around a manufacturer's proprietary curtain-wall system and invite the manufacturer to come in to help them work on details and specifications for that system. This kind of activity will not qualify for AIA/CES self-reporting credits.

PROVIDERS

AIA/CES Providers are organizations or individuals that have been approved by AIA/CES to offer continuing education in architecture, within the guidelines of the AIA/CES Provider Manual. In 2012, there were over 2,300 registered AIA/CES providers representing a wide diversity of interests in the profession. Approved Providers include architecture firms and stakeholders in design and construction, including associations, government agencies, product manufacturers, and universities. In addition, local and regional AIA Components, AIA National in-house departments, and AIA knowledge communities are also Registered Providers.

There are numerous design- and construction-related associations that are Registered Providers. These include the Construction Specifications Institute (CSI), the International Interior Design Association (IIDA), the American Concrete Institute (ACI), the American Institute of Steel Construction (AISC), and the Building Envelope Council (BEC).

There are a few large organizations, such as Hanley-Wood, that are Registered Providers. They provide courses across the country and conduct national conventions.

There are several categories of providers to reflect the format and geographic reach of educational classes that a Registered Provider will offer. For example, the Basic Provider category permits only face-to-face, on-site learning, while providers in the Passport and Professional categories are authorized to offer face-to-face *and* distance learning courses both nationally and internationally.

The Architecture Firm Provider–Internal category permits architecture firms to conduct classes and provide credits for their firm members only. An Architectural Firm Provider–External status will allow firms to also educate non-firm members, a group that may include clients, members of another firm that are collaborating on a project, or other members of the local architecture community.

Distance Education

Distance education is a fast-growing sector of the AIA/CES program. The number of courses registered and credits applied for distance education has been rising steadily and represented about 35 percent of all AIA/CES registered programs in 2012. Distance learning includes courses offered online, via written correspondence (for example, published articles), podcasts, webinars, and other non-face-to-face types of educational offerings. To validate that learning actually takes place with distance education, a test is required with LU/HSW courses.

AIA/CES EVOLUTION

The AIA/CES program is a relatively new requirement, especially compared to continuing education programs for other professions such as attorneys, doctors, dentists, and engineers. As a new program, it will continue to evolve as it matures and in response to changes in the profession. Although initially developed primarily as a membership requirement since only a few states had mandatory continuing education requirements at the time, the AIA/CES program has become the AIA member's primary Continuing Education tracking system for state licensure renewal requirements.

In 2012 the Discovery system added quarterly reports of member AIA/CES credit status, including a listing of the experience level category of the courses completed, when applicable. A quarterly e-mail notification of credit status will provide members with both numeric and bar graph information on the annual number of credits by type that they have accumulated. This e-mail will also provide information about carryover credits and a notice of congratulations when the minimum AIA requirements have been met. There will also be information and links to local course offerings, the local component, and CES Discovery. This notification may soon also be able to report MCE continuing education renewal status to members for the various states in which they are licensed.

The AIA/CES program is also evolving with the introduction of course experience levels: basic, intermediate, and advanced. This has been a feature of the programs at the AIA National Convention, and soon all courses will be classified in these three categories. In the early years of the AIA/CES program, many members were content with simply fulfilling their minimum credit requirements. Classes were often offered at a level of basic education to appeal to the broadest and largest audience. Over the years, the demand for more advanced and higher levels of classes has driven this change toward classification by experience level. The proliferation of Registered Providers and registered course offerings has allowed architects to be more selective and have higher expectations of the courses they choose to attend. This trend will continue, and the basic, intermediate, and advanced categories of courses will help members be more selective in their education. This trend will also drive education to reach beyond fulfilling minimum mandatory continuing education requirements to lifelong learning, wherein attendees establish learning goals based on firm strategic objectives and the needs of individual professionals.

LIFELONG LEARNING

Lifelong learning is different from meeting licensing or association membership requirements. Lifelong learning goes beyond the minimum baseline to support professional needs and goals. It is a commitment, over a sustained period, to acquire the desired and needed education regardless of the credits offered.

Lifelong learning can be focused on a single, specialized topic, such as the design of a unique building type like assisted living centers. More often an architect will have multiple learning emphases over the course of their career as interests, specialties, and skills continue to evolve and develop. It is a quest to improve one's professional knowledge and ability to deliver excellent projects. A member seeks out education and learning to achieve those goals. The AIA/CES program plays a role in this quest, but most architects find that they need far more than the minimum educational requirements to succeed in the profession, and to serve an innate drive to continually grow and learn. The rewards of lifelong learning are many. By engaging in continuous learning, architects remain invigorated in their careers and about their profession.

For More Information

AIA/CES Discovery: http://aia.learnflex.net/users/index.aspx.

The AIA/CES Provider Manual: http://aia.org/aiaucmp/groups/aia/documents/pdf/aiab082195.pdf.

The AIA/CES Member Manual: http://aia.org/aiaucmp/groups/aia/documents/pdf/aiab091686.pdf.

Architect's Essentials of Professional Development (Wiley, 2003) by Jean R. Valence.

3.5 Participating in Professional Organizations

Shannon Kraus, FAIA, ACHA, MBA, and Amaya C. Labrador, Assoc. AIA, EDAC

Getting involved in professional organizations can be a key activity in an architect's professional development, as well as a great way to explore passions and contribute to the profession of architecture.

Professional organizations are a vital part of most professions and this is especially true with architecture. From the American Architectural Foundation (AAF) to the National Organization of Minority Architects (NOMA) to the National Council of Architectural Registration Boards (NCARB), professional organizations are a way to give a voice to members and constituents that share a common cause, to organize around an issue, or to serve as a vehicle for setting policy. Such organizations can focus internally on the governance of the profession or interest groups within it, or they can focus externally to provide outreach to communities and the public at large.

Participating in professional organizations is a great way to supplement professional growth, explore passions, and contribute to the development of the profession of architecture. However, it is difficult to get involved without understanding the organizations' purpose or how they are organized. By understanding the context within which organizations work, how they are organized, and their history, an architect, intern, or student can identify the type of organization that fits their personal interests and ambitions and make the most out of these opportunities.

Becoming actively engaged with civic, cultural, and professional organizations puts an architect in direct contact with community leaders who are policy-makers and potential clients. Such civic engagement enhances the architect's likelihood of being called upon to assume leadership within the communities where planning, design, and building decisions are made.

—Ted Landsmark, M.Env.D., J.D., Ph.D., president, Boston Architectural College, 2013 president, NAAB

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HISTORY

For centuries, guilds have united craftsmen of a common trade. Historically, they operated with a charter or letters patent appointed to them by the governing authority. The guilds allowed knowledge to be controlled. By controlling the supply of labor, guilds were able to control the market, regulate wages, and safeguard working conditions. Some also maintained funds for elderly or infirm members and their families or for travel to find work, functioning as a sort of insurance. In addition, some guilds required apprenticeships that made it difficult to enter a field without their support. However, as modern economic principles spread, guilds began to be regarded as obstacles to free trade and their power began to fade.

The professional associations, as they are known today, came to be during the Industrial Revolution. Although modern trade or professional organizations have much in common with the historic guild system, today's professional organizations do not seek to control an industry within a geographic area, but rather provide support for its members or constituents and further commercial interests through setting policy or direction. By the end of the nineteenth century several associations were well-established, including the American Institute of Architects (1857), the American Bar Association (1878), the American Medical Association (1847), and the American Association of Public Accountants (1887).

TYPES OF ORGANIZATIONS

The most common question asked about professional organizations is, where or how do you begin to get involved? Most individuals entering the profession are generally aware of the higher-profile organizations. However, it is important to be aware of all the possibilities, including the lesser-known ones. This article won't cover every organization in existence, but it will cast a wide net. It is almost a certainty that there is an organization or committee within an organization that is suited for every architect and their passions.

Before discussing how to participate in a professional organization, it is important to understand the subtle differences among them. There are many organizations, each serving specific interests, needs, or segments of the profession. Although it might be initially daunting, finding the right fit and becoming engaged is very rewarding.

In defining the various types of organizations, the purpose is not to singularly categorize or silo them, but to help draw distinctions between the inherent missions that set them apart so individuals can find the groups that are right for them based on their own interest or what they may be looking to get out of their involvement. In many cases an organization will have components that serve each of the categories discussed below. For the purposes of this article the distinction, as subtle or controversial as it may be, is based on the actual mission of the organization, regardless of its programs or initiatives.

In the course of their development, three basic types of professional organizations have evolved:

- *Constituency-based*, which focus on serving a membership or representing a constituency
- *Cause-based*, which focus around a particular issue or cause to be addressed
- *Knowledge-based*, which exist to promote or serve a particular area of expertise

While many organizations will blur the lines across all three types, the distinction lies in how their mission statements are written and how their boards are organized to serve. The American Institute of Architects (AIA), for example, has knowledge communities focused on knowledge sharing, and sustainability committees focused on the sustainability cause. However, at its core, it is a constituency-based organization as defined by its mission to serve the best interests of its membership.

Constituency-Based Professional Organizations

Constituency-based organizations exist to serve the best interests of their membership. It is embedded in their mission statements and governance bylaws. It is through their membership that they then also typically have a higher calling, such as protecting the welfare of the public, advancing architecture, or creating healthy communities. These callings may stay the same or evolve as the membership's interests evolve. It is important to recognize that there are different types of constituency-based organizations and to be able to distinguish them. The most obvious are those that have fee-paying members, like the American Institute of Architects or National Organization of Minority Architects.

Other constituency groups are those that represent organizations or key stakeholders. For example, NCARB represents State Registration Boards, each of them with their own jurisdiction. Their higher calling is the protection of the public health, safety, and welfare through the regulation of the practice of architecture. The Association of Collegiate Schools of Architecture (ACSA) represents their member institutions, which are linked by their shared role in architecture education.

Our students and faculty care deeply about the environment, building communities, and the world's condition. Through publications, academic conferences, and communication vehicles, ACSA aims to further dialogues that advance architectural education, and so improve our collective path forward.

—Donna V. Robertson, FAIA, 2012 ACSA President

Professional Development

Typically, professional development is a core part of constituency-based organizations. Although the specific format may vary, most organizations offer programs centered on continuing education, knowledge sharing, networking, and also awarding honors and recognitions. Some organizations are focused internally, on their own constituents. The AIA, for example, assists its membership in professional development through its continuing education programs. On the other hand, NCARB's professional development programs (like the Intern Development Program) are focused externally. They are performed on behalf of the member State Boards, and they serve individuals who are not themselves members of NCARB.

- Continuing education is one of the largest vehicles for professional development. Programs can include annual conventions, topical workshops, and self-guided and online learning formats.
- Knowledge sharing, a form of knowledge-based networking, is also a vehicle for professional development. Within the AIA, knowledge communities exists, each focused on their own specialized knowledge area. Through these, groups of members come together in pursuit of this common knowledge area. Other organizations, like the ACSA, will host annual meetings where individuals may present research or white papers on emerging trends and topics.
- Of all the organization types, mentoring is most prevalent in constituency-based organizations. Although some mentoring relationships happen informally, some organizations have formalized programs that assign mentors and mentees based on location and common interests. These efforts generally include a structured program that includes scheduled meetings, online activities, and participant receptions.
- Awarding honors and recognitions is also a way to encourage professional development through honoring achievements, milestones, significant contributions, and other noteworthy accomplishments of the constituents they serve. In the AIA, the AIA Gold Medal, Firm of the Year, and Fellowship programs are all examples of this. The American Institute of Architecture Students (AIAS) honors its Chapters, and the ACSA awards the Topaz Medallion in conjunction with the AIA.

EXAMPLES OF CONSTITUENCY-BASED ORGANIZATIONS

The American Institute of Architects (AIA)
American Institute of Architecture Students (AIAS)
Association of Architecture Organizations (AAO)
Association of Collegiate Schools of Architecture (ACSA)
National Council of Architectural Registration Boards (NCARB)
National Organization of Minority Architects (NOMA)
Association for Women in Architecture + Design (AWAD)
Society for Design Administration (SDA)

Advocacy

Advocacy is often central to helping constituency-based organizations achieve their missions. The type of advocacy can vary greatly and may range from political action committees to policy making to social issues. The common thread is that the issue or item being advocated is of benefit or of direct interest to the organization's membership. AIAS focuses a lot of significant resources on representing and advocating student issues to the AIA, NCARB, ACSA, and other professional organizations. One of its biggest initiatives was the "Studio Culture Policy" that has since been adopted by all its collateral organizations and is now a key part of the conditions for architectural accreditation enforced by the National Architectural Accrediting Board (NAAB).

Cause-Based Professional Organizations

Members want to be involved with the Green Building Initiative because they have a voice in helping set direction in this ever-evolving green building industry.

—Sharene Rekow, VP Business Development, GBI

Cause-based organizations are very much professional organizations, but rather than a focus on serving the best interests of a constituency group, their mission is the pursuit or advocacy of very specific issues or topics. These vary greatly in organizational structure, and may even have categories of membership where people interested can join the cause, while also contributing financially. The distinction here is that the organizations don't exist to serve their members but rather they often have members to serve the cause, while providing a framework to help rally members to their mission. Cause-based organizations are often structured as nonprofits and may rely on donations and fund-raisings to serve their cause.

Cause-based organizations include groups like the Green Building Initiative, seeking to offer the marketplace a choice in sustainability; or others like most of the architectural foundations, which seek to promote architecture in various communities. This is a subtle distinction from the AIA, in that they serve architecture, not architects. The American Architectural Foundation (AAF) is the largest of these and has many great programs, including one that promotes architecture education and awareness in elementary schools. Many cities have local or regional architectural foundations as well (independent of the AAF), which serve a similar mission and are often a collaborative effort of the local AIA chapter, community leaders, and area schools.

EXAMPLES OF CAUSE-BASED ORGANIZATIONS

American Architectural Foundation (AAF)

Architects/Designers/Planners for Social Responsibility (ADPSR)

Architects without Borders

Architecture for Humanity

Beverly Willis Architecture Foundation

Centers for Architecture:
- The Architectural League of New York
- Center for Architecture Foundation
- Chicago Architecture Foundation (CAF)
- Dallas Center for Architecture

Public Architecture

Green Building Initiative (GBI)

U.S. Green Building Council (USGBC)

Professional Development

Professional development will happen within these organizations as well, but the organizations are almost always centered on external programs with the goal of promoting awareness or building support for their cause. The AAF and the local architectural foundations will offer speaking programs, seminars, tours, and even honors and awards to recognize outstanding achievements of volunteers that make significant contributions toward these issues.

Advocacy

Advocacy is a big part of cause-based organizations. They differ from constituency-based organizations in that they lobby for their cause. These activities can consist of formal lobbying, political action, or organizing advocacy-based conferences, workshops, and retreats. They also often organize events that serve as both advocacy and fund-raising. For example, the AAF holds Accent on Architecture each year to celebrate architecture, honor the contributions of those making a difference, and to raise money for scholarships, outreach, and programs.

Knowledge-Based Professional Organizations

Knowledge-based organizations differ from the previous two types in that they are focused around a particular area of knowledge, not just a cause or its members. They also often will take on advocacy, but it is in the pursuit of their knowledge area, so again it comes down to their official mission. They may be membership-based or volunteer-based and may also be nonprofits. The Urban Land Institute (ULI) and the Construction Specifications Institute (CSI) are examples of knowledge-based organizations.

One of the more widely known knowledge organizations is the Construction Specifications Institute. The CSI not only sets the standard for construction specifications but also offers multiple certification programs that quantitatively evaluate area of expertise. Other groups that offer certifications include the American College of Healthcare Architects (ACHA) through their board certification, and the Center for Health Design through its EDAC program.

Some knowledge-based organizations reside within other parent organizations. This is the case with most of the knowledge communities that reside under the umbrella of the AIA. These include committees on design, practice management, environment, and architecture for education; in all, there are more than twenty knowledge committees within the AIA.

My involvement with the Guidelines *and FGI (Facility Guidelines Institute) provides me the equivalent of a Master's degree in health care design every four years. No matter how much time I put into the development of each edition of the* Guidelines, *I get more out.*

—Kurt Rochstroh, FAIA, FACHA, FGI

Professional Development

Knowledge-based organizations typically offer robust continuing education programs, which can include conferences, lectures, workshops, tours, articles, white papers, and online seminars. Many of these organizations focus a lot of energy on distributing and sharing knowledge through their websites, newsletters, and other avenues.

Most knowledge groups will also offer various types of certificates or awards and recognition programs that denote expertise in the particular field.

One of the things that make knowledge-based organizations so attractive to participation is that regardless of your particular interest area within the profession of architecture, there is a group of like-minded individuals to network and learn with. From hospitality to justice to biomed life sciences, there is something for every architect.

Advocacy

Advocacy activities vary among the particular organizations, but often there is a central theme. The Facilities Guidelines Institute advocates for guidelines in health care construction both within the industry as well as through legislative channels. The Construction Specifications Institute advocates specification standards nomenclature and documentation standards. What is common to all is that advocacy is a powerful and productive way for knowledge-based organizations to leverage their members in order to build awareness for work, to help with fund-raising, or to help promote use of their specialized knowledge areas.

EXAMPLES OF KNOWLEDGE-BASED ORGANIZATIONS

American College of Healthcare Architects (ACHA)
Construction Specifications Institute (CSI)
The Center for Health Design (CHD)
Facility Guidelines Institute (FGI)
Urban Land Institute (ULI)

GETTING INVOLVED

In all of these organizations, there is no shortage of help needed, and most of the organizations struggle with converting individuals from mailbox members (the couch) to active members (going to the gym). Although it is easy to find a niche and get involved, there may be roadblocks during the couch-to-gym transformation.

The first roadblock is with understanding how to get involved. This can be overcome simply by reading about the organizations on their websites and by communicating with others who are already involved. The second big roadblock might be a general dissatisfaction with the direction of the organization in which a person is most interested.

AIA membership is like a gym membership. You can go, get involved, and get a lot of benefit. Or, you can sit on the couch, not get any benefit at all, and complain about the dues. You really get out of it what you put into it.

—John Senhauser, FAIA

It is therefore important to understand that organizations by their very nature are living, evolving entities that are defined by those who get involved, as well as those who choose not to. This is no different for professional organizations. They are people-driven entities and, further, they collectively mold the profession and shape the public perception of architects. Getting involved is a way of shaping the direction an organization takes in its development. Those who are unhappy with a policy or movement can and should get involved, in order to help shape that policy or refine that movement. Instead of criticizing something while not being a part of it, join, work to change the organization, and get more personal fulfillment along the way.

Professional organizations are about pulling together like-minded individuals who share common interests or goals. Joining, attending, or participating in them is a great way to stay in the loop; learn about the local industry; stay up to date with emerging technologies, trends, and issues; and network. Whether for networking or for a social cause, choosing where and how to participate should be done based on interests, as well as professional and personal goals.

Identify Interests

The first rule of engaging in professional organizations is to understand that involvement is most enjoyable if it aligns with personal and professional interests. Interests could be an issue, like sustainability; or it could be joining a network for professionals facing similar challenges, like one of the many local women in architecture organizations or identity groups. You should also receive something of value in return—whether personal enrichment, professional development or advancement, public service, or something else.

How to Get Involved

Get involved by helping aspiring architects build a future in the profession. Become an IDP Coordinator, mentor, or supervisor; serve as a volunteer on an NCARB committee or state licensing board; or simply help guide others along the path to licensure.

—Michael J. Armstrong, CEO, NCARB

Within each organization there are various ways to get involved. Locally, chapters host meetings, continuing education seminars, special interest events, public service programs, and networking events, among others. Participation in these events is a good way to stay connected to the local market, as well as a gateway to the larger national organizations. Typically, organizations offer member discounts to those activities that require a fee.

The larger entities, such as the national component of the American Institute of Architects (AIA), hold yearly national conventions. Held in a different location every year, they usually require travel, but provide great opportunities through their concentrated offering of continuing education seminars, roundtables, galas, and receptions that are great for networking, as well as local tours and often just-for-fun events.

Another great way to stay connected is to participate virtually. Most organizations keep frequently updated web pages with news, upcoming events, and participation opportunities, and send out regular e-newsletters. Member resources can often be accessed through web pages, like the AIA's KnowledgeNet. The KnowledgeNet website is an interactive repository for resource sharing, networking, and discussion forums, structured around subject-specific Knowledge Communities.

Social media can also be a valuable connection tool: Following an association's Facebook page or Twitter account will add their news to your newsfeed; joining their group on LinkedIn provides access to ongoing, member-led discussions as well as related job postings.

Levels of Participation

There are different "levels" of participation: for example, joining the AIA is a matter of meeting the requirements and paying your dues, which gives you the right to place "AIA" or "Assoc. AIA" after your name. However, the real value comes from taking advantage of AIA resources, attending the continuing education seminars, special events and tours, classes, ARE prep courses, and networking events.

One of the first steps is attending an organizational meeting or event and participating. Most who volunteer will be inspired by their passions or the opportunity to work with someone they respect. There are typically opportunities to participate at the local chapter as well as the national level. Organizations generally look for local members to volunteer for conventions and events, often giving discounts or other incentives in return. Many volunteer to serve multiple positions in the same organization over time, and in some cases leadership positions and director boards are usually staffed by volunteers. For example, members from the five collateral organizations form part of the visiting teams for NAAB accreditation visits, and the AIA, ACSA, NCARB, and AIAS have representative members of their organizations on the NAAB Board of Directors. Some organizations form special committees around an area of interest, such as the AIA's Young Architects Forum (YAF) or the National Associates Committee (NAC); these groups address the issues and interests of a specific subset of the organizations' membership.

Membership Benefits

Membership and participation in organizations have several benefits: education on emerging trends, publications, networking, conferences, product discounts, leadership development, and mentoring.

It wasn't until I joined CSI that I really started understanding building materials, construction technology, and the process of getting something built. Every successful building is the result of a team effort. CSI is where I get to know my teammates.

—Daniel Hargreaves, CSI, CDT, AIA, RAS

In addition to providing access to third-party resources, some professional associations perform and publish their own research regarding trends, or issue reports analyzing industry and market developments. These may be disseminated through the association's website or through their trade journal, newspaper, magazine, or newsletter.

Some organizations operate structured mentoring programs or offer matchmaking services for mentors and mentees; participating in these grants emerging professionals access to a seasoned professional and their experience. Within the AIA, the College of Fellows often works with the Young Architects Forum in a mentoring capacity. Other organizations will use mentors to help younger members achieve advanced status or honors. It is worth noting that taking on leadership roles and serving on committees as a volunteer also contribute toward mentoring and professional development. These provide members a way to pay it forward to the profession.

Finally, membership may make you eligible for discounts and reduced rates, not only for events produced by the organization itself but also for consumer products and services. For example, AIA's program AIA Advantage offers discounts on shipping services, software, insurance services, and others.

PARTIAL LIST OF PROFESSIONAL ORGANIZATIONS SHAPING THE PROFESSION

It would be nearly impossible to list all of the organizations that relate to the profession of architecture; it is also difficult to suggest that some are somehow more important than others. Each organization serves an important cause, advocates for an important issue, or represents a critical constituency and therefore helps shape the profession of architecture. However, there are several that are particularly important to know because they influence the practice of architecture directly.

The Five Collateral Organizations

Within the profession of architecture, each of the five collateral organizations plays a complementary role, addressing issues of advocacy, education, licensure, and practice. The five collaterals are: The American Institute of Architects (AIA), the American Institute of Architecture Students (AIAS), the Association of Collegiate Schools of Architecture (ACSA), the National Architectural Accrediting Board (NAAB), and the National Council of Architectural Registration Boards (NCARB).

AIA: The American Institute of Architects

The AIA was founded in 1857 by a group of 13 architects; according to its bylaws, the AIA's purpose is "to organize and unite the profession in fellowship; to promote the profession of architecture including its aesthetic, scientific, and practical efficiency; to advance the science and art of planning and building; to coordinate the building industry; and to make the profession of ever-increasing service to society."

Currently, the AIA provides many services to the architecture profession, among them sponsoring continuing education programs, setting industry standards for contract documents, providing resources for emerging professionals, conducting market research and analysis of factors affecting the profession, and advocating for the architecture profession.

Nationally, the AIA is governed through an elected Board of Directors, which includes representatives from each of the 18 defined regions. Locally, the AIA is organized into components (previously known as "chapters"), which may be state- or locally-based and through which individual membership is established. Special committees or groups within the AIA focus on particular issues and provide opportunities for participation: the Young Architects Forum, the National Associates Committee, the College of Fellows, and the yearly AIA National Convention.

AIAS: American Institute of Architecture Students

The student-run AIAS serves as the official voice of architecture students in North America, furthering its mission of promoting excellence in architecture education, training, and practice, fostering an appreciation of architecture and related disciplines, enriching communities in a spirit of collaboration, and organizing students and combining efforts to advance the art and science of architecture.

AIAS is divided into four geographic "quads," which serve to facilitate communication between the institution-based chapters and the Board. Current AIAS activities include the AIAS journal *Crit*, the national convention (FORUM), Quad Conferences, the Freedom by Design™ program, as well as numerous activities organized by individual chapters. In addition, representatives from AIAS participate on the National Architectural Accrediting Board's Board of Directors and on the NAAB teams which visit institutions for accreditation, as well as on the Association of Collegiate Schools of Architecture's Board of Directors, the AIA's Board of Directors, and some NCARB committees.

ACSA: Association of Collegiate Schools of Architecture

With the primary purpose of advancing architecture education through the support of its member schools, faculty, and students, the Association of Collegiate Schools of Architecture represents over 250 schools. Founded in 1912, the ACSA engages in multiple activities, including faculty awards and student competition programs, conferences, and publications such as the *Journal of Architectural Education* and *ACSA News*, as well as developing and supporting studies on issues affecting the architecture profession and architecture education.

NAAB: National Architectural Accrediting Board

The National Architectural Accrediting Board was established in 1940 by the Association of Collegiate Schools of Architecture, the American Institute of Architects, and the National Council of Architectural Registration Boards, eight years after the ACSA abandoned the "standard minima" needed by schools in order to be granted membership.

Today, the NAAB "develops and maintains a system of accreditation in professional architecture education that is responsive to the needs of society and allows institutions with varying resources and circumstances to evolve according to their individual needs." It is the only agency in the United States authorized to accredit professional degree programs in architecture.

The Board of Directors has 14 members: 3 members each from ACSA, AIA, and NCARB, 2 members from AIAS, 2 public board members, and 1 Executive Director. Accreditation decisions that are made by the Board rely on school visits performed by a rotating pool of volunteers who evaluate the programs based on established criteria.

NCARB: National Council of Architectural Registration Boards

The National Council of Architectural Registration Boards is a nonprofit corporation comprising the legally constituted architectural registration boards of the 50 states, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands as its members. Founded in 1919, NCARB protects the public health, safety, and welfare by leading the regulation of the practice of architecture through the development and application of standards for licensure and credentialing of architects. NCARB provides a range of important services to the profession, such as developing and administering the Intern Development Program (IDP), the Architect Registration Examination® (ARE®), and NCARB certification, which facilitates reciprocal registration.

Additional Organizations

The organizations listed in Table 3.2 are intended to be a representative sample of the many diverse organizations that exist in their respective fields. There are numerous other associations, each with their own opportunities for participation, learning, and networking. For a more exhaustive list, please see the latest edition of the *Almanac of Architecture and Design*.

TABLE 3.2 Key Organizations

Name	Acronym	Founded	Focus	Website
Constituency-Based Professional Organizations				
Association of Collegiate Schools of Architecture	ACSA	1912	Education and Educators	www.acsa-arch.org
American Institute of Architects	AIA	1857	Practice	www.aia.org
American Institute of Architecture Students	AIAS	1956	Education	www.aias.org
American Society of Interior Designers	ASID	1975	Interiors	www.asid.org
Beverly Willis Architecture Foundation	BWAF	2002	Women in Architecture	http://bwaf.org/
International Interior Design Association	IIDA	1994	Interiors	www.iida.org
National Architectural Accrediting Board	NAAB	1940	Education	www.naab.org
National Council of Architectural Registration Boards	NCARB	1919	Licensure	www.ncarb.org
National Organization of Minority Architects	NOMA	1971	Profession and Practice	http://noma.net
Union of International Architects	UIA	1948	Practice and Architects	www.uia-architects.org

(continued)

TABLE 3.2 *(Continued)*

Name	Acronym	Founded	Focus	Website
Cause-Based Professional Organizations				
American Architectural Foundation	AAF	1943	Architecture	www.archfoundation.org
Architecture for Humanity		1999	Public Service	www.architectureforhumanity.org
The Green Building Initiative	GBI	2004	Sustainability	www.thegbi.org
Public Architecture		2002	Public Service	http://www.publicarchitecture.org/
U.S. Green Building Council	USGBC	1993	Sustainability	www.usgbc.org
Knowledge-Based Professional Organizations				
American College of Healthcare Architects	ACHA	1986	Healthcare Architecture	www.healtharchitects.org
Association for Computer Aided Design in Architecture	ACADIA	1981	Digital Technology and Research	www.acadia.org
The Construction Specifications Institute	CSI	1948	Construction	www.csinet.org
Design-Build Institute of America	DBI	1993	Construction	www.dbia.org
Facility Guidelines Institute	FGI	1998	Construction	www.fgiguidelines.org
International Academy For Design and Health		1997	Research, Science, Health, and Culture	www.designandhealth.com
National Institute of Building Sciences	NIBS	1974	Research	www.nibs.org/

AAF: American Architectural Foundation

Headquartered in Washington, D.C., the nonprofit American Architectural Foundation (AAF) seeks to educate and inspire "elected officials, educational leaders, and other public-spirited decision makers to use design to create better communities." To achieve this, the AAF assembles design teams and connects them to community and government leaders, whose decisions have the ability to shape our communities. The AAF's programs include the Mayors' Institute on City Design, the Sustainable Cities Design Academy, and Great Schools by Design.

ACHA: American College of Healthcare Architects

The American College of Healthcare Architects offers board certification within the specialized field of healthcare architecture. The nonprofit organization recognizes four classes of certificate holders: Founding Affiliate, Affiliate, Fellowship, and Emeritus. Architects can apply to the Affiliate level if they have been licensed for at least five years, have practiced primarily in the healthcare field for at least three of those, and have passed the Board Certification examination. Affiliates are eligible to be nominated for Fellowship by a fellowship committee after five years of exemplary performance.

ASID: American Society of Interior Designers

The American Society of Interior Designers is the largest professional organization for interior designers. Although ASID was officially founded in 1975, its history predates that, through its predecessor organizations: the American Institute of Interior Designers and the National Society of Interior Designers. It is "committed to the belief that interior design, as a service to people, is a powerful, multifaceted profession that can positively change people's lives. Through education, knowledge sharing, advocacy, community building and outreach, the Society strives to advance the interior design profession and, in the process, to demonstrate and celebrate the power of design to positively change people's lives."

ASID represents more than 18,000 practicing interior designers and 10,500 interior design students through its 48 local chapters. Professional members must possess an accredited design education or work experience, and pass the accreditation examination administered by the National Council for Interior Design Qualification (NCIDQ).

Architecture for Humanity

Founded in 1999, Architecture for Humanity is a nonprofit organization that seeks to "promote architectural and design solutions to global, social, and humanitarian crises." The original Architecture for Humanity competition sought to build transitional housing to returning Kosovo refugees. The public interest generated both inside and outside the design communities through that competition, as well as the media exposure, was translated into an organization that connects the talents and expertise of over 40,000 professionals with communities that would otherwise not have access to design services. The organization counts community-based organizations, housing developers, institutions, nongovernmental organizations (NGOs), and government entities as their clients.

BWAF: Beverly Willis Architecture Foundation

The Beverly Willis Architecture Foundation (BWAF) was founded in 2002 by Beverly Willis, FAIA, together with Heidi Gifford and architectural historians Diane Favro, Ph.D., and Lian Mann, Ph.D., with the purpose of "advancing the knowledge and recognition of women's contributions to architecture." Currently, the Foundation offers a variety of programs that include museum programs, films, tours, industry roundtables, internships, and research grants.

CSI: The Construction Specifications Institute

With the original purpose of improving the quality of construction specifications, the Construction Specifications Institute was founded in 1948 by a group of government specification writers. Evolving with the times, today CSI's mission is to "advance building information management and education of project teams to improve facility performance."

Current programs include a series of certification levels (CDT, CCS, CCCA, CCPR), educational opportunities, the CONSTRUCT tradeshow, and the CSI Annual Convention. Local chapters also host educational sessions and networking opportunities, among other activities. In addition, CSI administers three formats for construction data organization: MasterFormat, GreenFormat and UniFormat. MasterFormat is an organization system for building specifications; GreenFormat is a web-based tool that standardizes construction products' sustainability properties; and UniFormat arranges information by systems, disregarding specific product selections. This allows for early construction cost estimates, among other uses.

DBIA: Design-Build Institute of America

The Design-Build Institute of America brings together leaders in the design and construction industry. Its membership comprises architects, engineers, owners, contractors, manufacturers, suppliers, students, and faculty. Headquartered in Washington, D.C., and established in 1993, the DBIA "promotes the value of design-build project delivery and teaches the effective integration of design and construction services to ensure success for owners and design and construction practitioners."

GBI: The Green Building Initiative

The Green Building Initiative's mission is to "accelerate the adoption of building practices that result in energy-efficient, healthier, and environmentally sustainable buildings by promoting credible and practical green building approaches for residential and commercial construction." Originally created as a way to help bring sustainable building practices into the mainstream, the GBI also currently administers the Green Globes® environmental assessment and rating tool in the United States, as well as their professional certifications programs: Green Globes Professional (GGP) and Green Globes Assessor (GGA).

GBI's board of directors includes representatives from construction companies, architecture firms, academic institutions, and industry representatives.

IIDA: International Interior Design Association

The International Interior Design Association was born in 1994 as the result of a merger between the Institute of Business Designers (IBD), the International Society of Interior Designers (ISID), and the Council of Federal Interior Designers (CFID). Currently, the IIDA supports 13,000 members in 31 chapters worldwide through its mission of creating "a strong niche for the most talented and visionary Interior Design professionals, to elevate the profession to the level it warrants, and to lead the way for the next generation of Interior Design innovators."

NIBS: National Institute of Building Sciences

Authorized in 1974 by the U.S. Congress through the Housing and Community Development Act, the National Institute of Building Sciences is a nonprofit organization that provides common ground where representatives of government, the professions, and industry and consumer interest groups can focus on shared problems that affect the construction industry. The Institute serves as an authoritative source of information for both the private and public sectors.

NOMA: National Organization of Minority Architects

During the 1971 AIA National Convention in Detroit, 12 African-American architects joined together to form the National Organization of Minority Architects. Founded in recognition of the need to fight discriminatory policies that limited minority architects' opportunities, NOMA currently "champions diversity within the design professions by promoting the excellence, community engagement and professional development of its members."

Public Architecture

Public Architecture is a nonprofit entity that "puts the resources of architecture in the service of the public interest." Founded in 2002 by John Peterson of Peterson Architects, the organization launched "The 1%," a program through which firms pledge 1 percent of billable hours to pro bono work. Through The 1% website, nonprofits in need of design services and design firms participating in the program can connect with each other. The program counts over 900 participating firms, which range from some of the largest in the country to sole practitioners.

USGBC: U.S. Green Building Council

Committed to sustainability, the U.S. Green Building Council is a nonprofit organization based in Washington, D.C. Pulling together local affiliates, companies, organizations, and individuals, the organization seeks to "transform the way buildings and communities are designed, built, and operated, enabling an environmentally and socially responsible, healthy, and prosperous environment that improves the quality of life." Most notably, the USGBC administers the LEED® Green Building Rating System™, but other programs include the LEED AP professional credentialing program, educational sessions, the Greenbuild International Conference and Expo, and advocacy for sustainable policies and initiatives. Nationwide, the USGBC has 79 regional chapters.

For More Information

For a list of professional and related trade organizations in the design and construction industry, see Appendix A: Allied Professional Organizations.

BACKGROUNDER

INTERN DEVELOPMENT PROGRAM (IDP) COORDINATORS PROGRAM

Harry M. Falconer Jr., AIA, NCARB

Serving as an Intern Development Program (IDP) Coordinator provides a vital service to the profession by helping to educate and guide emerging professionals along the path to licensure.

Harry M. Falconer Jr. is director of internship and education for the National Council of Architectural Registration Boards (NCARB). He joined the Council in 2006 and assumed his current position in 2012. He is licensed to practice in Virginia and holds the NCARB Certificate.

GIVING BACK TO THE PROFESSION

Architects and others—such as educators, firm administrators, career counselors, and even interns—looking for a way to serve the profession and shape the next generation of emerging professionals may wish to consider taking on the role of IDP coordinator.

The IDP Coordinators Program provides an extensive resource network that facilitates the flow of information to emerging professionals. The collective knowledge of the coordinators offers a variety of perspectives on the profession. These individuals often have the opportunity to be the first introduction to the licensure process; as such, they play a significant role in helping interns progress toward licensure.

VALUE OF PARTICIPATION

In addition to being of service to the profession, serving as an IDP coordinator provides the opportunity to enrich one's own professional development.

Chance to "Pay It Forward"

IDP coordinators, whether they are volunteers or appointees, are knowledgeable about the profession and well-positioned to advise students and interns on navigating the path to licensure. Serving as a coordinator is a rewarding way to support the next generation of professionals, since many coordinators feel they get as much back from the experience as they give toward it.

Strengthening of Firm Culture and the Profession

Coordinators can help encourage a positive firm culture that supports intern development. They know that growing future leaders depends on helping interns make a successful transition from school to work and supporting them in their pursuit of licensure. All levels of experience within a firm can benefit from the information exchange that takes place when interns are an integral part of the firm. Helping emerging professionals stay on track toward becoming licensed can go a long way toward influencing success as a firm—and as a profession.

Professional Development

Serving in an advisory capacity to emerging professionals creates a significant opportunity to build leadership and mentoring skills. The training and resources provided by the National Council of Architectural Registration Boards (NCARB) and the American Institute of Architects (AIA) can further refine those skills and help coordinators successfully fulfill their roles. Through their work as coordinators, individuals will also gain a deeper understanding of the licensure process as a whole as well as greater familiarity with key requirements—knowledge that makes them an invaluable resource to the profession. Some coordinators have gone on to play an even greater role in shaping the profession, such as serving on NCARB or AIA committees or taking on leadership roles within professional organizations like AIA components or Society for Design Administration (SDA) chapters.

(continued)

Expansion of Professional Networks

The IDP Coordinators Program offers frequent opportunities for collaboration among the extensive coordinator network to share knowledge, resources, and best practices. In addition, many coordinators develop strong ties with both NCARB and the AIA through their regular interactions. Because coordinators need to be knowledgeable of overall registration requirements in the states where they serve, they often interact and develop relationships with state registration authorities as part of their ever-expanding professional network.

ROLES AND RESPONSIBILITIES

The volunteers and appointees who serve as coordinators all share the common responsibility of serving as a knowledgeable information resource for interns on the required components of licensure (education, experience, and examination).

Auxiliary Coordinators are volunteers that educate their community about the IDP. Serving as an auxiliary coordinator presents an opportunity to enhance one's professional development and demonstrate leadership skills. Auxiliary coordinators are often associated with firms, local AIA components, state boards, or American Institute of Architecture Students (AIAS) chapters. Those located inside firms play a pivotal role in shaping a positive firm culture that supports intern development and in helping to ensure that interns have the necessary resources and opportunities to progress through the IDP and toward licensure. Interns themselves may choose to serve as auxiliary coordinators, sometimes spearheading initiatives that help strengthen and formalize their firm's intern development–related resources and processes.

> Interns are consistently exposed to both formal and informal individual discussions about their IDP progress. This allows us to tailor our efforts specifically to each intern and provides an environment that is truly conducive to mentorship.
>
> *—Architect and firm IDP [auxiliary] coordinator, Richmond, VA*

Educator Coordinators are appointed by the dean of each architecture school with a NAAB-accredited professional degree program. This role serves as a conduit for students between school and the profession, helping students understand requirements and how to get started on the path to licensure. They are responsible for distributing information and providing guidance to students at their school on the IDP and other key components of licensure.

> I post information on my website, a Facebook page, and a Twitter account. I also include a lesson plan on the IDP in my class, which includes bringing in an architect that has gone through the licensure process.
>
> *— Educator coordinator, Northeastern University, Boston*

State Coordinators are appointed by the AIA at the state level. They are volunteers that stay up-to-date on the latest information on the IDP, the Architect Registration Examination® (ARE®), and state licensing requirements, acting as resources for interns and the larger architecture community in their state. State coordinators often give presentations and participate on AIA and NCARB committees related to the IDP. They serve in a highly visible role, communicating and collaborating with NCARB and with IDP support networks, including AIAS chapters, auxiliary coordinators, local and national AIA components, the Young Architects Forum (YAF) and National Associates Committee (NAC) groups, and state registration boards. Those appointed to this voluntary position will find many opportunities to hone their leadership skills and make a positive contribution toward the profession by helping emerging professionals transition toward licensure.

> [Our state] brings interns at various states of the process together with licensed architects in small-group settings. It provides the framework and guides small groups across the state in multiple cities and towns.
>
> *— State coordinator, Montana*

SUPPORT AND RESOURCES

The commitment by IDP coordinators to support students and interns is backed by NCARB's and the AIA's commitment to partner with them, regardless of where in the 54 jurisdictions they are located. NCARB and the AIA offer a host of resources that aid IDP coordinators in executing their responsibilities:

- Training and networking through the IDP Coordinators Conference
- Collaboration and knowledge sharing via access to a web-based coordinator community
- NCARB training materials, including presentation tools for use during events
- AIA National training materials, such as its mentoring resources
- Staff support from NCARB and the AIA for assistance with understanding programs, requirements, and opportunities

Additionally, IDP coordinators can find strength in numbers by partnering with each other to share best practices, and by partnering with groups—such as NCARB Outreach, state registration boards, the AIA Young Architects Forum (YAF) and National Associates Committee (NAC), AIA components, and AIAS and SDA chapters—to develop programming/events that support intern development.

For More Information

Comprehensive information about the IDP Coordinators Program, including position descriptions, eligibility, responsibilities, and support resources, can be found online at www.ncarb.org.

3.6 Participating in Architectural Education

Donna V. Robertson, FAIA

There are numerous ways for practitioners to participate with academic institutions and the education of future design professionals. This article outlines some of the possible ways to engage.

INTRODUCTION

Involvement of practitioners in architecture schools is vital to the intent of professional education. Architecture degree programs offer unique value for the acquisition of new ways of seeing, doing, and creating beneficent change. Even if all graduates do not go on to be licensed (and approximately 50 percent don't), all gain from hearing the perspective of the practicing professional who is participating daily in creating the built environment.

Day-to-day practice can be grinding and slow, with only long-term gain. In contrast, education offers a chance to step back and consider bigger ideas, gain a different perspective, and give back to those in development. It can be enormously gratifying, and there are myriad ways beyond but also including standard classroom teaching that offer such positive experiences.

Some do choose to teach, a direct way to interact with students and academic colleagues. Also available for practitioner engagement is guest reviewing in studio courses, where a practitioner visits periodically with the studio instructor and students to evaluate the ongoing work. This offers an afternoon of stimulating conversation and debate, with student engagement at the fore. Architects can also serve as a guest lecturer in a class, offering a specialty topic based on a practice's research and discoveries. Most teachers welcome outside input. An example of this is the case study class taught at Illinois Institute of Technology (IIT). This course is aligned with Chicago projects of special note, and embeds the students in a firm's process as the project progresses. Many schools have such courses, so a firm can likely offer a special project for academic study. The only requirement is to reveal (almost) all of the project's behind-the-scenes information so that students are informed of the strategies for going from "big idea" to final execution in a real-world project. The project should exemplify some development in management of the built environment: civic, commercial, economic, political, etc.

All schools have public programs that welcome visitors to hear from special lecturers, attend workshops on new applications in the field, or participate in conferences and symposia, which gather many around specified topics. Look for these events on websites, or join an organization that suits particular interests, such as the Society for Architectural Historians or the Council for Tall Buildings and Urban Habitat. There is also the Association for Collegiate Schools of Architecture, the national organization of educators. They hold annual conferences, which showcase academics submitting papers for "peer review." This is a wonderful way to find out what is going on in academia. Conference proceedings are published on their website.

As Henry N. Cobb noted in his Gropius lecture, given at Harvard in 1985, "We teach because involvement in a professional school helps us gain a critical distance from our practice" ("Architecture and the University," Harvard University Graduate School of Design, 1986). Beyond those already mentioned, there are myriad ways for practitioners to contribute to, and gain from, architecture education beyond graduation.

Donna V. Robertson is a professor at Illinois Institute of Technology and was dean of architecture for 16 years. She is a partner in macroDesign and has executed projects throughout the United States. Robertson was the 2012 president of the Association of Collegiate Schools of Architecture and is a peer reviewer for the GSA.

INVOLVEMENT WITH AN ALMA MATER

The school from which an architect graduated is a first place to start understanding what is happening in education. Stay in touch with faculty mentors, periodically visit, and view the extensive communications that most schools have in place to foster ongoing alumni contact. Most likely, over the years the school will be continually evolving. Keep an open, curious mind as to those changes and what they indicate about the evolution of the profession and the shifts in university perspectives on the delivery of education. Significant change can happen, yet there are (at this writing) 123 schools of architecture, 154 programs of professional study, and a plethora of perspectives on what to teach and why.

Most schools have ways for alumni to actively engage, whether to help with recruitment of new students, mentor current students, hire graduates, participate in career fairs, or give workshops that focus on current standards of professional preparation. Most schools have open studio reviews, where the student work is visible and available for judicious comment (try to stay positive). Many have end-of-the-year shows, meant to engage the community in what the school is doing. These openings serve both alumni and local practitioners looking for a closer engagement and understanding. Schools publish websites, newsletters, publications of faculty work, student catalogues and broadsheets, etc., meant to disseminate the work of the school. As well, schools have formal mechanisms for feedback from the outside world, through advisory councils, alumni councils, reunions, continuing education forums, etc., that are excellent avenues for dialogue. Work through faculty mentors, colleagues, and the administrative leadership to look into how to engage.

Finally, giving back to a school by sponsoring programs as part of a firm's philanthropy is a powerful way to make a difference in a school's programs.

LOCAL PARTICIPATION

Opportunities for participating with schools located in the area in which a firm practices come from many sources. The local AIA chapter will undoubtedly have education councils, awards programs, student visits to firms, etc., that provide the means to learn what is going on in academia. Find an AIA Knowledge Community (committee) meeting on a subject close to individual practice interests. They almost always engage academics in the discussion, and can provide an overview as to trends and experts.

Schools enjoy bringing in local practitioners to serve on studio reviews, advisory councils, career fairs, public events, etc. Gaining an invitation comes with knowing someone in the school, so the open public events might be the best place to start if one lacks personal contacts. So too, the local AIA component can provide leads to link an architect's expertise to a school's faculty.

Many schools and AIA Students (AIAS) chapters welcome firm sponsorship of student interns. Offering a student scholarship or prize, even if modest, is well-received and can open up lines of communication. See if the school is sponsoring a charrette; often they rely on local professionals to work with students and judge results.

Teaching is a most stimulating way to keep in touch with education and young people, as well as see trends in the profession. The benefits of teaching include fostering student development, having interesting colleagues and conversations, and design research that can advance one's practice. Classroom teaching of "Support Courses" can also be rewarding and involve specialized topics that surround design education: Structures, Systems, History/Theory, Professional Practice,

NCARB AWARD FOR THE INTEGRATION OF PRACTICE AND EDUCATION

Harry M. Falconer Jr., AIA, NCARB

SUPPORTING THE INTEGRATION OF PRACTICE AND EDUCATION

The NCARB Award, initiated in 2006 as the NCARB Grant, supports architecture schools' efforts to create, innovate new programming that brings non-faculty practitioners into the academy to help raise awareness about issues central to practice and better prepare students for internships and future careers as architects. Projects are intended to have a long-term, ongoing impact on students, faculty, and curricula. Additionally, the Award seeks to promote development of models that can be adapted or adopted by other schools.

Full details about the NCARB Award, including available funding, eligibility rules, program requirements, and assessment criteria, are available online at www.ncarb.org or by contacting NCARB customer service.

etc. All schools have their curriculum described on their websites, making it easy to see where a particular practitioner's expertise might fit in. Many classes use expert practitioners for guest lectures and reviews.

To become a faculty member, architects need to have their special abilities known to the school. Sometimes this comes through a formal search process to find new faculty hires (mostly for full-time positions). Those positions would be posted on the school's website. Beware of the time commitment in being a full-time instructor. The position requires not only teaching but also formally advising students, helping with school service (recruitment, committees, etc.), and producing significant architecture that is nationally recognized. Most schools require approximately 15 credit hours a year for full time, which translates into about 20 hours a week minimum preparing and directing classes.

However, practitioners may prefer to teach as a part-time faculty member—less bureaucracy and time commitment. Schools usually rely on word of mouth for those appointments, so getting involved in general ways can lead to specific opportunities to teach. Attend lectures, exhibitions, symposia, and conferences where networking is possible, demonstrate unique talents and knowledge, and gain continuing education units. Written course proposals are welcome, so try to get to know a school's curriculum and discover if there is something special, or missing, to offer. Ask to see sample syllabi and read a school's accreditation report (mandated to be on reserve in their library and usually on the website) to understand the school's perspective and needs.

A most special gift that a firm can make to its employees' development and to a school's quality is allowing the time and encouraging the staff to become involved in teaching. More than a monetary gift, this offering can make a huge difference in how closely a school is aligned with the profession's values.

Many schools now participate in architectural research, and firms can become involved in those enterprises. Some firms sponsor a research project that aligns with their practice ambitions, either through extracurricular, faculty-based endeavors or through course-based activity. A school's website is a place to start to know the faculty's interests and abilities.

Schools also host societies focused on topics of special interest. IIT's Mies Society sponsors programs connected to mid-twentieth-century modernism. They partner with industry on programming, such as a children's Lego Build event. So, too, the University of Texas–Austin's Charles Moore Foundation fosters public engagement to issues and inquiry. Most museums have programs on architecture and design, and these are ways to link with others seeking a broader outlook on the profession's affects. There are specialty academic journals also offering a wider perspective, such as *Places* magazine or the *Architect's Newspaper*.

Lastly, a firm's gifts to a school are a first level of engagement in the school's values. Gifts can be tailored to specific interests and hopes for outcomes. Scholarships, internships, awards, and sponsorship of events are just a few of the possibilities. Work with the school's development director to put in motion the power of philanthropy to create change and engagement.

NATIONAL PARTICIPATION

The National Architectural Accreditation Board (NAAB) accredits American professional degree programs. This organization is sponsored by the Collateral Organizations of architecture: AIA, National Council of Architecture Registration Boards (NCARB), Association of Collegiate Schools of Architecture (ACSA), and AIAS. Accreditation visits to schools happen once every six years for a program, and the Visiting Team is made up of representatives for the sponsoring organizations. This is another avenue for participation in architecture education: providing an outsider perspective to the process of program review by being an organization's representative. The means to get on a Visiting Team is to work through a local chapter, gain national involvement with the respective organization, then let an interest in education guide participation and offerings. It is important to bring sympathy for the domain of education and an understanding that schools need to offer both professional and general education, while participating in scholarly production to the advancement of knowledge. Architecture education cannot just involve professional practice-related offerings. Each school has its unique qualities, so keep an open mind to different definitions encountered on an accreditation visit. There will always be an educator on the Visiting Team to guide others in the current issues facing higher education.

The national AIA Annual Convention and many state conventions have sessions on architecture education. These track and reveal trends in schools and offer a chance for dialogue and exchange of information. Conventions also provide a chance to stay current with the larger trends in architectural design and construction, something schools work hard to do.

OTHER OPTIONS

There are many organizations and institutions devoted to fostering architecture education outside of professional degree programs:

- *Community colleges*. Many offer two-year programs to feed into professional undergraduate programs. This is a way to advance diversity in the profession and help those without resources for four-year college to have access to becoming an architect. These programs welcome teachers, especially those engaged to work with the professional "destiny" schools to develop curriculum that prepares students to enter a profession in later years of study. Try giving a local community college design department a call to offer time and expertise.
- *High school programs* abound, from those that are extracurricular or mentoring-based to those embedded in the school programs. ACE (Architecture, Construction and Engineering) is a national program mentoring high school students to enter those professions. They have local chapters in all major cities, and are a way to be in touch with aspiring architects and other professionals who care about the future of the profession. Many local nonprofits have ways to help with high school involvement in the built environment, such as the Chicago Architecture Foundation's national programs on architecture education in grade school, or the Newhouse Competition or their program on design curricula for grade schools.
- *State arts programs*, mirroring the National Endowment for the Arts, also have programs on education. These welcome grant proposals and collaborations toward further architectural design awareness in the general population.

Participating in architecture education gives practitioners an opportunity to briefly step away from daily practice. For a chance to further explore artistic and scholarly interests, consider making a grant proposal to one of the artist colonies, such as the MacDowell Colony or the Ragdale Foundation. They welcome architects with a special research project of import. Securing some recognizable recommenders will help first-time applicants. Artist colonies can be chances to get away to think about bigger issues and connect with other artists. There is also the Rome Prize for mid-career practitioners, a wonderful way to step back and focus on the wider picture.

For More Information

Association for Collegiate Schools of Architecture: http://www.acsa-arch.org/programs-events/conferences.

Architects Contractors and Engineers (ACE): http://www.acementor.org/.

National Endowment for the Arts programs on education: http://www.nysca.org/public/guidelines/architecture/index.htm.

Architecture School: Three Centuries of Educating Architects in North America (MIT Press, 2012), edited by Joan Ockman.

Educating Architects (Wiley, 1995), edited by Martin Pearce and Maggie Toy.

CHAPTER 4

Public Interest Design

4.1 Socially Responsible Design Overview

Rachel Minnery, AIA, NCARB, LEED AP

A socially responsible architect believes that buildings influence people's lives, that people influence the design of buildings, and that architects are accountable for the impact of their work on people and the environment. Public interest design tends to the common good and advocates for design as a means to help alleviate social distress.

THE SOCIAL IMPACT OF DESIGN

Social responsibility is fundamentally an ethical ideology that states that an entity, be it an organization or individual, has an obligation to act to benefit society at large and to maintain a balance between the economy and the ecosystem (International Institute for Sustainable Development, Perceptions and Definitions of Social Responsibility, 2004). Architects, through their involvement in design and construction, have direct and indirect impacts on people, the economy, and the environment, and are well positioned to engage in socially responsible activities.

Social Responsibility is an ethical ideology or theory that an entity, be it an organization or individual, has an obligation to act to benefit society at large.

—The ISO and Corporate Social Responsibility, "Perceptions and Definitions of Social Responsibility"

Socially responsible design aims to address social, environmental, economic, and political issues through design and design thinking. The socially responsible design movement has been fueled by activist designers who are troubled by the limited reach they have in a traditional architectural practice, where statistically fewer than 2 percent of people will (have the means to) work with an architect. Due to the initiative, dedication, and generosity

Rachel Minnery was 2012 chair of the AIA Disaster Assistance Committee and an architect and grants manager with Environmental Works Community Design Center in Seattle, Washington.

of designers volunteering with organizations such as Architecture for Humanity and Architects Without Borders, projects such as mobile health clinics in Africa, a post-tsunami orphanage in Sri Lanka, and schools in Haiti have garnered attention within and outside the profession for the remarkable impact they have made in people's lives. Examples like these and other designs that serve to empower people have been collected in books like *Design for the Other 90 Percent* (Editions Assouline, 2007), by Cynthia E. Smith, and *Design Like You Give a Damn* (Metropolis, 2006), by Kate Stohr and Cameron Sinclair.

Socially responsible designers say that they don't have to look past their own backyard to find opportunities to transform challenging conditions. "The transformative power of design, to achieve aesthetic richness, as well as practical and programmatic ends," writes Mark Robbins, Director of Design for the National Endowment of the Arts, "should be brought to the forefront in discussions about the very real problems of American cities and towns."

Whether focused on specific individual needs or those of society, socially responsible design typically refers to one or more of three design aspirations: to ease people's problems; improve human experience physically, emotionally, and psychologically; and, in the public realm, care for the space that connects private property to the community. Some urge architects to look beyond the property lines of their projects for the relationships, opportunities, and challenges in the surrounding community, and some architects are contributing to a new movement that addresses these common interests.

Public Interest Design

The professions of law and health have adopted the term *public interest* to describe a firm that represents the general welfare or common well-being in their work. To better understand the involvement of architects in the public interest, Architects Roberta Feldman, Bryan Bell, David Perkes, and Sergio Palleroni were awarded the AIA's Latrobe Prize in 2011. Their study increased public awareness of public interest design, or "putting creative abilities to practical use to improve communities," and encouraged a shift from a client-driven practice toward a needs-based practice. The research studied ways to increase the capacity to create and sustain public interest design, either through nonprofit design practices or by integrating public interest projects into traditional practices.

Health, Safety, and Welfare

Public interest design should not be a foreign concept to those architects who are familiar with the language of their architectural license. When granted a license to practice architecture, there are certain expectations of the architect: to protect the health, safety, and welfare of the public. *Welfare* refers to the well-being and social support for all citizens. Well-being is enhanced when healthy, safe, comfortable, and interesting spaces are created for all.

Architects can protect welfare by addressing individual needs, cultural values, and societal benefits in their design work. Others go further and engage directly in service and leadership to their communities. As *Citizen Architects*, they are civically engaged in public policy issues and the improvement of their community.

► See the backgrounder The AIA Code of Ethics and Professional Conduct (1.1), for a more detailed discussion.

While the profession has been criticized for a lack of civic participation, architects are encouraged through their professional membership in the AIA to involve themselves in public matters and socially responsible practice. The AIA's Code of Ethics and Professional Conduct, Canon II, states that Members "should promote and serve the public interest in their personal and professional activities."

To serve the public interest, socially responsible design aims to accomplish three basic goals:

- Make choices that acknowledge a building design's direct impact on the immediate context, on user health, and on community quality of life. (Community and User Needs-Based)

- Consider the potential indirect and long-term impacts of the building design on all human beings and the larger environment. (Sustainability)
- Meet the needs of those who cannot afford architectural design services and would benefit from receiving them. (Pro Bono)

Community and User Needs-Based Design

Whitney Young, the president of the National Urban League, spoke to the profession at the AIA National Convention in 1968. In that landmark speech, Young challenged young professionals, as a new and diverse base of talent, to alter the architectural profession's dependency on market forces and refocus it on helping communities meet their needs. Like other professions, architects and designers responded to the social inequities and challenges of urban environments in the 1970s by forming new community-based organizations. These included the first *community design centers* (CDCs). These nonprofit design organizations emerged as collaborations between architects, academics, students, planners, and community leaders to address specific needs in their communities. Where they initially served to rejuvenate derelict neighborhoods and create housing, parks, and social service centers, CDCs now address a variety of issues, including cultural preservation, diversity, poverty, special needs populations, social equity, and self-help projects that enhance an individual's self-sufficiency and resilience.

For more information on community design centers, see the backgrounders Community Design Centers in Context (4.3) and Independent Community Design Centers (4.4).

As population growth and development continued to rise rapidly, in 1977 a network formed of individuals, organizations, and institutions committed to increasing the capacity of planning and design professions to better serve communities—the Association for Community Design (ACD). The ACD defines *community design* as a movement focused on the creation and management of environments for people. They value the design process for promoting change to the built environment from the neighborhood to regional scale, and aim to meet community needs through participatory decision making at all levels to address:

- *Equity and justice*: Advocating with those who have a limited voice in public life
- *Diversity:* Promoting social equality through discourse that reflects a range of values and social identities
- *Participatory decision making:* Building structures for inclusion that engage stakeholders and allow communities to make decisions
- *Quality of life*: Advancing the right of every person to live in a socially, economically, and environmentally healthy community
- *Integrative approach*: Creating strategies that reach beyond the design of the built environment
- *Place-based solutions*: Generating ideas that grow from place and build local capacity
- *Design excellence*: Promoting the highest standards of quality in the design and construction of the built environment

Architects who are committed to the intensive community design process can help people act on their own behalf and facilitate community consensus on viable place-based projects. This collaborative process is a shift from designing *for* people to designing *with* people, ensuring the vision is one the community will continue to invest in over time. As a form of problem-seeking, *participatory design*

ENVIRONMENTAL WORKS COMMUNITY DESIGN CENTER

Environmental WORKS, a nonprofit community design center in Seattle, Washington, was founded in 1970 by a group of architecture graduates and professors in a storefront near the campus of the University of Washington. This group later squatted in a vacant firehouse until the City sold it to them and two other nonprofit organizations for one dollar. For more than 38 years, environmental WORKS provided free early design guidance and technical assistance to nonprofit organizations with funding from a City of Seattle Community Development Block Grant (CDBG) and General Funds.

For nonprofit organizations such as those providing community health care and child care, the preliminary design services defined the project scope and budget so that funding could be allocated for full design and construction. Nonprofit organizations were given the reassurance that their capital funds would be spent wisely, and the city and local architecture firms benefitted economically by the investment when 85 percent of the funds invested in the Community Facilities Design Fund resulted in built community services facilities. Between 2000 and 2008, $1.5 million invested in the design fund leveraged a total of $32 million in construction funds. The program was considered a great success and operated continuously until CDBG and the City's general funding were reassigned to basic human services in 2008.

elicits different ideas, interests, and values that inform the final design and ultimately add richness, variety, and character to a community environment. People who find it hard to break through a complex, formal governing system find their voices in an open visioning process, achieving greater equity and social justice through design. When the architect demonstrates an understanding of needs and benefits of proposed design elements through effective visual and verbal communication, the client and stakeholders develop confidence in new ideas. The collaborative process fosters a connected community that will make people feel safe.

Good community design cannot undermine an individual's capacity to meet his or her own needs. *Needs-based design* (NBD) is an approach to design founded on an understanding of fundamental human needs and creating spaces that eliminate or minimize barriers to people satisfying their needs (Natalie Heltrich and Geoffrey Stack, thesustainabilitysociety.org.nz). Proponents of needs-based design advocate moving beyond preconceived ideas to receive input from users that will promote health, safety, and well-being. Design can serve as a tool to address the unique needs of the disabled, elderly, economically disadvantaged, and other vulnerable populations. To limit vulnerability in the built environment, designers will consider natural and man-made hazards and other risks in the building and its surroundings.

When statistics from the EPA suggest that people in the United States spend almost 90 percent of their time indoors, it is clear that building design increasingly impacts one's life experience. Research has found that design elements can serve as change agents that can influence human behavior by encouraging implementation of healthier habits and practices. Thoughtful design that appeals to and protects the senses will reduce environmental stress and foster a sense of personal control over one's surroundings.

▶ For more information on research and design, see Chapter 14, Research in Practice.

Design research can support how design decisions will impact comfort and livability, providing owners with reassurance before the final design is executed. After construction, *postoccupancy studies* serve to inform architects of the outcomes of their design by seeking user feedback.

Sustainability

As observed by Mark Robbins, "The ways buildings, cities, and entire landscapes are designed have economic, social, and political causes and consequences." This acknowledges that all decisions have an impact on one another, forming the basis of designing for *sustainability*, or the ability to endure, wherein the choices we make today are influenced by their projected impact on the future.

Accordingly, the United Nation's Brundtland Report on Sustainable Development (1987) targets *three aspects of sustainability*: economic growth, environmental protection, and social equality. Combined, these three aspects provide a means of reducing the negative consequences of development worldwide, though a strong focus on economic growth in recent decades has tended to sacrifice the other two. The consequences of this imbalance have contributed to a resurgence of attention to the impacts of development on the environment and human beings.

The Brundtland Report cited two key initiatives:

- The concept of "needs," in particular the essential needs of the world's poor, to which overriding priority should be given
- The idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs

The architectural profession has become a respected leader and advocate of sustainability, and the reasons for that are compelling—buildings have a remarkable impact on resource use and the environment. Globally, buildings use 40 percent of raw materials (Worldwatch Paper 124, 1995, by Nicholas Lenssen and David Malin Roodman). According to the Department of Energy, buildings represent 73 percent of U.S. electricity consumption. As a response to this situation, many buildings are being designed to meet sustainability standards set by the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) program. Regulations have also changed, in some cases requiring the design of buildings to meet higher performance standards and to attain a certain level of LEED certification.

Several sustainable design metrics and organizations have emerged to forward the sustainable design movement toward an end goal where building elements may produce resources rather than consume them. The groundbreaking book *Cradle to Cradle: Remaking the Way We Make Things* (North Point Press, 2002), by William McDonough and Michael Braungart, attempts to bridge this goal by encouraging a "systems thinking" decision-making model where designers and consumers first consider the full life cycle of any given building material and its impact on the whole (of the environment, society, the economy).

Forwarding the continual development of sustainable design strategies, the AIA Code of Ethics and Professional Conduct includes Canon VI: Obligations to the Environment. Canon VI states that members should "promote and practice sustainable design and development principles in their professional activities and encourage others to do so as well."

Resilient Design

Impacts to environmentally sustainable communities aren't limited to resource consumption. In the last decade natural disasters and other hazards have affected 200 million people. The increase in the cost and impact of natural disasters such as hurricanes has increased concern about the progressive impacts of climate change. The U.S. Green Building Council (USGBC) issued a wake-up call: "A central challenge of the twenty-first century is to develop strategies that can help us bounce back from potentially disastrous events. If we are to have regrets, let us do so by coming to terms with the reality that the human condition can never be free of risk, but at least let us not regret our inaction."

Following a disaster, trained architects can evaluate buildings for safety and habitability, and, more broadly, they will advocate for and incorporate mitigation measures to create more resilient, sustainable communities. Architects can perform specific *risk assessments* of buildings to inform design and decision making of conditions or events that may cause harm, injury, or loss of service over the life of the building. Emergency power generators, "safe rooms," and hurricane shutters contribute to lives saved, business continuity, and habitability so that structures can continue to meet the needs of their occupants in the face of hazardous events such as a power outage, snowstorm, or disaster.

The Role of Architects in Disaster Response and Recovery (4.2) further discusses how architects can be effective in disaster response, recovery, rebuilding, and resilience to help shape truly sustainable communities.

Pro Bono Work

Some architects enter the profession with a keen interest in making a positive difference in the community, and some will go to great lengths to do so, sacrificing evenings and weekends to work without pay. Providing pro bono services, that is, services for the public good, is an opportunity to serve those outside the usual marketplace for architectural services. While pro bono services are unpaid, there are other tangible and intangible rewards, according to Jonathon Moore. Pro bono services increase firm-name recognition, improve public understanding of the value of the profession, and develop professional skills and business relationships (Jonathon Moore, *Pro Bono Services: Improving the Profession*, 2007).

Design competitions, open-source sharing networks, and positions with nongovernmental organizations (NGOs) created an enormous opportunity to connect pro bono designers with real and pilot projects that work to alleviate acute challenges to sustainable human life: poverty, disease, suffering, and access to resources like water and power.

Inspired designers take the initiative to innovate design solutions for accessible, safe, sanitary, and healthy living conditions for the world's poor and those affected by war, disease, or disaster. In this regard, architects bring their greatest strengths—design knowledge, technical skills, and creative problem-solving—to meet the world's greatest needs.

To acknowledge the growing volunteer efforts and expand a formal pro bono movement with the profession at large, the program The One Percent launched in 2005 to challenge firms and architects to dedicate a minimum of 1 percent of their working hours to pro bono services. Proponents of The One Percent boast that if every architecture professional in the United States committed 1 percent of their time to pro bono service, it would add up to the equivalent of a 2,500-person firm working full-time for the public good.

▶ For a more detailed discussion of pro bono work, see Architects in the Nonprofit Sector (4.3).

The AIA encourages all of its members, their firms, and components to provide pro bono services as part of their contributions to the profession and the Institute in service to society. The AIA provides tools such as the Architect's Knowledge Resource Checklist to help architects decide if a pro bono project is right for them. After deciding to move forward, members can refer to the AIA's Pro Bono Services Agreement between owner and architect to formalize the work.

Project Types

Community-based design projects can improve urban conditions and create more vibrant communities with permanent and pilot projects. Architects have "designed by demonstration" creating temporary parklets, mobile food markets, and "living charrettes" that create new uses for vacant or underutilized land. Architecture firms have initiated projects in their communities, such as the Aladdin Fairy Tale Castle at the Dallas Arboretum by local firm HKS. Another example is Perkins+Will's Adopt a Room project to design a "dream room" for the University of Minnesota Children's Hospital.

Community charrettes place the architect in the position of facilitator and communicator, directly engaging with community members and stakeholders on a design issue in the built environment or proposed project to create a vision that represents the community's ideas, goals, and values.

Design-build projects bring the architect and contractor together with the owners and occupants in a comprehensive process. Habitat for Humanity is one of the most widely known programs in which volunteers and future low-income residents realize a design together. Auburn University's Rural Studio modeled an industrious academic program wherein students learn practical skills through real-world projects in impoverished communities, exercising predesign, design, and construction skills.

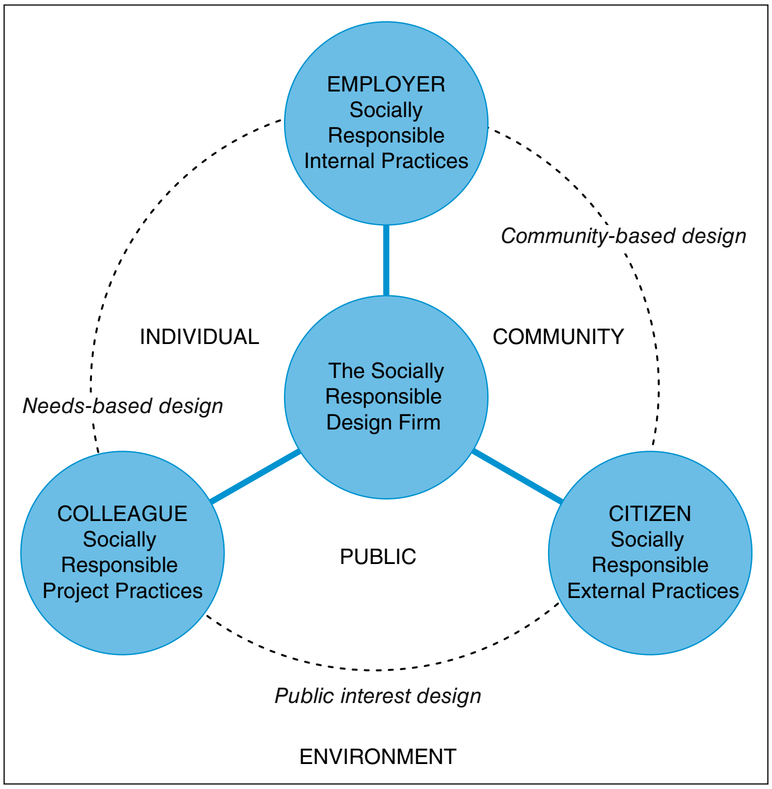
While socially responsible architects seek projects because of their values, they also turn projects down for the same reason. For instance, the professional organization, *Architects, Designers and Planners for Social Responsibility* (ADPSR), advocates against building new jails. Instead, their aim is a community-based alternative to incarceration to alleviate the prison system's moral impact on society and its economic burden on tax dollars that otherwise could be assigned to schools, health care, and affordable housing.

SOCIALLY RESPONSIBLE DESIGN PRACTICES

Socially Responsible Practice Management

Architects fully "walk the talk" of social responsibility when their firms operate and conduct business across all of their roles in the community: as citizen, employer, colleague, and fellow human. Business leaders are stewards of valuable resources: money, time, staff, supplies, space, and the resources of their clients. Increasingly, the design firm's employees expect the firm to have goals that will extend beyond profit to focus on the health of the entire community.

A socially responsible firm will have, as part of its core mission, the goal to improve the lives of everyone in its sphere of influence: employees, consultants, clients, users, communities, and the natural environment (see Figure 4.1). For a mission to be



Rachel Minnery, AIA

FIGURE 4.1 Socially Responsible Firm Diagram

successful, research shows that 80 percent of an organization needs to participate. This calls for workplace policies that will ensure the firm's socially responsible values will be implemented.

Internal Practices: The Workplace

Policies and procedures may be the most important aspect of a firm's practice because a strong organization with empowered staff and resources is more productive and innovative. According to the Labor Department, "in the 1990s, companies have found that they can achieve superior financial results by developing a superior workplace. Evidence suggests that a positive correlation [exists] between innovative approaches to workplace practices and company performance."

Some key ways to create a socially responsible workplace (adapted from *Corporate Social Responsibility: Guidelines for Top Management* [Praeger, 1989] by Jerry W. Anderson Jr.):

- *Understand staff values, goals, needs, and challenges*: First and foremost, staff resources are human beings, and their personal needs must be addressed to have a viable workforce. Consider flexible policies that express mutual vesting between employer and employee and build long-term staff retention.
- *Diversify staff:* Employment diversity should reflect that of the community's culture. "Diversity is especially important and beneficial for problem solving and innovation tasks" according to a multiyear study published in 2005 by Columbia Business School professor Elizabeth Mannix and Stanford Business School professor Margaret Neale.
- *Workplace wellness programs*: Nutrition, fitness, stress-reduction, and disease prevention have been proven to reduce sick days and increase productivity. Architects don't consider an office setting as a place for workplace safety concerns, yet those who sit at a desk for the majority of the day are more prone to back, neck, and carpal tunnel problems.

A FIRM'S SOCIAL RESPONSIBILITY INITIATIVE

Perkins+Will's *Social Responsibility Initiative* began in 2007 when the Board of Directors appointed a task force to assess current activities informally underway in the firm and to formalize them into firm-wide protocols and guidelines. The document created by the task force established the framework that fostered a national dialogue and empowered each local office to organize and implement social responsibility as part of its core philosophy, practice, and individual accountability.

Perkins+Will's mission statement for social responsibility: "*Perkins+Will is committed to engage its professional resources and leadership to benefit the social needs in the built environment where design can make a difference.*" The firm encourages volunteerism of employees and donates 1 percent of its billable time and unique intellect to initiate and execute projects and buildings that serve the broad society who otherwise would not have access to professional architectural services.

A phased approach of implementing their new commitment began with just 25 percent of donated billable hours in 2007, building to 100 percent commitment of the firm's goal over the next few years. The program has improved and become more efficient. Existing relationships with nonprofit organizations were strengthened and many new relationships with other organizations were established.

- *Diversify duties and reduce or interrupt computer use:* How work is done and the tools that are used are very different in the twenty-first century from those used even a generation ago. A 2003 study by the Journal of the American Medical Association found health problems including work-related depression and productivity loss attributable to extensive computer use. Try to limit screen time to three-hour intervals and incorporate social and educational activities, hand drawing, or journal reading to break up the day.
- *Avoid overtime*: Well-managed firms will strive to schedule deadlines to align with staff resources. Respect evening and weekend time for respite and not for additional shifts for salaried employees.
- *Provide a supportive work environment*: Know the human struggles of your staff. Invest in their "human-beingness." Allow for flexible work schedules, family leave, child care, and other personal and family-friendly programs.

External Practices: In the Community

Firms often focus on external actions for visibility and to build the reputation of the firm in their community and profession. The AIA believes that society and the profession benefit from civically engaged architects who use their insights, talents, training, and experience to contribute meaningfully, beyond self, to the improvement of the community and human condition. "Citizen architects advocate for higher living standards, the creation of a sustainable environment, quality of life, and the greater good" (AIA Issue Brief, "Citizen Architect," 2011). Architects engage in external practices of social responsibility when they institute a "Firm Social Sustainable Policy." Create and empower a committee to suggest and develop a unique social sustainability mission, goals, and proposed actions. With buy-in from the leadership, a formal commitment can be made and exercised through policies communicated to employees, clients, and partners. The commitment may include:

- *Provide pro bono services* to organizations or missions that cannot otherwise afford to hire an architect to the extent feasible. Consider committing to The One Percent, a program launched by Public Architecture that connects nonprofits with architecture and design firms willing to give their time pro bono (www.theonepercent.org).
- *Volunteer and host team-building days*: Annually include one or two days of employer-sponsored volunteer days for team-building and community outreach.
- *Contribute a portion of profits* to charitable organizations in the community that share a mission you care about.
- *Publicize and exchange knowledge*, research, and lessons learned with clients, the public, and other design professionals.
- *Participate in the community* on nonprofit and civic boards, committees, and community meetings. Host or facilitate events or guest speakers that reflect the firm's values.
- *Share your mission, successes, and innovations* on the firm's website or other social media. Convey policies, practices, and commitments that reflect the values of the firm.
- *Seek appointments to civic boards and commissions*. Refer to the AIA's guidelines, *How Architects Can Become Advocates for Livable Communities* and *Communities by Design: Influencing Your Community's Quality of Life*.

The Socially Responsible Project: Best Practices

To practice socially responsible design, an architect doesn't have to change jobs, request a new project, or get knee-deep in a pro bono project. Instead, one can offer a different approach or adjust participation within the context of current work. In practice:

- *Establish a team mission:* Inquire with engineers, consultants, and vendors as to their social responsibility practices.
- *Facilitate a participatory design process:* Identify all relevant stakeholders. Be inclusive and solicit feedback from all stakeholders, starting early in the design process and integrating it into the work.
- *Establish a project vision and measurable goals:* Collectively create goals that reflect the values of the stakeholders and develop ways to measure the success and results. Dig deep in the needs and risk assessment to uncover potential opportunities and challenges for the duration of the life of the building.
- *Utilize design research:* Consult publications and media for case studies, research, materials, and technologies.
- *Design to actively promote the health and well-being of occupants*: Incorporate design elements that reduce sensory stress, encourage movement and interaction, provide access to natural light and the outdoors, and contribute to thermal comfort, good indoor air quality, and sound control for all occupants.
- *Incorporate and forward sustainable design principles:* Address the deeper needs of the environment, the community, and the occupants through your design process.
- *Perform life cycle analysis:* For all the investment in creating the building, consider what happens after the project is complete. Assess the viability of meeting long-term goals and the structure's durability, adaptability, and re-usability. Discuss the building's end of life and how it may be disassembled.
- *Engage in the execution of the design:* Create a plan with the owner to have the design administered responsibly during construction to ensure design intent and safety standards are met.
- *Evaluate the completed project*: While measuring success can be difficult, particularly of an individual design element, interviews with clients, users, and public feedback can be illuminating. Create case studies to evaluate whether specific goals have been met.

While the majority of architects work on fee-for-service projects, alternative career paths are another option for socially minded architects. Although community design centers make up less than 1 percent of the nation's architecture firms, other architects work on staff for nonprofit organizations, a choice that provides rewarding opportunities to utilize design, management, and other necessary people and business development skills.

► For more information about working in the nonprofit sector, see the backgrounder Architects in Large Nonprofits (4.3).

ORGANIZATIONS FORWARDING SOCIALLY RESPONSIBLE ARCHITECTURE

Community-based organizations and nonprofits often originate with a focus on improving the physical, social, and mental health and well-being of a community in a way that the marketplace cannot. They do this through their work, educating future practitioners, supporting peers and colleagues, and volunteering or otherwise engaging with their communities.

The Association for Community Design (ACD) supports various types of nonprofits and those who engage in community design practices by sharing and advancing research, education, best practices, and policies related to community design.

Reflecting values and movements within the profession, in 1967 the AIA formed the AIA Regional/Urban Design Assistance Team program (R/UDAT), an interdisciplinary community design program that combines local resources and nationally recognized design professionals to identify ways to encourage desirable change in a community. In 2005, the AIA expanded this successful program with the AIA Sustainable Design Assistance Team to focus on community efforts to increase sustainability.

Local organizations like Habitat for Humanity, Architecture for Humanity, and Architects Without Borders link qualified pro bono community projects with generous volunteer designers. Pro bono undertakings can rejuvenate jobseekers and appeal to newer graduates, often entering the profession having already witnessed the visible difference their design-build studio projects have made.

Celebrities-turned-philanthropists Brad Pitt and Sean Penn have steered their fans' attention to the power of design to help communities in need. The Make it Right Foundation and J/P Haiti Relief Organization were formed to assist in, respectively, the rebuilding of New Orleans after Hurricane Katrina and Haiti after the earthquake of 2009.

Open Architecture Network—now Worldchanging—was formed with the express interest of sharing design ideas among architects, clients, and builders, all free to download from their website. The website boasts that "design is the ultimate renewable resource," promoting design as an empowering tool to build safer, more sustainable, and more innovative structures (www.openarchitecturenetwork.org). As an evolution of the Cooper-Hewitt's exhibit "Design for the Other 90 Percent," the Design Other 90 Network is another open-network database of design solutions for those living in poverty globally.

Some companies have strategically partnered with nonprofit organizations or have spun off their own nonprofits to serve a specific mission. Looking to send a call to action to the design industry, the Rockefeller Foundation partnered with IDEO to create a pilot study for connecting design firms to the social sector, known as the Initiative on Accelerating Innovation for Development. IDEO later formed a nonprofit arm to work with other nonprofits and foundations to bring design solutions to poverty-focused problem-solvers around the world.

Sponsored fellowships provide funded opportunities for postgraduate designers to work within communities. AmeriCorps, Enterprise Rose, and Design Corps are just a few fellowships available to designers interested in making an impact with their new design skills.

► For more information on the AIAS program, see the backgrounder The American Institute of Architecture Students Freedom by Design (4.4).

The American Institute of Architecture Students (AIAS) Freedom by Design (FBD) program is a community service program that utilizes the talents of architecture students to offer modest design and construction solutions to enhance the homes of low-income, elderly, and disabled people by addressing their struggles with everyday tasks.

Other nonprofit design organizations focus on the preservation of architecture as it represents the history, culture, and identity of a community. Docomomo US and the National Trust for Historic Preservation are two organizations dedicated to the documentation and conservation of buildings, sites, and neighborhoods.

Architects, Designers and Planners for Social Responsibility (ADPSR) was founded in 1981 as a coalition of designers working for peace, environmental protection, ecological building, social justice, and the development of healthy communities.

As a resource, The Environmental Design Research Association (EDRA) is an organization that advances research to improve understanding of the interrelationships between people and their built and natural surroundings, and helping to create environments responsive to human needs.

► For more information on SEED, see the backgrounder Social Economic Environmental Design (4.1).

Spearheaded by the nonprofit organization Design Corps and funded by a grant from the Surdna Foundation, the Social Economic Environmental Design (SEED) Network formed in 2005 to develop a common standard to guide, evaluate, and certify the social, economic, and environmental impact of design projects. SEED Principles include: (1) Advocate with those who have a limited voice in public life. (2) Build structures for inclusion that engage stakeholders and allow communities to make decisions. (3) Promote social equality through discourse that reflects a range of values and social identities. (4) Generate ideas that grow from place and build local capacity. (5) Design to help conserve resources and minimize waste. The Network's website hosts a SEED Evaluator, where architects are free to join, submit, and certify a project.

There are many challenges in advancing socially responsible and public interest design. According to PublicInterestArchitecture.org, "current efforts are small in scope, disconnected, and redundant, and in the profession the interest is palpable, but opportunities are few and far between." Significantly, more socially responsible employment and funding opportunities need to be created to make this movement an important mainstay in the profession.

GATHERINGS AND ORGANIZATIONS FOR SOCIALLY RESPONSIBLE DESIGN

ACADEMIC PROGRAMS AND CONFERENCES

- Structures for Inclusion Conferences
- Public Interest Practice in Architecture
- Design Like You Give A Damn

PROFESSIONAL ORGANIZATIONS

- Architects/Designers/Planners for Social Responsibility (ADPSR)
- Environmental Design Research Association (EDRA)
- International Association for People-Environment Studies
- Business for Social Responsibility

CONCLUSION

A real estate billboard in Seattle for the old Rainier Brewery's converted work lofts reads, "Own a piece of Seattle's history." Cities adopt their buildings as if they were their own, suggesting that there are more building "owners" than the one within the property lines. Buildings embed themselves in the memory of their city and reflect the character and vitality of generations of residents.

Because of the connection between people and their buildings, there may be a time when the public will demand socially responsible design practices from architects. As Matthew Patsky, of Robertson, Stephens & Company suggests, "Over time, the companies that are going to succeed are the companies that have adopted what have been labeled socially responsible criteria into their business practices.…Over time, if you are not empowering your employees, if you are not caring about the community and the environment, you are not going to survive as a company."

Following in the footsteps of the nation's first citizen-architect, Thomas Jefferson, architects can help communities sustain healthful future generations, and in doing so, redefine the meaning of successful design. As Public Interest Architecture observes, "We stand on the brink of an emerging field with the means to improve learning in our schools, health in our communities and the lives of countless people around the world" (http://www.publicinterestarchitecture.org). Buildings will continue to shape people's lives, and their design presents an opportunity for architects to access their highest contribution to others.

The rest of this chapter on public interest design will provide more information about the breadth of activity that constitute engagement in socially responsible architecture. Specific issues and examples will be discussed, including case studies of programs, organizations, and individual architects who are engaging with individuals and communities to improve the environment, the lives of people, and the public realm.

For More Information

AIA Center for Communities by Design: http://www.aia.org/about/initiatives/AIAS075265.

"Pro Bono Services: Improving the Profession" http://www.aia.org/practicing/bestpractices.

AIA Citizen Architect: http://www.aia.org/advocacy/local/AIAB051121.

Public Architecture (The 1% program): http://www.theonepercent.org/.

The SEED Network: http://www.seed-network.org/.

Architecture for Humanity: http://architectureforhumanity.org/.

Open Architecture Network: http://openarchitecturenetwork.org/.

Architects Without Borders: http://www.architectswithoutborders.com/.

Center for Inclusive Design and Environmental Access: http://www.ap.buffalo.edu/idea/.

BACKGROUNDER

SOCIAL ECONOMIC ENVIRONMENTAL DESIGN (SEED)

Bryan Bell

Public-interest design is a quickly growing sector of the practice of architecture. SEED provides public interest design with a professional standard of ethical practice through a clear mission and set of principles.

Bryan Bell is the founder of Design Corps, founder of the Public Interest Design Institute, and a cofounder of SEED. He received a 2007 AIA National Honor Award in Collaborative Practice and is a co-recipient of the 2011 AIA Latrobe Prize, which focuses on public interest design.

PUBLIC INTEREST DESIGN

The goal of public interest design is that every person should be able to live in a socially, economically, and environmentally healthy community. As in the field of public health, those practicing public interest design take a holistic approach, considering a broad range of social impacts. As with public interest law, practitioners seek to provide services to serve all of the general public, not just those able to pay a fee for services.

The first decade of the new millennium saw an increasing interest in design with public benefits. In 2000, the annual Structures for Inclusion conference was launched to illustrate projects from around the world that demonstrate design in the public's interest. The first of these was held at Princeton University on October 7, 2000, and was called "Design for the 98% Without Architects." Attendees were challenged "to serve a greater segment of the population rather than the 2% currently being served by architects" (*Good Deeds, Good Design: Community Service Through Architecture* [Princeton Architectural Press, 2003] by Bryan Bell).

The first exhibit of public interest design was "Design for the Other 90%," held in 2007 in the exterior courtyard of the Cooper-Hewitt National Design Museum. Interest reached a critical level with the exhibit "Small Scale, Big Change," at the Museum of Modern Art in New York in 2010.

SOCIAL ECONOMIC ENVIRONMENTAL DESIGN (SEED)

In 2005, the Social Economic Environmental Design (SEED) Network was founded at a conference organized by the Harvard Loeb Fellowship. The SEED Network established a professional community specifically with a public interest mission and a common set of principles to guide ethical community engagement. A 2011 poll of members of the American Institute of Architects agreed that this mission (77% agreed) and principles (75% agreed) were appropriate for public interest design:

> SEED Mission: Every person should be able to live in a socially, economically, and environmentally healthy community.

SEED Principles

- Principle 1: Advocate with those who have a limited voice in public life.
- Principle 2: Build structures for inclusion that engage stakeholders and allow communities to make decisions.
- Principle 3: Promote social equality through discourse that reflects a range of values and social identities.
- Principle 4: Generate ideas that grow from place and build local capacity.
- Principle 5: Design to help conserve resources and minimize waste.

SEED EVALUATOR

To convert this mission and principles into design-based action, a new tool was developed, the SEED Evaluator. The SEED Evaluator is a communication tool that allows designers and communities to define design projects that address critical issues. The Evaluator provides for significant involvement of the community, resulting in greater transparency and accountability, and allows tracking a project through its entirety. There are four broad benefits of using the SEED Evaluator:

- Process: Provides a standard process for designers and communities to assess challenges, define priorities, set goals, and create design projects to address critical social, economic, and environmental issues.
- Participation: The Evaluator functions as an online communication platform that can include multiple stakeholders and diverse community members in the process. Broad and diverse participation in a project is a requirement of the SEED Evaluator for a project to be determined as in the public's interest.
- Transparency: Progress toward success can be tracked online and in real time. The results of the project in achieving these goals or not are made publicly visible.
- Accountability: Completion of the SEED Evaluator can lead to SEED Certification, which confirms, through a third-party review, the success of a design project in achieving the goals set by the community. SEED Certification has established a trustworthy method for the public, community organizers, civic leaders, designers, and funders to confirm the public interest aspects of design projects.

RESEARCH AND TRAINING IN PUBLIC INTEREST DESIGN

Research conducted through the 2011 FAIA Latrobe Research prize researched "Public Interest Practices in Architecture" and surveyed a representative sample of AIA members. The interest of these professionals in practicing public interest design was measured. Obstacles and support mechanisms were also determined. These responses established a need for training, which has not been provided in traditional architectural education.

Public Interest Design Training includes:

- Finding new public sector clients
- Learning about new fee sources and structures
- Understanding public interest design and how is it reshaping the design professions
- Proactively finding a public interest design project
- Using a step-by-step process of working with a community as a design partner
- Leveraging other partners and assets to address project challenges
- Maximizing a project's positive impact on a community
- Measuring social, economic, and environmental impact on communities

As a result of this research, the first professional training in Public Interest Design was started in 2011 by the Public Interest Design Institute and held at the Harvard Graduate School of Design.

For More Information

Good Neighbors, Affordable Family Housing (Images Publishing, 1997) by Tom Jones, William Pettus, AIA, and Michael Pyatok, FAIA.

Good Deeds, Good Design: Community Service Through Architecture (Princeton Architectural Press, 2003) by Bryan Bell.

Studio at Large: Architecture in Service of Global Communities (University of Washington Press, 2004) by Sergio Palleroni and Christina Merkelbach.

Design Like You Give a Damn: Architectural Responses to Humanitarian Crises (Metropolis, 2006) by Kate Stohr and Cameron Sinclair, eds.

Expanding Architecture, Design as Activism (Metropolis 2008) by Bryan Bell and Katie Wakeford, eds.

Design Revolution: 100 Products That Empower People (Metropolis, 2009) by Emily Pilloton.

The Power of Pro Bono (Metropolis, 2010) by John Cary, ed.

Latrobe Prize 2012 Information: http://network.aia.org/cof.

Public Interest Design Institute: www.publicinterestdesign.com.

BACKGROUNDER

CULTURE, DIVERSITY, AND DESIGN

Sanjoy Mazumdar, B. Arch. (Hons.), M.Arch.A.S., M.C.P., Ph.D.

Design is important to cultural groups. Design flaws and culturally inappropriate designs can be harmful. Attending to cultural and social needs is the designer's responsibility. These themes are delineated herein.

Sanjoy Mazumdar is professor at the University of California, Irvine, past chair of the Environmental Design Research Association, and Fellow of the Design Research Society. His designs exist internationally.

The effects of culture on design are manifest in the variety in architecture existing around the world, illustrated by books on, for example, Japanese or Indian architecture. In many nations, such as the United States, immigrants create various special cultural spaces, such as Little Saigon in Southern California. For a number of reasons, including place attachment, these groups have felt the need to (re)create an architectural and physical sense of place important and meaningful to them. Distinct are their architectural forms, morphological features, colors, textures, ambiences, and building–street interfaces, as well as the ways in which people use sidewalks and streets and interact with buildings.

Following is a summary of the ways culture influences design, the effects of faulty design, and some of the cultural responsibilities of architectural, urban, interior, and landscape designers. Culture is defined as a group's socially negotiated and accepted values, traditions, customs, mores, lifestyle, and ways of doing, acting, and building. This includes views of the physical environment as well as of design.

The distinctiveness of a culture's architectural designs, according to *House Form and Culture* (Prentice Hall, 1969) by Amos Rapoport, as well as other authors, is due primarily to the uniqueness of cultural approaches to design. Attitudes toward design are influenced by the culture's ideas about design problem setting (what needs attention), problem-solving (how problems ought to be resolved), design appropriateness (out of the possible solutions that are acceptable), design requisites (preferred conditions like directions, shapes, sizes, dimensions, materials, and technologies), sentience qualities (visual, including forms and colors; haptic and textural; acoustic/sonic; olfactory/smell; and gustatory), and relationships with other humans, other species, and nature, among others.

Culture's connections with design can be fairly strong, deep, influential, multifarious, and complex. Among the various cultural factors influencing design that have been

(continued)

identified by researchers are cultural values, conceptions, preferences (for forms, materials, etc.), aesthetic sensibilities, symbolism and meaning attached to forms, and attitude toward and responsibility for nature. Cultural conceptions may direct the selection and preparation of the land, the design process, construction, preparation, dedication, and occupation, as well as design features including character, location, orientation, and arrangement of spaces. House designs of religious groups tend to have special ambience and spaces, and unique décor, furnishings, furniture, items, and equipment; as well as distinctive uses, activities, rituals, and ceremonies. Not attending to cultural needs can lead to design failure and consequent costs.

DESIGN PERFORMANCE AND FAILURES

Designs perform successfully in many ways. Briefly, these include users being able to conduct intended functions, tasks, and activities, feeling a sense of comfort, and even satisfaction with the design. Designs can also innovatively provide imaginative possibilities and open new vistas.

Designs fail for several reasons (excluding those not under the designer's control; for example, planning, management, construction deficiencies, and natural or other disasters). *Cultural design failures* are designs that culture members significantly modify, refuse to use, reject, abandon, or dispose of because they deem them culturally inappropriate (e.g., Snyder, Stea, and Sadalla 1976; Mazumdar 2000). *Functional design failures* do not meet reasonable expectations regarding affordance of functions, uses, activities, or comfort conditions. *Design performance failures* refer to the inability of the design product to perform at the level expected. There could be others—for example, *structural design failures,* wherein the structural design is inadequate.

Cultural design failures can have many deleterious effects on people living in culturally inappropriately designed environments (Jaulin 1971; Mazumdar 2012). Living in inappropriately designed houses can hinder, and require adjustments to, religious rituals and activities deemed important. This can be particularly damaging to those groups for whom home is a primary site for religion (e.g., Hindus, Buddhists, etc.). Some outcomes are immediately noticeable, such as the inability of users to conduct their cultural practices and/or having to truncate, modify, or forgo them. Medium-term effects of not being able to engage in cultural routines include feelings of incompleteness and inadequacy, and failure to recall details of the process. Long-lasting consequences consist of amnesia concerning cultural knowledge about procedures and practices as well as their rationales, and inability to socialize and teach the subsequent generation, leading to loss of culture (Jaulin 1971). Besides direct and obvious ones, there can be ripple effects whereby other aspects are affected (e.g., inability to prepare certain foods might lead to nutritional deficiency in children and adults and loss of that cultural recipe). And there can be indirect and hidden effects.

Cultural design failures affect post-disaster housing. After disasters destroyed their homes, disaster victims, who had hardly any options, have nonetheless refused to occupy the houses provided because the designs were culturally unsuitable and instead chose to live in tents or use these in drastically modified ways. For example, those displaced by the 1970 earthquake in Gediz, Turkey, did not occupy the housing supplied (Oliver 2003). Knowledge of such design failures and their effects led to a proposal for a cultural ecological approach to disaster planning (Mazumdar 2012).

These cultural failures have led to the realization that one way of design (planning and landscaping) may not be suitable for all. Because the one-design-fits-all approach is not likely to lead to appropriate and acceptable environments, designers and planners will need to be knowledgeable and motivated to provide appropriate environments.

CULTURALLY APPROPRIATE DESIGN

To avoid cultural design failures and the ensuing embarrassment to designers, and to minimize harm to occupants, it may be useful to adopt the physicians' adage: "First, do no harm." Designers do not always know what is good for the local people, and so the following would be useful to incorporate into regular practice: To achieve culturally appropriate and responsible designs, a "cognoscent approach" is necessary (Mazumdar 2000, 2012). In this, it is essential to develop cultural consciousness, recognize the importance of deep understanding, and adopt an attitude of becoming as knowledgeable as possible about local culture–design relationships. This requires learning about local cultural values and their influence on design and the effects of inappropriate designs. In this culture-intensive and engaged approach, it is useful to frequently verify one's knowledge with culture members. Because cultural values are not static, it is useful to learn about core values that resist change, peripheral ones that are more amenable to modification, and problematic ones that can be considered for alteration. Once knowledge is acquired and choices and consequences properly considered based on comprehension, understanding, and astute judgment, culturally appropriate and responsible design decisions can be made that respect the culture's core and key values while improving conditions. Providing possibilities for cultural members to comprehend the proposed designs—their effects as well as the trade-offs implied—will be useful for their engagement with the design.

A few caveats deserve mention. Individuals are cultural members and agents, but culture is neither a collection of individuals nor the summation, average, mean, or mode of individual opinions or preferences. All cultural features described are important, and so selectively focusing on a few—such as prevalent forms of the region—is insufficient.

CONCLUSION: DESIGNER'S CULTURAL RESPONSIBILITIES

Designers, thus, can have positive or negative effects. Culture, once destroyed due to lack of consideration, action, or knowledge, is near-impossible to reconstitute again (Jaulin 1971). Attending to the various cultural requirements is therefore crucial.

Designers can play an important role in enriching users' lives by drawing on and respectfully using local cultural wisdom; making meaningful products through culturally appropriate design; facilitating cultural experiences (e.g., spaces for contemplation, peace, tranquility); incorporating and specifying local arts and crafts and local materials, products, and labor; and through socioculturally inspirational design that becomes a pride of the community. Additionally, whether required or not, they can address intractable problems, and provide "socially conscious" elegant, affordable, culturally appropriate, imaginative, eco-sensitive, healthy, and safe solutions that make the project suitable for persons with disabilities, children, and the elderly, powerless, and poor (Oliver 2003). Designers are in a special position to lead the way by seeing every project as an opportunity.

For More Information

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4.2 The Role of Architects in Disaster Response and Recovery

Rachel Minnery, AIA, NCARB, LEED AP

Architects have an opportunity to fully embrace the unique and valuable contributions they can make as design leaders in communities at risk of natural hazards. This article discusses how architects can be effective in disaster response, recovery, rebuilding and resilience to help shape truly sustainable communities.

INTRODUCTION

In the United States, the number of federally declared disasters has been steadily and swiftly on the rise. In 1958 there were 8 declared disasters; just 50 years later in 2008, there were 10 times as many. What accounts for the dramatic increase? Some view climate change and global warming as a factor, others perceive an increase in the involvement of the federal government in state and local affairs. Most agree that the compounded effects of population growth, aging infrastructure, and the expansion and development of cities contribute to the increased scale and intensity of hazardous events.

The United States is prone to various life-threatening natural hazards, including hurricanes, floods, tornados, earthquakes, volcanoes, and wildfires. History and science show that numerous faults on the Pacific coast are due or overdue for a seismic event.

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Although flooding, which accounts for more than 75 percent of federally declared disaster areas, is the most prevalent disaster event in the United States, it is excluded from typical homeowner insurance policies. Without flood insurance programs, damage due to floodwaters leaves homeowners physically and economically vulnerable.

Hurricane Katrina had a stunning impact on the nation, yet disasters of truly catastrophic proportion have largely been unseen by Americans in this past century. While the risk of occurrence is low, the threat will exist for generations to come. With over half of the American population living within 50 miles of a coastline, many are aware of the direct risk of hurricanes and windstorms. Japan's Tohoku earthquake in March of 2011 was also a reminder of the indirect risks when an earthquake many miles away sounds tsunami alarms in the United States. For some perspective: A single earthquake off the Gulf Coast could trigger a tsunami affecting 35 million people, and one off the East Coast could impact 65 million people.

When Hurricane Katrina hit in 2005, it was a wake-up call. This storm cost the federal government $85 billion, and natural disasters caused $960 billion in damage to U.S. property and infrastructure in 2010 alone. According to the United Nations International Strategy for Disaster Reduction, the severity of this financial impact of natural disasters is directly linked to unplanned development and destruction of ecosystems. Hurricane Katrina was the costliest natural disaster in the history of the United States. In New Orleans this cost was due in part to infrastructure failures: Breached levees caused the destruction of 4,000 homes in the Lower Ninth Ward. This was the sixth-strongest recorded storm, yet it claimed the lives of 1,836 people and damaged or destroyed 850,000 homes, leaving many coastal communities and neighborhoods still struggling to recover years later. In addition to the monetary costs, there is a humanitarian cost. Until Hurricane Katrina, the largest displacement of Americans had been caused by the Civil War.

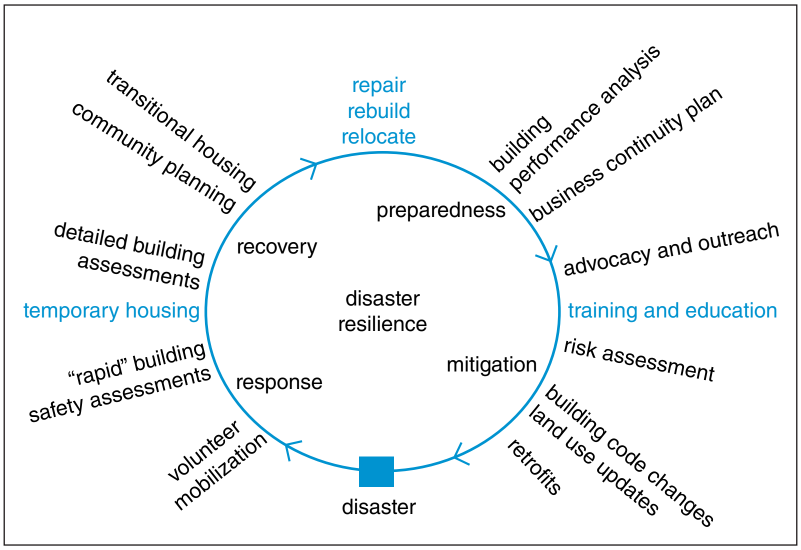
The impacts on Gulf Coast communities have been astounding: fewer than 50 percent of the residents of New Orleans had returned to their city more than five years after the storm. This aspect of prolonged displacement raises an immediate issue after the disaster: When is it safe to return to one's home?

Eager to rebuild their lives, some residents returned to damaged homes too soon, unaware of safety and health risks to themselves and their families. Doctors' visits and prescription use surged in the first year following the disaster for burns, wound care, illness, and injury. A common complaint came to be called "the Katrina cough" due to the mix of high temperatures and flooding in homes (Falk and Baldwin, "Environmental Health and Hurricane Katrina," *Environmental Health Perspective* 2006). Mental health is also fragile. A Harvard University study found that up to 50 percent of Katrina survivors were diagnosed with post-traumatic stress disorder, and another 20 percent with mental illness.

Disasters don't just cause short-term health problems; the more people are exposed to stressors, the more they are at risk for developing long-term mental illness (Gardner, "Mental Health Woes Doubled," *Health Days* 2007; and Hurricane Katrina Community Advisory Group, Overview of Survey Baseline Results, 2006). Ongoing illness and the threat of long-term illness is one of many reasons the recovery costs continue to rise. The more quickly people are able to safely return to their homes, the healthier they will be.

Design professionals and the construction industry have a significant role in the health and safety of the environment and in disaster management (see Figure 4.2.). Their role includes a range of activities designed to maintain control over emergency situations, providing a framework for helping those who are at risk to avoid or recover from the impact of the disaster (Kelly, *Limitations to the Use of Military Resources for Foreign Disaster Assistance*, 1996). FEMA recognizes both as unfilled roles, stating "the literature on natural hazard mitigation directed toward the architectural profession is scarce in spite of the fact that architects can make a significant contribution to hazard risk reduction" (FEMA, *A Manual for Architects*, 2006).

As a first priority, the American Institute of Architects has been advocating for architects to engage with local building departments and state emergency management



Rachel Minnery, AIA

FIGURE 4.2 Disaster Resilience Cycle and the Role of the Architect

agencies to perform building safety assessments when needed. This community engagement reduces the need for temporary housing and prevents further injury or loss of life by ensuring that structures are safe to occupy. See Figure 4.3 for an image of temporary shelter in Haiti provided by one of dozens of nongovernmental relief organizations after the January 2010 earthquake.

BUILDING DAMAGE AND SAFETY ASSESSMENTS

Most jurisdictions and emergency management agencies approach building damage assessments in three phases: windshield assessment, rapid assessment, and detailed assessment. The same assessment approach is used by the Applied Technology Council (ATC), a nonprofit professional organization that develops resources and applications for use in mitigating the effects of natural hazards on the built environment.

- *Windshield assessment*, just as the term implies, is a drive-by cursory view of damage. This is typically performed by emergency personnel, local firefighters, and police, from a vehicle or in conjunction with search and rescue work, to assess the severity of the damage and public safety impacts of the event.

Rachel Minnery, AIA

FIGURE 4.3 Haiti Temporary Shelter

- *Rapid assessments* are performed by local building departments to determine the habitability and extent of damage of individual structures, often conducted only at the request of the owner. Typically teams of two perform up to a 30-minute exterior and interior review of the building damage, sufficient to determine habitability and if there is a need for further investigation. Buildings are tagged on the exterior with red, yellow, or green placards to communicate to the owner, resident, and community where the building is safe to occupy and under what conditions: a red tag indicates it is unsafe to occupy; a yellow tag indicates a restricted occupancy; and green-tagged buildings are determined safe, though they may have minor damage. Unfortunately, after Hurricane Katrina, red-tagged structures were misconstrued as demolition notices, and, regrettably, historic structures were destroyed across the Gulf Coast when demolition crews haphazardly dismantled and removed red-tagged buildings.
- *Detailed assessments* are the in-depth reviews and assessment of complex buildings, and are the final step before recovery and rebuilding begins.

The AIA provides training to architects, building officials, and engineers in how to perform these crucial assessments to help building departments during what is likely to be an overwhelming situation. Following a disaster, even a minor one, local building departments very quickly become inundated by requests for help from residents and business owners. A job that could take up to six months to complete by building department staff, and often the victims of the event themselves, can be reduced to days with the help of a volunteer team of architects and engineers. This increased capacity allows residents to return more quickly and safely to their homes and places of work.

After Hurricane Katrina, 80 California Emergency Management Agency Safety Assessment Professionals, in two 10-day shifts, assessed homes and business in the face of very difficult, sometimes harrowing, conditions, reviewing and tagging over 17,500 of the 28,000 properties in St. Bernard Parish. In Alabama, after the April 27, 2011, tornadoes, 73 volunteer architects donated more than 1,300 hours and performed 7,000 inspections over a five-day period. Nonstructural components typically account for 60 to 80 percent of the overall cost of building construction, so the initial rapid building damage assessment is a job suited for the architect, as a generalist design professional. Furthermore, damaged nonstructural elements such as plumbing, mechanical equipment, light fixtures, suspended ceilings and furniture often pose a greater hazard than the building itself.

Even an earthquake as minor as the 6.8 magnitude 2001 Nisqually Earthquake in the Pacific Northwest left 400 people injured. Architects and engineers were retained for private detailed assessments of buildings. Properly trained architects aided the City of Seattle in handling rapid assessments for homeowners concerned about wall cracks and chimney damage.

When architects provide rapid assessments, engineers are freed up to focus valuable assessment efforts on detailed review and complex buildings.

Any given home is evaluated to some extent up to six times after an event: one or more times by local authorities, FEMA, insurance providers, design professionals, and nongovernmental disaster response organizations (NGOs). In the case of Hurricane Katrina, volunteer architects, with interns at their side, performed voluntary Goodwill Assessments at the request of a homeowner or small business owner for up to a full year following the storm. The Goodwill Assessment is an objective professional evaluation of the building damage and may include recommendations for repair. These reports proved invaluable to many property owners in obtaining repair work reimbursements as they engaged in extended negotiations with home insurance providers and FEMA.

THE AIA DISASTER ASSISTANCE PROGRAM AND COMPREHENSIVE RESPONSE SYSTEM

Recognizing the complexity of the problems communities face as a result of disasters and the absence of any similar program or service related to the built environment, the AIA began providing disaster assistance to communities in 1973. One of the first projects undertaken by the AIA was the recovery and plan for rebuilding after a tornado destroyed downtown and East Nashville. Architects with experience in similar disasters provided much-needed insight for the rebuilding process. They were able to effectively facilitate public workshops and design charrettes with local community stakeholders. As an outcome of this disaster and design assistance team, a nonprofit community design center was formed that remains in existence today to support the community.

Over the years, the AIA Disaster Assistance program has evolved in response to changes in emergency management practices. In 2006 the Disaster Assistance Program, led by volunteer architects from all corners of the United States, was formalized, and the Comprehensive Response System (CRS) was created. The CRS includes guidelines and protocol for architects engaged in the full cycle of disaster management: emergency, relief, and recovery.

There are five critical components of the model AIA policy for the Disaster Assistance Program, with a focus on the safety assessment process.

1. *Liability coverage.* For architects, this is typically provided through a state-enacted Good Samaritan Law. These laws protect architects and engineers while providing emergency services in a specific area within a designated time frame. While often similar in language, the Good Samaritan Law varies from state to state and is not enacted in all states. As more states exercise the use of the professional Good Samaritan Law, it has come under notable criticism for its lack of legal protection. Without indemnification, a citizen can bring suit against a volunteer architect for negligence. The process to exonerate the volunteer can be lengthy and expensive.
2. *Clarity on workers' compensation*. If an architect experiences an injury or fatality while performing voluntary damage assessments in an emergency, who is responsible for medical care or other associated costs?
3. *Standard for professional training for rapid assessment*. Many jurisdictions do not recognize a formal training program for responding architects and engineers. Those that do commonly refer to training first developed by the Applied Technology Council (ATC) with seed funding from FEMA. ATC initially created training and protocol for assessment of earthquake-stricken structures. In 2005, utilizing the same basic protocol, ATC developed a training program for structures exposed to wind and water damage. In recent years, using the methodology of ATC, the state of California developed the Safety Assessment Program (SAP) for building officials and other design professionals to assess damage due to a wide variety of natural and man-made hazards.

   With the growing number of training programs and increasing exposure to liability risk with each event, the AIA has been supporting the American Society of Civil Engineers' proposal to FEMA to establish uniform standards of training and credentialing of engineers and architects to be used nationwide. The training provided by qualified architects has allowed architects to gain firsthand response experience and provide leadership and guidance to local governments, especially valuable where hazardous events have been rare and/or formal emergency management protocol has not been developed.
4. *Network of trained volunteers available and ready for activation.* Acknowledging that response and recovery is the responsibility of the local community, the AIA State Coordinator Network was formed to encourage identification of a Disaster Assistance Coordinator and to create an individual disaster assistance program for each state. The network of volunteers is activated only when a request for professional emergency assistance comes from a local building department or state emergency management agency. Over the past 10 years, thousands of architects nationwide have been trained in the SAP or ATC program offered through the AIA, SAP, ATC, International Code Council, and engineering associations.

After Hurricane Katrina, the Governor of Mississippi, a state that is still without a Good Samaritan law for architects, provided a letter authorizing architects to be temporary contract workers of the state. Minutes later, the first team of architects headed off to the coast with state-employed building professionals to perform rapid damage assessments. Without liability coverage, the architects could not have volunteered, as it would have jeopardized their careers or employers in the states where they practice.

5. *Portability of licensure.* Because architects are licensed by each individual state, not at a national level, this fifth component of the model policy is critical for larger-scale disasters. In a disaster, local architects may be tending to their own families and businesses and thus out-of-state volunteer architects are invaluable. However, they may not be able to help unless the state architectural licensing board adopts emergency policies allowing licensed architects from other states to serve as "emergency workers" when deemed necessary by the state. Yet there is concern that allowing outside architects to participate in the emergency response phase will lead to lost work and future revenue for local architects. The disaster assistance team must be sensitive and cautious in their evaluation of the request for assistance. The Florida SAP trained architects who volunteered to help after the 2011 Alabama tornadoes were denied because they would be "practicing architecture without a license" in the state.

ARCHITECTS IN RESPONSE AND RECOVERY EFFORTS

While disasters are a problem for all nations, they are an especially critical issue in third world countries. Natural disasters are the cause of 95 percent of deaths in third world countries (United Nations Intergovernmental Panel on Climate Change, Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptations, 2012). U.S.-trained architects have been made available to other countries in need of assistance, as in the case of Haiti following the 2010 earthquake. Two teams of American architects and engineers were able to perform damage assessments there, via the nongovernmental disaster relief organization All Hands Volunteers.

The network of architects in the Southern United States was activated in April of 2011 when a series of tornados struck urban and rural areas of Alabama and Missouri. Members of the AIA Disaster Assistance Committee conducted damage assessment training sessions for architects in Alabama. The training sessions paid dividends to communities like Tuscaloosa, providing services valued in excess of $300,000 (see Figure 4.4.). Residents were able to quickly and safely return to their homes, allowing resources to be focused on food and other necessities rather than shelters and temporary housing. Simple prioritizations allow the community to begin recovery and rebuilding efforts quickly.

Michael Lingerfelt

FIGURE 4.4 Volunteer Architect Michael Lingerfelt Tags a Damaged Building in Alabama.

Past community recovery success stories like that of Greensburg, Kansas, offer insight and inspiration to communities struck in 2011, like Tuscaloosa, Alabama, and Joplin, Missouri. Communities affected by a disaster are eager to return their lives to the normal condition they knew before the event. The Greensburg success story offers hope to survivors of other disasters by demonstrating that opportunities for positive change can be born from devastation and pain.

Architects can provide vision and community facilitation to create a unique road map for recovery in the creation of a community's "new normal." While government agencies are best suited for response and relief efforts, it is the private sector that usually leads recovery and reconstruction. Universities and nonprofit organizations with established community networks have been a vehicle for architects, designers, and students to contribute to recovery efforts. Nonprofit design centers have sprung up and rooted themselves permanently in communities as a result of a disaster. Architecture for Humanity is one well-known organization that provides humanitarian design-build services after disasters.

Architects are eager to help after a disaster, yet those good intentions need to be guided to be effective or, if real-world parameters are not understood, they could do harm. In Mississippi, architects and historians worked together to develop design standards for repair and rebuilding the city of Biloxi. Design competitions can be a great way to energize a community by soliciting innovative ideas for reconstruction, and are especially effective when the design process is inclusive of future residents and stakeholders. The Make It Right Foundation built sustainable, storm-resistant houses in New Orleans to model responsible rebuilding on flood-prone land. Yet making structures viable and resilient has the potential to also make them unaffordable to the average homebuyer. The feasibility of reconstruction is based on many variables, first of which is the availability of funding and financing for property owners.

As a response to significant criticism of the health and habitability of the FEMA trailer, several architects developed designs for temporary and transitional housing following Hurricane Katrina. One of the most well-known is the "Katrina cottage," a 308 square foot single-story home designed by Marianne Cusato. At a cost equal to or less than the FEMA trailer, Cusato's adaptable design could be made permanent and allow for future additions and renovations. All too often, temporary housing has become permanent because of a lack of resources, and still local government officials feared that the small houses would drive property values down (Jarvie, "Post-Katrina cottages get a lukewarm welcome," *Los Angeles Times*, 2007). Yet due to their success and popularity, national retailer Lowe's began selling the house kit not just locally but nationally as an economical DIY housing alternative, similar to the Sears & Roebuck kit houses of the early 1900s.

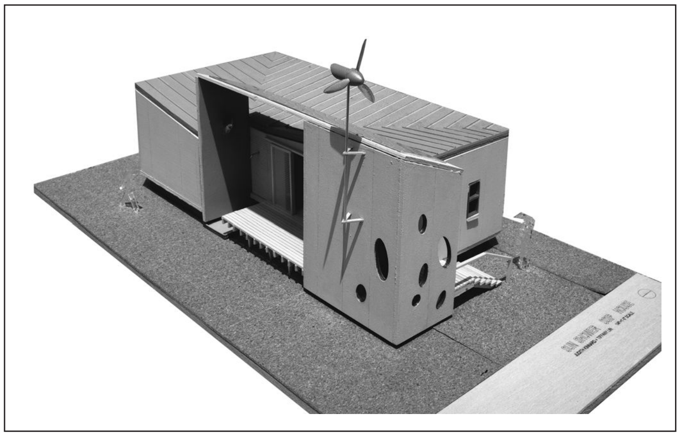
ARCHITECTS LEAD IN KANSAS DISASTER RECOVERY

In May 2007, when a 1.7-mile-wide tornado tore through the rural town of Greensburg with 205-mph winds, an AIA Kansas Disaster Assessment Team responded by performing building safety assessments of the 10 percent of structures left standing. With significant participation of the 1,400 residents of the town that was left completely devastated by the storm, the disaster assessment team and Kansas design teams facilitated the recovery decision-making process after identifying and gathering stakeholders.

Under the leadership of sustainability-minded architects and design professionals, all public buildings were rebuilt to a standard that earned them a Platinum rating from the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) program. To educate residents and make them aware of their options for reconstruction, AIA Kansas hosted a green building exposition, inviting vendors of green building products and contractors to attend. This distinctive recovery effort is considered a great success and has served as a model for sustainable post-disaster recovery, with more than 50 percent of Greensburg residents having returned within three years, rebuilding their homes and businesses.

ARCHITECTURE FOR HUMANITY

Architecture for Humanity (AFH) links a broad network of young professionals through its design fellowship program and chapter organizations. The organization fields requests from communities struck by conflict, natural disaster, or other crisis and will often collaborate with other nonprofit agencies and firms to complete projects. Formed in 1999 by Cameron Sinclair and Kate Stohr, today the San Francisco–based office employs 36 full-time staff and manages numerous volunteers for their global work to alleviate poverty, build community, and address climate change. Owing to Haiti's lack of resources, the group was already working there when the earthquake struck in January 2010. In a country with only 30 architects, AFH became involved in seven master planning projects to help the country recover. While international post-disaster aid is typically earmarked to specific projects like new housing, other essential needs for recovery remain unmet. Survivability is more complex in a place that has nonexistent or inadequate water treatment, so addressing the obstacles to sustainable development has been critical to long-term recovery. As the organization has grown and learned from their post-disaster experiences, the roles of the nonprofit organization have diversified to adapt and make an impact. Collaboration and learning new skills in financing, grant-writing, land development, and public outreach have been critical to getting projects off the ground.



Judith Kinnard, FAIA, and Tiffany Lin

FIGURE 4.5 Sunshower House by Judith Kinnard, FAIA, and Tiffany Lin

Creative solutions for post-disaster homes and shelters have evolved to improve the way sustainable homes are designed for the masses. Judith Kinnard, FAIA, and Tiffany Lin's Sunshower House, as shown in Figure 4.5, is a climate-adaptable modular home design that is packaged to be flexibly transported by a single shipping container. Inspired by the walk-in coolers that had the distinction of surviving hurricane Andrew, the design features structurally insulated panels that withstand wind speeds up to 156 mph. While "deep green" sustainability promotes living "off-grid," survivors of a disaster are forced to live in those conditions. A structure that could be considered both resilient and sustainable, the roof generates electricity from either solar panels or a wind turbine and collects water from the roof for reuse.

DISASTER RESILIENCE AND BUILDING MITIGATION

Communities can prepare themselves for potential disasters and *mitigate* or reduce the impact of hazards so that they will not have to rebuild their homes and businesses. When risks are addressed ahead of time, the potential for damage will decrease. As expressed by FEMA, "mitigation has long been perceived and practiced as an essential tool for helping to save lives, reduce property damage, and decrease the money spent on disaster recovery efforts." Informed and trained architects can be advocates for increased public education and awareness by conveying the risks owners face and demonstrating how those risks can be reduced through specific building mitigation methods.

Government leadership can prioritize community needs and resources to address the hazards and mitigate the potential consequences. Vulnerability is reduced with thoughtful design and construction methodologies. Common building practices have evolved to create safer, healthier, and more affordable buildings, enhancing quality of life. Post-disaster building performance assessments and scientific analysis inform design professionals and those responsible for building code changes and flood mapping revisions.

The increasing occurrence of disasters coincides with concern over climate change because both present significant modifications in the environment that require adjustments in design approach. As climate change brings more floods and droughts, demand for clean water is projected to increase. Rising sea level will diminish coastlines and impair infrastructure. Therefore, addressing the impact of climate change is integrally connected to achieving disaster resilience. The World Mayors Council on Climate Change is working toward strengthening cities' commitment to mitigation measures. Disaster resilience can be strengthened by sustainable design methods that incorporate long-term ecological resilience: green storm water infrastructure reduces urban flooding, coastal wetlands buffer storm-surge, green roofs cool buildings, and parks reduce heat island effect.

One of the most significant issues facing the built environment is the current stock of largely unregulated existing buildings. Architects, engineers, and authorities work to ensure that buildings are constructed properly, yet after buildings are constructed little is required of a building owner in terms of testing and monitoring the building's safety.

Building Retrofits

For existing buildings, *passive retrofits* are implemented when new building codes are put into effect when property owners voluntarily decide to add, renovate, or demolish a structure or rebuild after a disaster. In some cases, local jurisdictions have enacted *active retrofit policies* to retrofit certain building types in advance, for public safety. In other cases, code requirements for seismic bracing or modest life safety improvements are not always enforced.

Retrofit and mitigation practices incorporated into building codes are credited with saving homes and lives. These are fairly simple measures such as hurricane clips, shear walls, and hold-down anchors, among other refined construction practices. Though not required in coastal communities, the use of hurricane shutters, fabric, or impact-resistant glass along with heavy-duty garage doors is shown to prevent extensive damage by protecting openings that otherwise would expose the interior of the house.

Financial incentives for pursuing existing building retrofits work well when used in combination with compliance deadlines, as is the case for early adopters of newly classified flood zones. Home and building insurance discounts and rebates provide further promise when they incentivize elective retrofits and mitigation, reducing homeowners' insurance rates up to 50 percent. In devastating tornados, safe rooms—small, fortified, self-contained rooms typically made of steel and bolted to a building's foundation—have frequently been the only vertical portions of the structure left standing. In 2012, it was reported that a safe room in Mississippi withstood an EF-5 tornado, protecting the 10 people who sought shelter in it during the storm. These lives might have been lost if the storm had occurred just a few years ago, prior to the Mississippi State Emergency Management Agency's program "A Safe Place to Go." The program incentivized homeowners with a 75 percent reimbursement of the installed cost (up to a maximum of $4,000) of a safe room.

Challenges to Disaster Resilience

Change is inevitable after a disaster strikes a community. If local governments want future federal post-disaster assistance, they are required to implement policies that will mitigate principal damage. With evidence of flood and storm surge risks, FEMA updates its Advisory Base Flood Elevations (ABFE) for inclusion in new building and land use codes and retrofit guidelines for elevating structures above grade. During Hurricane Katrina, the highest winds on land were clocked at 175 mph, though the active building code set a design wind speed of 110 mph. As a result, the 2009 International Building Code has increased the design standard to 150 mph. When the building code and land use policies change, the cost of recovery is reduced.

An obvious challenge to disaster resilience is the economic burden. Low-income populations are inherently more vulnerable in a disaster due to a lack of resources.

CASE STUDY: RETROFIT FOR A NONPROFIT HUMAN SERVICES ORGANIZATION

A highly regarded nonprofit organization in Seattle, Washington, that provides community-based human and emergency services occupies a 51,000 square foot three-story unreinforced masonry school building originally constructed in 1911. In 2003 a remodel design, which included seismic upgrades per the 2003 building code, was put out to bid. The upgrade was estimated to cost $268,000, approximately 10 percent of the overall cost. In 2010, when remodel funding was secured, the code's approach to seismic design had changed so dramatically that the seismic retrofit was estimated to cost almost five times its original bid. The project remains stalled due to increased costs, so the building has not been remodeled to meet the tenant's changed needs, and it has not been seismically retrofitted. This cost-based catch-22 is another lose-lose situation for the owner and the public. If funding becomes available, a difficult decision must be made: Demolish the 100-year-old, culturally historic, yet unsafe building, or rebuild to create a fully code-compliant facility for approximately $7 million.

The predicament the organization faces is not uncommon to nonprofit organizations and those with limited resources.

Those with the fewest resources often build and live on the least desirable land. Even without a disaster, finding affordable homes and places of business in poor communities can be a challenge, and renters are dependent on property owners to maintain safe and available homes. Seismic technologies, for instance, add on average 10 percent to the cost of residential construction. For families struggling to meet their basic needs, this slight increase can be the difference between a having a home and not having a home.

New Building Codes

For building construction to be cost effective and safe, the methodology of the building code is to preserve life, not to protect against loss of property or function. Building codes represent minimum standards, and the few who design in excess of the code usually do so because of an owner's risk management practices. The standards to which a building is designed and constructed is critical because it will determine a safety baseline, the building's capacity to weather change over time, and therefore its resilience.

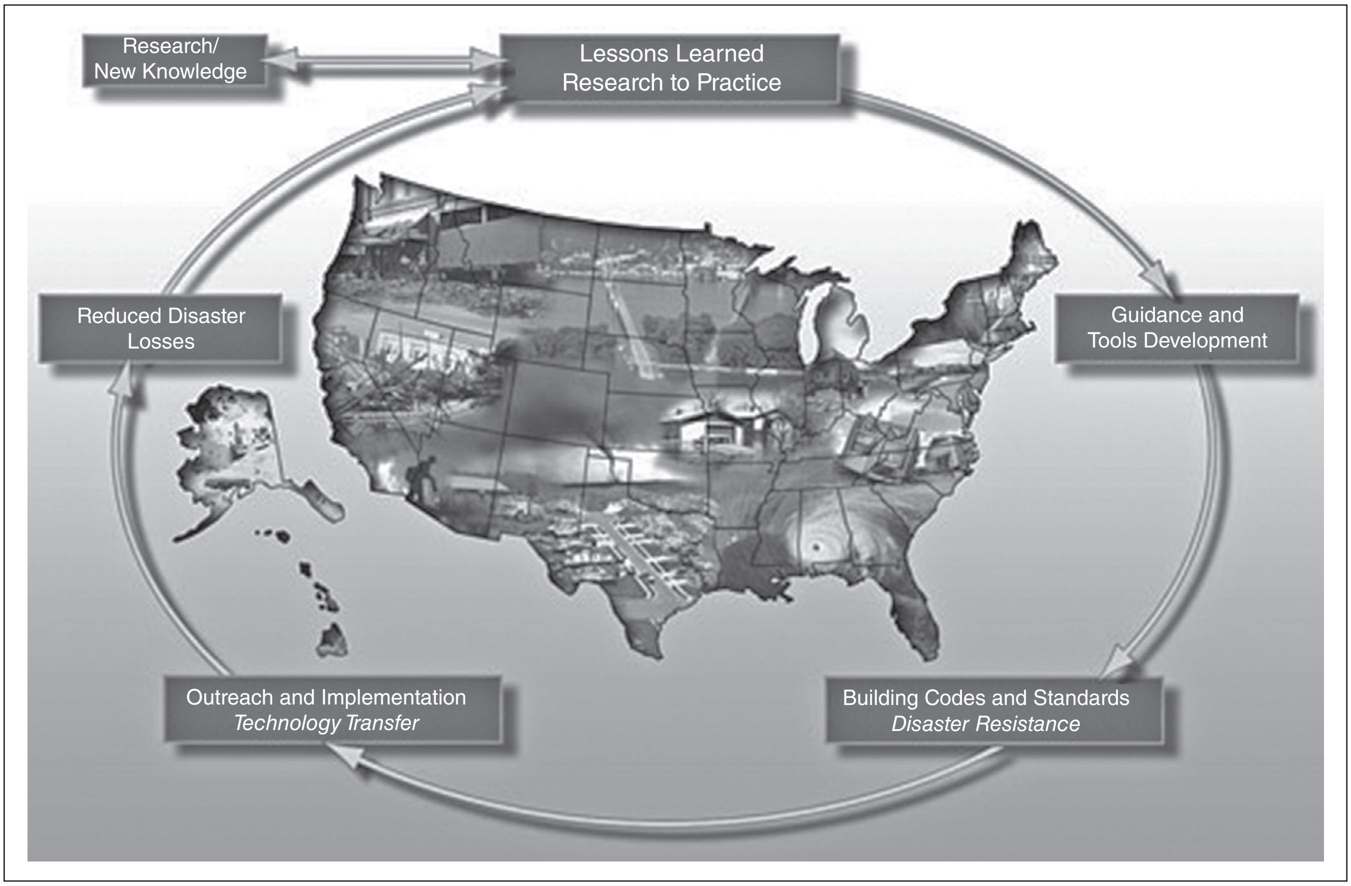
Resilience refers to an ability to adapt to change over time. A fully resilient community would suffer limited negative consequences of a natural hazard. The State of Washington, for example, has defined a resilient state as "one that maintains service and livelihood after a major hazard. In the event that services and livelihoods are disrupted, recovery occurs rapidly, with minimum disruption, and results in a new and better condition affecting *Property Protection*, *Economic Security*, *Life Safety and Human Health*, and *Community Continuity*, where all communities should have the capacity to maintain social networks and prevent social discrimination and social bias."

The resilience of the built environment is defined well in terms of its resilience as a whole system. ResilientCity.org is a not-for-profit network of design professionals whose mission is to develop creative, practical, and implementable planning and design strategies that help increase the capacity for resilience. They define a resilient city as "one that has developed capacities to help absorb future shocks and stresses to its social, economic, and technical systems and infrastructures so as to still be able to maintain essentially the same functions, structures, systems, and identity" (www.resilientcity.org).

The San Francisco Planning and Urban Research Association, or SPUR, a nonprofit with the goal to make cities truly resilient, acknowledges the direct relationship between building codes and resilience. "When we select engineering [and design] standards for buildings and lifelines, we are really choosing how many deaths, how many building demolitions, and how long a recovery time we have for various levels of earthquakes." This distinction, and the degree to which new buildings are capable of withstanding natural hazards, is largely misunderstood by the general public, who often assume that a new building can weather any storm, so to speak.

One tool to inform the design team and communicate expectations to the owner and building official is building performance modeling—the use of drawings, photos, and the like to construct a unique model within simulation software. Although modeling is only as good as its data input, it could be a useful tool for prioritizing mitigation technologies (see Figure 4.6.). With the intent to encourage the design of buildings to higher standards and with increased reliability, building codes have been moving toward a performance-based design approach. Performance-based design focuses the design on meeting a set of established goals rather than a building program based on minimum design standards.

Adoption of building codes by a jurisdiction is voluntary, and code enforcement poses a significant challenge to local building departments, whose resources are often stretched and whose personnel may lack adequate training in code enforcement. The consequence of irregular enforcement has resulted in inadequate construction and ultimately unnecessary damage and destruction of structures. Conditions such as these were discovered during damage assessments of tornado-stricken homes in the Midwest.



FEMA

FIGURE 4.6 Building Damage Mitigation Cycle

Approaches to Resilient Design

As a result of the Disaster Mitigation Act and Stafford Act, most cities have mapped their hazards, determined likelihood of occurrence, and anticipated impacts. Risks associated with those hazards are incorporated in mitigation plans to reduce loss from those hazards and to help prioritize local and federal mitigation funding. HAZUS, a software program developed by FEMA, estimates losses due to natural hazards at a regional level and can include utilities, bridges, and general number of structures. These tools inform decision making for land use and future development.

Architects can support a community's hazard mitigation plan by establishing resilience goals for their development projects. This is facilitated through site assessment, including collecting data from National Weather Service, FEMA's National Flood Insurance Program (NFIP), United States Geological Survey, and state or university surveys and research. Some jurisdictions have GIS mapping that includes hazards for floods, liquefaction, landslides, and the like. A detailed site-specific investigation, including the availability and condition of existing infrastructure, may illuminate development feasibility.

Having early conversations with clients to understand their comfort with risk will help determine acceptable levels of disruption in a disaster and establish appropriate design standards. It is important to communicate to owners that code compliance sets a minimum life safety standard with very limited protection of property. This may cause owners who depend on continuity of service for the long-term survival of their business to choose a design standard that exceeds the building code. Expectations can be outlined with a *vulnerability assessment*, where potential hazardous event scenarios are defined, modeled, holistically assessed, and analyzed for performance impacts and costs. This assessment would include investigations of resources and systems outside property limits: uses, site access, utility/infrastructure, backup systems for water, waste, electricity, and communications. This additional knowledge may alter design to provide additional safety and improve durability of the building through hazard mitigation.

Mitigation begins at the outset of design when decisions are made regarding the building's configuration and footprint, yet mitigation is not exclusively structural. Nonstructural building elements account for up to 80 percent of the value of a building—including windows, ceilings, interior partitions, equipment, furniture, and utilities—and are inherently less durable. Therefore, they are more susceptible to damage and may also negatively affect the structural performance of the building and prevent habitability.

▶ The backgrounder accompanying this article, Resilient Design, further explores the concepts of resiliency.

As seen with recent developments in the building code, the philosophy of mitigation is moving toward a resilient design, in that robust and resistant design is being replaced by design that is adaptable, flexible, and responsive.

CONCLUSION

The Loma Prieta earthquake of 1989 provides perspective on the long-term effects of a disaster in modern times. A post-earthquake economic recession struck northern California with building damage and loss greatly exceeding projections. Development decisions might have been different if building owners had understood the level of protection offered by building code standards. Engaging the public in decision making on acceptable building performance is important because the actual performance expected of a code-compliant building, and particularly existing buildings, is not widely understood. As difficult as the Loma Prieta recovery was, time has a way of minimizing if not erasing the memories of lessons learned.

FEMA statistics show that resilience is improved through mitigation. The potential for loss can be greatly reduced when mitigation practices are incorporated into both retrofits and new construction. Every dollar spent on mitigation saves at least four dollars in recovery, yet mitigation saves more than dollars—it also saves lives. However, to consider the resiliency of a home, one must consider the resilience of the community at large. As such, homeowners experiencing recurring floods who choose to relocate their families to a safer location will also have relationships and routines to rebuild to make a new house feel like home.

There will never be a lack of need for safety assessments of damaged buildings and for the skills that architects can offer to aid in the recovery from a disaster. The AIA model policy for a Comprehensive Response System is one starting point, created to equip architects with the guidance and tools they need, prepare them for the risks they face, and help them protect the communities they serve. Awareness, knowledge, and options for positive action can empower individuals to create resilient sustainable communities.

For More Information

AIA Disaster Resources: www.aia.org/disasterresponse/.

California Safety Assessment Program: www.calema.ca.gov/Recovery/Pages/Safety-Assessment.aspx.

Applied Technology Council: www.atcouncil.orgFEMA.gov/plan/prevent/bestpractices/index.shtm.

FEMA 454, "Designing for Earthquakes: A Manual for Architects": http://www.fema.gov/library/viewRecord.do?id=2418.

Federal Emergency Management Agency (FEMA) Coastal Construction Manual (CCM): www.fema.gov/residential-coastal-construction#1.

National Earthquake Hazards Reduction Program (NEHRP): NEHRP.gov.

The National Tsunami Hazard Mitigation Program of NOAA, "Planning for Tsunami: Seven Principles for Planning and Designing for Tsunami."

BACKGROUNDER

THE ROLE OF ARCHITECTS IN DAMAGE ASSESSMENT AND RESTORATION

Sharon Lobo

The role of architects in damage assessment and repair involves working toward solutions to unique problems, since disasters are unique events. The architect is often involved in the rebuilding efforts, since they were part of the original design team and must work with insurance adjusters, attorneys, clients, and other professionals and coordinate with governmental agencies.

Sharon Lobo is a licensed architect with over 20 years of architectural experience. With Thornton Tomasetti, Erwin Lobo Bielinski PLLC, and Indus Architect PLLC, Lobo has developed an investigation, litigation support, and construction analysis practice. She is regularly retained by national insurance carriers to investigate claims for building damage.

BUILDING DAMAGE ASSESSMENT

Building damage can be existing and may have been caused by substandard installation, poor design, or lack of maintenance. Building damage can happen at any time, ranging from minor wall cracks to structural failure, and it is not always catastrophic in nature. Any combination of these causes may result in a building's exterior and structural systems failing prematurely, and may cause additional damage such as air and water intrusion into the building's interiors. The architect can act as a conduit for communication after a disaster or damaging event to assist the owner in understanding causation.

For example, the architect can communicate to the client the difference between building damage and normal wear and tear. In the latter case, over years minor cracks may develop that are not threatening to the building. These can be caused by prolonged exposure to sunlight or wind. The client should be made aware that no construction is without flaws and that some minor instances of cracking are within accepted industry standards.

- If an architect is the original designer of the damaged building, expert opinions should not be offered regarding the cause of the damage because the client may incorrectly interpret the original architect's technical opinion regarding the cause of the damage or believe that the architect may be in some way responsible. Even if obvious, the architect should arrange for an independent third party who has expertise in the damage assessment to opine.
- The architect, if the original designer, should provide the project history to the expert who is hired. This project history is crucial in understanding what materials were used and, with the help of the original builder, under what conditions they were installed. There are often mitigating circumstances, and the architect can usually help "fill in the blanks" about the specifics.
- Even if the architect is seen as partially or wholly responsible for the damage to the building, it may be within his or her best interests to work with the client to develop the repair. The architect can serve as a conduit between the client and the contractor. When damages from disasters occur, clients sometimes consider litigation, and the architect can help facilitate bringing to the table participants necessary for diffusing such conflicts.

ASSEMBLING THE RIGHT TEAM

The right team consists of professionals with specific experience in assessing building damage and formulating a repair strategy. These professionals should be adept at following the unique protocols that are often established, such as the following:

- *Documenting the damage with photos, video, and field drawings*. A particular order and sequence of documentation must be established.
- *Developing a methodology for investigating damage*. This may involve deconstructing a building's defective assembly (such as an exterior wall system) in a controlled method to document each component of the system. Each of the interested parties should have a representative present and document the deconstructed system individually. In some cases, additional testing may be deemed necessary, and all parties must agree on the testing methodology. ASTM and ANSI standards are often used as testing guidelines.
- *Communicating with the legal or insurance representatives in a manner that they deem appropriate*. Some attorneys prohibit written or e-mail communications of any kind, citing lack of attorney-client privilege, preferring direct discussion or telephone communications only. Others depend on written communication. Be aware that e-mails are typically not protected by attorney-client privilege; rather, e-mails are increasingly used as evidence. Therefore, the architect should write them with the knowledge that they may be used in the courtroom. The tone in an e-mail should be direct but unemotional, relying on factual information only.
- *Consulting with the attorney or insurance company*. They may lead the team, but they often depend on the architect for advice on how to bid the repair, how to meet the code, and how to learn from the building damage. The rebuilding effort is more fluid than the conventional design process of a new building, and it is often constrained by increased time pressures and varying levels of available resources.

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The team may consist of forensic architects or engineers, cost estimators, restoration contractors, insurance adjusters, and attorneys. Depending on the size and scope of the building damage, the team may range from a few to several hundred professionals. The client and often the insurance provider must approve the hiring of professionals. Depending on the insurance policy, these professionals' fees may be covered.

FORMULATING A REPAIR STRATEGY

The architect often works with the building owner to plan and "program" a new building. Likewise, an architect can be especially useful to "reprogram" an existing space or footprint after a building disaster.

The architect may be asked to speak with product manufacturers in regard to warranty coverage. Manufacturers often choose to interpret building damage causation to events that negate their warranty, such as improper use or installation of the product or lack of maintenance and inspection. Clients are not always technically sophisticated enough to understand the limitations of the warranty. Architects can assist as an owner's advocate to obtain whole or partial replacement of the product, whether a roofing system or a window unit.

COORDINATING WITH GOVERNMENTAL AGENCIES

Governmental agencies often have requirements that can negatively affect a rebuilding effort, such as detailed documentation of rebuild designs when in sensitively zoned areas. For example, the New York City Department of Environmental Protection requires a Remedial Action Plan (RAP) for building modifications made within certain historic districts. This includes designing for an Alternate Means of Ventilation (AMV), which affects the design of windows, mechanical systems, and the exterior envelope. The intention is that the building be able to function with all doors and windows in the closed position with increased sound insulation and mechanical ventilation. These more stringent requirements must be taken into consideration when managing damage assessment and repair.

Additionally, energy codes and other national codes are often supplemented with more stringent requirements at the state or city levels, and they often require the approval of local code officials, specialized inspectors, and product manufacturers. After a disaster occurs, architects are sometimes held accountable for these requirements if litigation ensues. Therefore, the architect should make every effort to appropriately include these parties in the design and construction phases.

CASE STUDY

A high-end residential project in Boston experienced premature cracking in the wood flooring. The client refused to move into the residence in anticipation that the wood floors would be removed and replaced, thus costing him additional moving expenses.

The flooring subcontractor and general contractor refused to return to the project if the owner demanded total replacement. The design architect brought all parties to the table and convinced the client to hire Indus Architects as an expert to provide an opinion. The design architect arranged for Indus Architects to inspect the floors, review the project documentation, and provide an opinion regarding causation and damage repair. The architect provided supporting documentation such as project e-mails, letters, and product submittals.

Indus concluded that the product was appropriate for its use and the cracking was within industry standards. They determined that the wood floor needed to acclimate to the HVAC system and the client's occupancy would help lessen the perceived damage. The architect's role in this case was to facilitate communication, provide project history, and manage what was becoming a tense emotional situation.

CONCLUSION

The architect, as a leader and project advocate, can be beneficial as a conduit of information and communication. Though stresses of time constraints and high emotions are often present when building damage occurs, the architect should have the technical means and personal communication skills to bring about a successful resolution to most problems. Even if the architect is found to be ultimately responsible for the problem, working with the client to repair it may avoid litigation and possibly bring about a long-term professional relationship.

BACKGROUNDER

RESILIENT DESIGN

Alex Wilson

"Resilient design" is not only about surviving a storm, flood, or other natural disaster but also about creating buildings and communities that will maintain safe, livable conditions in the aftermath of a disaster. Resilient design provides for building occupants during extended power outages, shortages of water, and interruptions in motor fuel supply.

Alex Wilson, the founder of BuildingGreen Inc. in Brattleboro, Vermont, and executive editor of Environmental Building News, is a leading expert on resilient design and adaptation to climate change.

BROADENING THE DEFINITION OF RESILIENCE

Much of the focus of resilience has been on the ability of buildings to weather storms, floods, and a variety of other natural disasters. But in an age of climate change and resource constraints, the concept of resilience should be broadened to include how well buildings and communities perform with non-emergency (slow) disasters. These can include heat waves, extended drought, interruptions in water supply, extended power outages from any cause, spikes in fuel costs, outright fuel shortages, and even food shortages.

Some of these impacts can result from climate change. Others may result from natural disasters unrelated to climate, such as the devastating tsunami that struck Japan in early 2011 or a terrorism event. Some experts are particularly alarmed about the risk of cyberterrorism, in which terrorists hack into the controls of power plants or regional electric grids, causing widespread power outages that affect nearly all buildings in that area.

Resilient design is an effort to create buildings and communities that will maintain livable conditions both during disasters and in the aftermath of such disasters—which can extend much longer than the particular event. For example, in 2005 there were widespread power outages throughout the Gulf Coast region that lasted weeks or months after Hurricane Katrina, even in areas not directly affected by flooding.

Architects need to be aware of society's vulnerability to power outages—which may result as a secondary effect of other problems. An extended regional drought could result in widespread power outages if water levels drop so low that power plants have to be shut down for want of cooling water. In the United States, 89 percent of electricity is generated using thermoelectric power plants that depend on large volumes of water to condense steam. During the 2007 drought in the Southeast, one power plant was forced to shut down; several dozen more were threatened with shutdown had the drought continued. A 2003 drought and heat wave in Western Europe resulted in more than a dozen power plants either shutting down or reducing output—just when air conditioning loads were at record levels. The droughts in the West in 2011 and 2012 raised these same concerns.

Resilient design is most applicable to residential buildings—homes and apartment buildings—because unless evacuation is called for, residents are often advised to stay home during emergencies. But it also applies to public buildings that serve as emergency shelters. Schools, sporting venues, and other public buildings often serve as places of refuge during times of disaster.

ELEMENTS OF RESILIENT DESIGN

Resilient design encompasses a wide range of seemingly disparate building design and operation issues as well as much broader, macro-scale land-use planning and policy issues—all with the goal of ensuring public safety. These issues are introduced here.

Storm Resilience

Architects should consider the predicted impacts of climate change, including increased storm intensity. Warmer temperatures will drive more intense storm systems, including hurricanes, thunderstorms, and tornadoes. Changing precipitation patterns are expected to produce more intense rainfall events.

Achieving storm resilience involves designing to the most stringent wind and water-intrusion codes, such as the Miami-Dade County Hurricane Code. Such standards should be followed not only in coastal areas, but also throughout much of North America. It also makes sense to incorporate areas of safe refuge in homes or garages. Such safe rooms provide excellent protection even in tornadoes, our most devastating storm events. Requirements for safe rooms may be incorporated into future editions of buildings codes in some zones.

Flood Avoidance and Flood-Proofing

Climate change will contribute to flooding in several ways: It will produce heavier precipitation events; more intense tropical storms will result in coastal storm surges; and the sea level will gradually rise. Designers and planners should immediately begin designing buildings and communities to protect from flooding.

Risk of flooding is defined by the Federal Emergency Management Agency (FEMA) and indicated on Flood Insurance Rate Maps as follows:

- *Special Flood Hazard Areas* have a 1 percent chance of flooding in a given year ("100-year storms") and are designated as specific zones, including Zone A and Zone V.
- *Moderate Flood Hazard Areas* have a 0.2 percent risk of flooding in a given year ("500-year storms") and are often designated as Zones B and X.
- *Minimal Flood Hazard Areas* lie above the 0.2 percent risk elevation.

Building strategies related to flooding include avoidance of all areas identified on FEMA maps as Special or Moderate flood hazard areas, elevating living spaces in buildings within these zones (providing break-away barriers on the lower level), elevating mechanical and electrical systems within a building (especially in basements), and using building materials that can sustain wetting without permanent damage or fostering mold production.

Superinsulated Building Envelope with Passive Solar Gain

A resilient building is one that will maintain livable conditions in the event of an extended power outage or loss of heating fuel or mechanical cooling. (The vast majority of heating systems and virtually all cooling systems depend on electricity.) The key strategy for achieving such resilience is to design a building enclosure with high levels of insulation, high-performance windows, airtight construction, and passive solar gain.

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To achieve this level of resilience, insulation levels and glazing standards should go far beyond what is required by the International Energy Conservation Code (IECC). For example, in IECC Climate Zones 5 and higher, one should aim for the following minimum R-values:

- R-10 under slabs
- R-20 for foundation walls and slab perimeters
- R-40 for above-ground walls
- R-60 for ceilings or roofs

Window energy performance and air tightness should be commensurate. Sun tempering or passive solar design should be provided in these climates so that livable temperatures will be maintained in winter months even with loss of heating fuels or electricity.

Cooling Load Avoidance and Natural Cooling

During power outages, air conditioning systems do not function, so controlling heat gain is critically important. The summer of 2012 provided a wake-up call to this reality, when a heat wave blanketed many of the Mid-Atlantic states following intense storms that knocked out power for a week or more in some places. Strategies include minimizing glazing, especially on east and west façades; providing exterior overhangs and shading systems for fenestration; providing light-colored (reflective) roof and wall surfaces; providing vegetative shading and green roofs; and designing buildings to provide ventilative airflow through operable windows.

Daylighting

To provide livable, functional daytime-use spaces during extended power outages—a high priority in school buildings and other community spaces that can serve as emergency shelters—incorporate plenty of daylighting. Daylighting strategies vary by building configuration, but can include skylights, clerestory windows, and conventional windows, especially those high on walls. Lightshelves and light-colored ceiling and wall surfaces can help to distribute daylight deeper into rooms.

Water-Efficient Fixtures, Equipment, and Landscaping

With climate change, droughts are predicted to become more common in certain regions, such as the American West, even as overall precipitation increases. During droughts—and during extended power outages in rural areas that depend on electric pumps to provide water—minimizing water use is a high priority in achieving resilience. The use of high-efficiency toilets, low-flow showerheads, low-flow faucets, and water-efficient clothes washers and dishwashers are top-priority strategies in residences. While these systems will function with less water, the installation of composting toilets allows operability with no water and with a nonfunctioning sewage system. Low-water-use landscaping (xeriscaping) and, where needed, water-efficient irrigation equipment are top priorities outdoors.

Emergency Water

Having a supply of stored water can be extremely important during periods of water shortage. Water storage can consist of keeping on hand several carboys of potable water (the type used in water dispensers) or larger cisterns. For nonpotable uses, such as toilet flushing, a rain barrel positioned at the corner of a house can provide a water source. Full-fledged rainwater harvesting systems with aboveground or underground storage provide the best in resilience.

Emergency Generators

Backup generators are one component of resilience and, indeed, they are becoming more and more common in much of the country. But we learned in the aftermath of Hurricane Katrina that most generators either ran out of fuel or failed after just a few days—while the power outage lasted many weeks.

Renewable Energy Systems

Solar-electric (photovoltaic or PV) systems can provide the ultimate in energy resilience by providing electricity during extended power outages—but grid-connected PV systems require specialized inverters and at least some battery storage to be usable when the electric grid is down. Most PV systems are unusable during power outages, even during the daytime when the sun is shining. For resilience, be sure to provide a system that can function when the grid is down—these are sometimes referred to as "islandable" PV systems.

Solar water heating can provide hot water during power outages or fuel shortages, but to function without grid electricity it needs to be a passive solar water heater, such as a thermosiphoning system (with the tank positioned above the collector) or an integral-collector-storage (batch) heater, or an active system with its own integrated PV module to power the pump and provide control (when the sun shines, the PV module generates electricity and the pump operates). In rural areas, some homeowners augment solar water heating with a wood stove that has a heat exchanger in it through which water circulates.

Durability

With climate change, the ranges of termites and other wood-boring insect pests are extending farther north, so control measures may be needed where they were not in the past. Good building science practices will help to protect against moisture damage and other problems that lead to premature failure of building systems and buildings—one aspect of resilience.

Community Resilience

Resilient communities are communities that can function during times of gasoline and diesel shortages. Political upheaval in oil-producing countries, storms that take out a significant fraction of oil refining capacity, or terrorist actions that damage pipelines could all result in temporary shortages of fuel.

While actual shortages could occur, perhaps more likely are dramatic price increases that could effectively create fuel shortages for people who can't afford to fill their fuel tanks.

In such a situation, the ability to get around without a car will be critically important. To foster that, we should be designing towns and cities to be easily walkable and bikeable, and we should develop better public transit systems. Communities that work to achieve high rates of bicycle and public transit ridership, such as Portland, Oregon, will be at a great advantage should there be interruptions in transportation fuels. Use of locally produced biodiesel and site-generated electricity in electric vehicles or plug-in electric hybrid cars can also deliver resilience.

Food System Resilience

Food production in North America is extremely centralized, with much of our produce shipped from California and most grains from the Midwest. Severe, extended drought in food-producing regions could have significant effects, as could shortages of diesel fuel, upon which most shipping of food depends.

Greater resilience can be achieved through a focus on local food production. Strategies to achieve greater food system resilience include the creation of community gardens on abandoned urban lots, support of CSA (community-supported agriculture) farms, programs to supply schools and hospitals with local food, the protection of agricultural land (for example, through the creation of urban growth boundaries), and the relaxation of regulations that prohibit farming activities in more-developed areas. Landscape architects can even begin incorporating edible landscaping into their projects, allowing our landscapes to serve double duty.

THE ARCHITECT'S ETHICAL RESPONSIBILITIES

Faced with climate change and other vulnerabilities, should resilience be a part of the design profession's responsibility to protect public safety and welfare? Some argue that just as architects must create buildings that are structurally sound, so too should they create buildings that will ensure that residents will be safe in the event of extended power outages, loss of heating fuels, droughts, heat waves, damaging storms, and other impacts likely to increase in the years and decades ahead.

Building codes could also be expanded to address these issues more directly. Most disaster-related building codes today focus only on performance *during* the event and not the aftermath. Codes could be expanded to address building performance relative to life-safety during a scarcity of power, heating fuel, or water. New York City is already examining these issues, as are some other progressive cities around the country.

A significant benefit of many of the resilient design strategies introduced here is the mitigation of climate change. Creating more energy-efficient buildings and relying more on renewable energy sources, for example, will result in burning less fossil fuel and contributing less to climate change. Such measures will also reduce the operating costs of our buildings. These are win-win-win solutions.

4.3 Architects in the Nonprofit Sector

David Gamble, AIA, AICP, LEED AP

Increasingly, architects and young designers are looking for opportunities to become more engaged. They seek ways to have a direct and positive influence in the communities where they work and live. Civic engagement, once deemed passé, is becoming cool again.

INTRODUCTION

One of most powerful skills to learn as an architect is the ability to solve multiple variables in the fewest number of moves. Since an architect is an individual who works in the service of clients (both public and private), a primary product of an architect's work is the creation of more efficient, sustainable, and beautiful environments. This skill is directly associated with the ability to think spatially and to

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synthesize. Equally important, and often more difficult to learn, is the skill of designing not just the product but also the process to arrive at an elegant design solution. Learning that the process of engagement can directly affect the process of designing the product is fundamental to the development and maturation of an architect.

Working with the nonprofit sector provides enormous benefits in this regard. Not-for-profit organizations seldom have the financial resources to allow designers unlimited constraints for a project. Tight fiscal budgets, restricted staff time, and diverse constituents require design solutions that balance multiple variables and require effective negotiation skills.

While these limits can be present in any project large or small, architects working in the nonprofit sector are embedded in an environment that demands cost-effective solutions, fostering creativity and requiring efficiency. When this work is nested in underserved or distressed neighborhoods where more diverse voices must be considered, even greater skill at community engagement is warranted.

The pedagogy of design education typically revolves around the studio culture, and most students or recent graduates feel comfortable operating in the world of design. Unfortunately, there are fewer opportunities as a young architect to be directly involved in the process of community engagement and the valuable lessons that can be drawn from direct client interaction. Working with nonprofits can open up opportunities to architects of all experience levels to be exposed to these dynamics, and provide invaluable lessons that can be applied in all facets of the profession.

► See the backgrounder Independent Community Design Centers (4.4), and the backgrounder accompanying this article, Community Design Centers in Context, for related information.

Fortunately, there are a variety of ways in which an architect, intern, or student can pursue work in the nonprofit sector. One way is to seek out volunteer (or pro bono) work on behalf of clients. This interaction often takes place in collaborative settings with other volunteers. Another venue for engagement lies with Community Design Centers (CDCs) that may or may not have an academic affiliation. There are a variety of CDC models, but these locally based organizations work directly in the communities they serve.

► A backgrounder accompanying this article, Architects in Large Nonprofits, further discusses the opportunities for architects who work on staff for nonprofit organizations.

Still another opportunity is the path of architects who work directly for a not-for-profit organization in which they apply their problem-solving skills and design acumen directly for the organization.

Regardless of the direction one takes, working in the nonprofit sector can bolster skills, foster connections, and heighten one's awareness of the communities in which one works.

PRO BONO WORK

The term "pro bono" commonly refers to work that is done without an expectation of payment. The complete phrase is *pro bono publico*, which further clarifies the meaning of the work as "for the public good." Work that is done pro bono, then, is often thought to mean labor that is free, but it really defines an effort that is in the interest of the greater public or deserving of a cause.

In law and medicine, pro bono work is considered an important component of the profession, and many doctors and lawyers feel compelled to give back to society in meaningful ways. Countless people are in need of health care or legal representation, but they simply cannot afford those services. Pro bono efforts help to fill the void. For some practitioners in these fields, pro bono work is seen as an ethical imperative, and an essential component of their practice. So it is with architects.

The Benefits of Pro Bono Work

It is a sobering fact that as much as 90 percent of the population does not come in contact with architects, or may never even be able to afford their services. Increasingly, architecture firms both large and small are performing pro bono work to address this deficiency. While the volunteer work may not contribute to the firm's financial bottom line in the short term, inculcating an ethic of pro bono work into the culture of a practice provides other benefits that can pay dividends in the future. Compensation should not be viewed as strictly monetary. Substantial rewards are also garnered by developing the skill sets of younger architects, who frequently do not have an opportunity to interact directly with clients or present plans in public forums.

Different people enter the architecture profession for different reasons: the opportunity to combine artistic and technical skills, pursuing the desire to see ideas get built, or to lead others and make a positive impact on people's lives. Doing pro bono work provides a platform for applying these skills in a community context and an opportunity to engage clients in important work that would not otherwise materialize. Advancing design skills, cultivating leadership traits, and even giving space to altruistic ambitions can be fostered when working with organizations that lack the resources to hire firms, or that lack an awareness of the design process itself. In this way, working as an architect transcends the definition of a sole designer and embraces a broader definition as an architect who leads others.

Cultivating an ethic of pro bono work is contagious and rewarding for any size firm. Within the culture of a large office, it represents an opportunity to nurture leadership skills among younger professionals and to provide them with opportunities for growth. In the context of a small practice, it advances the reputation of the firm in the public's eye and empowers architects to take initiative in forming new relationships. Cultivating relationships is one of the most important skills when running a practice, regardless of scale, and devoting a portion of one's creative efforts to pro bono work can lead to unforeseen paid opportunities in the future. At its best, the work can provide a valuable service to the client and a platform to educate the public about what architects do and the value they bring to society. Pro bono work is also encouraged by the AIA Code of Ethics.

Pro bono work moves the learning environment away from the office or classroom and into the environment in which one lives. It mirrors the realities of practice and models the type of work one will be engaged with in the future. The sooner younger architects are exposed to this work and apply their skills, the more prepared they will be for success in the profession. Even for more experienced professionals, pro bono work fosters a stronger connection to the place in which they live. Undertaking volunteer work with both seasoned professionals and emerging architects together is often the best scenario, as mentoring occurs more naturally between the groups (from both ends of the spectrum) and in a setting outside the confines of the firm.

Ethical Standard 2.2 Public Interest Services: Members should render public interest professional services, including pro bono services, and encourage their employees to render such services. Pro bono services are those rendered without expecting compensation, including those rendered for indigent persons, after disasters, or in other emergencies.

—*AIA Code of Ethics and Professional Conduct*

While most pro bono efforts are informal agreements between parties, the AIA publishes a document (AIA Document B106™–2010, Standard Form of Agreement Between Owner and Architect for Pro Bono Services) specifically tailored to providing professional services in which the architect does not anticipate receiving financial compensation. This contract serves a number of purposes, not the least of which is to formalize an agreement between parties in what otherwise can be an informal arrangement. Signing a contract underscores the value of the services by itemizing the amount of time committed to the work and demonstrating the commitment of the client to the endeavor.

Despite the numerous advantages, working in a pro bono capacity can be fraught with potential pitfalls, and it is important to go into the work with a sense of how to negotiate the terrain. What type of organization are you working for? What evidence is there of their community connections? What is the scale of the impact to the community, and what do they really need? Does the organization have effective leadership, and what funding opportunities for the work are there? Evaluating these components of a pro bono project can help to filter out projects that may not be an ideal fit and can also serve as a barometer for potential success.

CASE STUDY 1: BRAINTREE ELECTRIC LIGHT DEPARTMENT/BROWNFIELD REHABILITATION, BRAINTREE, MASSACHUSETTS

The town of Braintree, Massachusetts, lies 10 miles south of Boston. The town needed assistance on negotiating a public process surrounding the potential redevelopment of an important former industrial property on a waterfront. The town was poised to acquire the site from the area's municipal electric light department. However, redevelopment efforts were stalled due to an acrimonious relationship with residents of the adjacent neighborhood, who were concerned about the impacts of new construction. The property remained vacant for nearly a generation due to differing opinions about what new uses should emerge.

The pro bono design team established an effective community planning process by first establishing themselves as an independent party. While they were initially contacted by the town, the volunteers were not seen as "hired guns." Community aspirations were identified in the initial public meeting with a second meeting offering precedents for consideration. A final meeting brought together a range of redevelopment scenarios that built from recommendations by the community. The alternatives spanned a range of building scales to initiate dialogue and debate. Residential, arts, and business incubator plans each included an open space component, generating some economic benefit to the site but also maintaining an appropriate amount of publicly accessible open space and access to the river.

After years of acrimonious debate, a consensus vision for the site has finally emerged that balances the needs for some economic development on the site with the community's aspirations for public access. Through an effective participatory process, there is now an alignment of goals between the surrounding residents and the town. By limiting the engagement to three well-advertised public meetings, momentum was created during the three months. The process concluded by recording the effort in a document that was widely distributed and endorsed. The property is now in the predevelopment phase, and the town has control of the property.

Be Aware of the Challenges

One misconception about pro bono work is that architects who do work in a volunteer capacity are siphoning work away from firms who would otherwise do the work for a fee. In reality, most pro bono work actually creates work for others that would otherwise never have materialized. Perceived roadblocks, a lack of vision, or an unclear idea about what is actually needed are frequently the reasons that stymie nonprofits or communities from even beginning to look for an architect. This is where pro bono work can be most effective—in unleashing projects from these constraints and developing a path to move forward. Identifying goals, establishing an effective process, building consensus, and forming relationships are all skills that are essential to any client-architect relationship, and these are the geographies where pro bono work is most often entrenched.

As the scale of the project increases, so too can the number of people influenced by the work. Planning within neighborhood settings usually takes place in the midst of multiple parties with competing agendas. Often, the most substantive part of pro bono work is the time it takes to negotiate conflict. It is important to assess the potential level of conflict at the beginning of the process, and strive to understand where tensions lie. Failure to do so can lead to time squandered and aggravate participants.

Finally, it is important to be aware of the erroneous perception that volunteer work is not of the same caliber as work that is paid. Simply because the effort does not involve financial compensation does not release participants from quality work. With this in mind, below are five things to consider and five potential pitfalls in pro bono work as an architect.

Five Do's

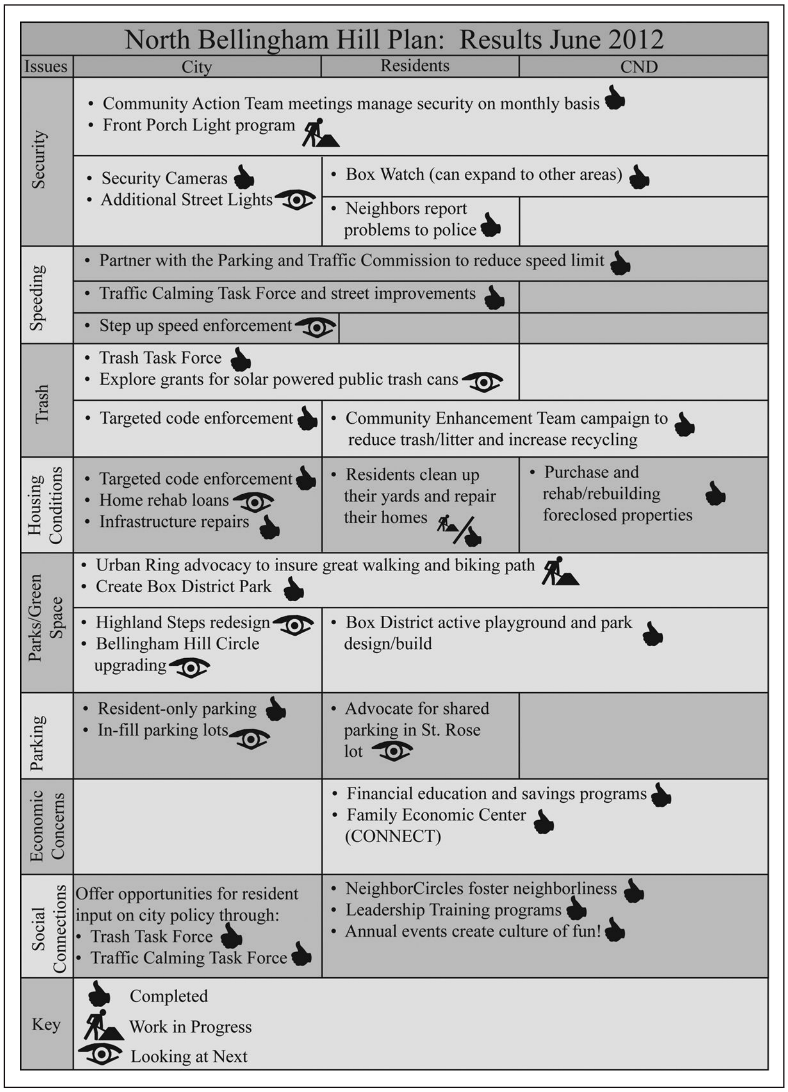
1. *Design the process.* Spend almost as much time designing the process as designing the project. A well-considered and intelligent method for engaging clients will build the confidence of the participants and provide for effective means of communication.
2. *Consider the effort as a relationship-building endeavor.* Assisting clients with an initial, short-term pro bono effort can lead to unanticipated possibilities for long-term paid work in the future. Even if it doesn't lead to new work, the engagement process will be good training for the cultivation of architect-client relationships.

CASE STUDY 2: CHELSEA NEIGHBORHOOD ACTION PLAN, CHELSEA, MASSACHUSETTS

The City of Chelsea, Massachusetts, and the nonprofit Chelsea Neighborhood Developers (now called The Neighborhood Developers) partnered together to significantly improve a distressed six-block area. The client sought to develop a plan for "transformative reconfiguration" of the dense neighborhood by taking advantage of the soft real estate market to begin implementation. Strategic demolition and housing rehabilitation, streetscape improvements, traffic calming, and public safety measures were most needed to help stabilize the neighborhood.

While ambitious designs for new streets and infill development were enticing to consider, what was most needed was a strong demonstration of community investment and recognition that the problems in the district were as much social as physical. The volunteer design team focused their efforts on near-term actions that could improve selected areas where traffic calming, safety, security, and redevelopment could take hold.

The community dialogue therefore involved close coordination of the department of public works, the city planning department, and the police department. The effort provided a forum for residents to identify the areas of greatest concern where limited resources would have the greatest effect (see Figure 4.7). The engagement began a process of regeneration from a distressed area into a healthy neighborhood by promoting affordable housing, establishing desirable public spaces, and fostering resident prosperity and leadership. Initial grants for new security cameras led to substantial local and state aid for new infrastructure investments and a community pocket-park that is serving as a catalyst for private development.



Community Design Resource Center, Boston

FIGURE 4.7 Evidence of Impact and Community Engagement Process

3. *Work hard for the client and demand excellence.* Simply because the project is not financially profitable in the way that a paid project is, that is no reason not to demand and expect excellence from both sides.
4. *Look for opportunities to enlist others in the endeavor.* While engaging more people requires more time devoted to management, having other designers involved will lighten the production load and enable synergies to emerge in the design process.
5. *Advocate and educate.* It is important to listen well, but also assert your position as someone who is trained to problem-solve, think creatively, and help to educate others about the benefits of good design.

Five Don'ts

1. *Don't overpromise.* Be realistic about what can be accomplished within the time constraints available, the number of participants, and the perceived commitment of the partners. As with any project, managing expectations is critical to success.
2. *Don't rely on jargon.* Like many professions, architects use their own language to convey meaning. This language can confound the general public and frequently distances the audience from understanding what is being said.
3. *Don't begin the work without a good understanding for what the client needs.* Strive to identify the key issues and the likely level of conflict before the engagement begins.
4. *Don't grandstand.* In a community-based setting, cultivate a dialogue with those in attendance and allow participants to share in the joy of creating. It builds capacity and ownership of the work.
5. *Don't allow the project to go on indefinitely.* Carve out time to work on the effort and stick to deadlines. Pro bono efforts need to adhere to deadlines as much as—or even more than—traditional projects. Resist the urge to be seduced by the indeterminate nature of the design process. Be decisive and keep to a time schedule.

CONCLUSION

There is an increasing desire by the emerging generation of design professionals and architects of all experience levels to be more actively involved in the shaping of their environment. Advances in technology have accelerated the possibilities for engagement and opened up new means for communication. Pro bono work provides a valuable platform to effectuate change. It helps emerging architects to develop client relationships and assists in honing design and planning skills. More important, however, as tomorrow's leaders seek to address the most pressing design challenges of the future, pro bono work not only results in a better architect but also a more enlightened and socially responsible individual.

For More Information

Public Architecture (The 1% Program): www.theonepercent.org/.

Public Interest Design Institute: www.publicinterestdesign.com.

Good Deeds, Good Design: Community Service Through Architecture (Princeton Architectural Press, 2003) by Bryan Bell.

Design Like You Give a Damn: Architectural Responses to Humanitarian Crises (Metropolis, 2006) by Architecture for Humanity.

Design for the Other 90% (Editions Assouline, 2007) by Cynthia E. Smith.

Expanding Architecture: Design as Activism (Metropolis, 2008) by Bryan Bell and Katie Wakeford, eds.

The Power of Pro Bono (Metropolis, 2010) by John Cary, ed.

BACKGROUNDER

COMMUNITY DESIGN CENTERS IN CONTEXT

Dan Pitera, FAIA, ACD

Community design centers relate closely to the context in which they practice. They are generally organized along two continuums based on engagement with the university and professional context and on research and project endeavors.

Dan Pitera is Executive Director of the Detroit Collaborative Design Center, University of Detroit Mercy School of Architecture.

A primary proposition for a Community Design Center (CDC) is to be specific and relevant to the context it engages. Each center determines where it will expand the practice with respect to people, programs, and geographies to make well-designed and thoughtful places. Since it is a requisite for CDCs to be specific and relevant to the contexts they engage, there is no single typical way they are organized. For a CDC, "typical" is a myth.

Community design centers are generally organized along two correlated continuums:

1. University-based centers and professional-based centers
2. Research-based centers and project-based centers

UNIVERSITY-BASED AND PROFESSIONAL-BASED CENTERS

Etymologically speaking, when someone operates in a professional context they are making a "public declaration." The history of the word *professor* means that one has something to "profess…lay claim to, declare openly." This pairing is meant to illustrate that the line between the academic and the professional is less than clear. Similarly, the distinction between professional and academic design centers is more complex than whether or not they are located within an academic institution. In many CDCs, lines between academic or professional labels are not distinct and are continuously shifting.

As an example, the Detroit Collaborative Design Center (DCDC) is an academic program within the University of Detroit Mercy School of Architecture. Though the DCDC is in an academic context, its organizational structure is essentially modeled after a year-round professional design office. It is not based on a semester system. It does not take summers off. It has a full-time professional staff of about 8 to 10 people with 1 to 2 students as full-time employees.

RESEARCH-BASED AND PROJECT-BASED CENTERS

When people conduct research, they "search closely"—they search and re-search again and again. Most CDCs participate in client-based design projects such as buildings, master plans, and/or landscape designs. Some conduct research on people, programs, and/or geographies. Some do both. This should not suggest that there is no research in design projects. Instead this distinction is directed toward the underlying focus of the work—actual projects designed and built within communities, or study (research) on those communities. One cannot happen without the other. They are distinct but interrelated. University-based centers often are hybrids resulting in unique research-based practices.

For example, since 2001, as part of its mission the DCDC, alongside community residents and artists, has coordinated and performed mercenary artistic/architectural installations within several burned houses throughout the city of Detroit. This project is titled "FireBreak: Architecture and Community Agitation."

FireBreak engenders the position that everyone—the next-door neighbor, the person down the street—can shape her or his physical world. The DCDC's research through these catalytic interventions and interferences has thrown the urban context, and one's power over it, into the public discourse through both event and word. Being in an academic environment gives the DCDC an advantage in that there is access to and emphasis on creative methods of research and project delivery, which are potentially more limited in a traditionally professional context. FireBreak is both intensely research- and project-based. It asserts that design is also a research activity, whether inside or outside of the academic environment. Being research-based is not about where the center is located but about how the center engages the process of investigation.

UNIVERSITY-BASED COMMUNITY DESIGN CENTERS

Teaching Hospitals for Architects

The DCDC has modeled itself after a teaching hospital—an operational "project-based" entity, which uses its "projects" for research and teaching. It is a place for learning by doing. Though they may have not explicitly articulated this position, many university-based design centers also can be seen as following the teaching hospital model. They are unique hybrids of professional work, applied research, and educational development. These design centers use diagnostic and analytical research accomplished through actual client-based projects. Design students work alongside design professionals, similar to how medical students work alongside doctors in a teaching hospital. Such CDCs are often independent departments within their schools. The professional staff members are full-time employees of the center, who may also teach part-time in the curriculum.

(continued)

The analogy of a teaching hospital can also bring perceived negative outcomes if projects and clients are seen as test subjects—or if the university is viewed as fulfilling a community service requirement. It is important for a center to define a methodology of community engagement in which mutual knowledge sharing is the core. This is distinct from community service that can imply a hierarchal working relationship with the design center at the top. When community stakeholders hear the word *service,* they may hear an underlying subtext that suggests they are incapable of defining and maintaining the direction of their neighborhood. Removing the notion of service from the process helps establish a meaningful engagement and partnership between the university and the community and mitigates the potential feeling within the community that they are the subjects of a scientific experiment. Neighborhood residents often use the phrase "lab rats," with hostility, when referring to the methods and means many universities use when working in their city.

Structural Relationship to the Academic Institution

The format and the relationship of the center to the university structure can vary. There are three general formats:

Some centers start in the studio environment and are limited to the time restrictions of a semester. They may use this structure to gauge the need for a more full-time and professionally staffed center. Some have found the studio format to be a unique and meaningful structure given their projects. For example, Lawrence Technological University's Detroit Studio is located off-campus and in the New Center neighborhood of Detroit. Every semester a studio of students tackles a new project or continues the prior studio's work.

There is the full-time center staffed with professionals and students, such as the Detroit Community Design Center. Another example is the Tulane City Center (TCC) at Tulane University. Born in the aftermath of Hurricane Katrina, the Tulane City Center is focused on New Orleans and is undergoing a transformation in its working model to adapt to the current community context.

A third model for CDCs develops around unique partnerships between a professional office and a university department. The bcWorkshop is a Dallas-based, independent, professionally based center that has engaged many of its projects through collaboration with the University of Texas at Arlington. It was not financially but instead pedagogically supported by the University.

CONCLUSION

Community design centers seek methods and procedures to expand the nature of practice to include more people, more projects, and more geographies in the process. They are advocates for people who are typically left out of design and place-making decisions. While many community design centers are connected to academic institutions, they vary as to their structural relationships and their engagement with research. Regardless, community design centers attempt to alter conventional ways of seeing and working. Rather than being alternative practices, they have the potential to fundamentally change the way design professionals work.

For More Information

Definitions of terms used in this article: http://www.etymonline.com/index.

BACKGROUNDER

ARCHITECTS IN LARGE NONPROFITS

Susan A. Chin, FAIA

Many architects specialize in working with nonprofit clients, but only a small number of architects work on staff for nonprofit organizations. Working directly for a nonprofit, as an architect, can provide multiple perspectives that are unique to that environment.

Susan Chin is the vice president of planning & design and chief architect for the Wildlife Conservation Society. Chin is a licensed New York State architect and heads the renowned Exhibitions and Graphic Arts Department (EGAD), notable for its many innovations in the field of zoo design.

ABOUT THE ORGANIZATION

The Wildlife Conservation Society (WCS) is committed to protecting wildlife and wild places around the world. This is accomplished through over 300 conservation projects in more than 50 countries and by inspiring the next generation of environmental stewards at four zoos and one aquarium in New York City.

WCS is a 501(c)(3) nonprofit that operates the Bronx Zoo, New York Aquarium, Central Park Zoo, Queens Zoo, and Prospect Park Zoo, which are all on New York City Parks land. Approximately 15 percent of its operating budget is funded by New York City. The balance is provided through private funding and earned revenue. The capital program is funded through a combination of public and private funds.

The Exhibitions and Graphic Arts Department (EGAD) is the in-house design group of the WCS. EGAD designs innovative exhibit experiences that inspire guests to care about wildlife and wild places and connect them to conservation through innovative programs and animal experiences. The EGAD team combines the disciplines of architecture, landscape design, exhibit design, graphic design, and interpretive programming to produce effective results in guest experience and informal science learning. As the director of EGAD, my role involves providing design leadership and coordination of an integrated process of design and construction in collaboration with all stakeholders.

DIFFERENCES FROM TRADITIONAL ARCHITECTURE FIRM PRACTICE

A leader of a design group within a large nonprofit organization that is continually involved in capital improvement initiatives involves playing multiple roles. Many of these are similar to a senior principal in a traditional architecture firm, and there are also similarities to architects who work in the public sector. However, there are distinct differences, summarized below:

- As the representative of a nonprofit owner, it is critical to have a comprehensive organizational perspective that integrates the needs of the mission and brand-driven design.
- The majority of WCS capital projects are funded in part by New York City and occur on New York City–owned land. Similar to other nonprofits that receive public funding, there is continual engagement with public sector agencies on multiple levels.
- There are likely to be many diverse stakeholders that must collaborate in the design and construction process, including, in the case of WCS, animal departments, education, operations, finance, construction, global conservation programs, and senior administration.
- Senior leadership represents the organization to the public and interacts with the Board of Trustees, donors, and other external constituents, including government and funding agencies.

In addition, for an organization such as WCS, the annual capital program is developed across the organization with input from multiple stakeholders. Projects are measured against need, guest experience, mission, and business plans. Once approved, the capital plan is continuously managed and rebalanced as necessary throughout the year.

Many professionals are attracted to the mission of nonprofit work and the potential for gaining diverse and valuable experience, particularly as they start out their careers. However, the realities of compensation in a nonprofit can affect staff retention. In addition, developing specialized design and construction knowledge requires constant investment in training.

Nonprofit architects are usually working in an environment that exposes them to other fields and professional areas. However, it is sometimes insulated from the normal architectural environment. Keeping a connection to the profession is vital to stay current on technical information, materials, and design. When outside of traditional practice, a concerted effort is required to attend events, read about the industry, and keep a strong network of contacts in multiple professional arenas. For instance, at WCS, architects will maintain contacts with those in similar roles in zoos and aquariums around the world, those in similar cultural organizations in New York City, and fellow architects at the local AIA chapter.

BENEFITS

There are many benefits to working in a nonprofit environment. The obvious one is being paid to work for a cause with personal meaning. Although salaries are not at the high end of the spectrum for the field, there are many aspects to nonmonetary compensation.

For many, working in the nonprofit sector can accelerate learning in some areas and provide the ability to gain diverse experience. There are opportunities to be involved in all phases of design, client management, budgeting, estimating, and consultant management. In addition, there is the opportunity to collaborate with architects, designers, and construction managers—constantly being exposed to and learning from a diverse number of professionals in the field.

Nonprofit employees generally share the mission goals and inherently similar interests, resulting in a motivated, committed, and passionate staff. There is the ability to interact with professionals from fields that may not be directly connected to architecture or design. At WCS, there are opportunities to work with a diverse group of people—curators, scientists, fundraisers, educators—and, of course, other species. Collaborating on a marketing plan, financial plan, and fund-raising strategy as well as design of a project creates a unique leadership perspective that can inform design process and mission advancement.

Nonprofits are a fertile environment for emerging professionals. Many staff members gain valuable experience that enables them to go on to work at for-profit design firms, other museums and cultural institutions, and even to become zoo, aquarium, or museum directors.

One of the greatest benefits of work in the nonprofit sector is a personal connection to the mission of the organization. While most architects forge a long-term connection to their projects, in a nonprofit context one can appreciate the aggregated accomplishment toward a mission goal as projects are completed. There are many important rewards for success—salary, recognition, happy clients—but it is difficult to quantify the personal satisfaction and sense of fulfillment that comes with the understanding that your work contributes to your community or has a direct impact on a cause that you care about.

4.4 Public Service and Community Involvement

Jess Zimbabwe, AIA, AICP, LEED AP

This article offers an overview of ways that architects have committed themselves to the public interest. From casual volunteering to full-time community design advocacy, from providing technical expertise on a planning commission to running for elected office, thousands of architects across the United States have used their professional capabilities to improve their communities.

THE ARCHITECT'S ROLE IN COMMUNITY AT LARGE

We engage the problems and issues that people care about. We believe in the transformative power of design.

—from the mission statement of the Architecture + Civic Engagement Center of the School of Architecture at Woodbury University

In 1968, when Whitney Young Jr. spoke before the annual convention of the American Institute of Architects in Portland, Oregon, he excoriated the profession for doing too little to engage with the crises that American cities were facing at that time: "As a profession, you are not a profession that has distinguished itself by your social and civic contributions to the cause of civil rights, and I am sure this has not come to you as any shock. You are most distinguished by your thunderous silence and your complete irrelevance."

In the years since, architects and their professional organizations have come a long way, creating dozens of community design centers that serve needs of nonprofit organizations and underserved communities across the country, but the fact remains that, within the larger profession of architecture, public interest design is still a somewhat marginalized mode of service delivery. In 1996, the seminal Carnegie Foundation report on the state of architectural education concluded that "schools of architecture could do more…to instill in students a commitment to lives of engagement and service."

▶ For related discussions of the community design movement, see Community Design Centers in Context (4.3) as well as the backgrounder accompanying this article, Independent Community Design Centers.

Since the end of the last century, there has been a debate about whether a new, broad consciousness of public interests is emerging in architecture and the related design professions. The community design movement has been active in the United States since at least the late 1960s. In contrast to a Hollywood trope of portraying architects as heroes of abstract design ideas, the community design movement focused on delivering a useful service to under-invested communities.

Based on several lessons from successes and failures of the community design movement, several new models of a broader field called public interest design have emerged in recent years. Projects and programs that are explicitly devoted to serving the public have emerged from the underfunded shadows to be promoted in mainstream design media with funding through grants and corporate and individual gifts. Sharon Haar, an architecture professor at the University of Illinois at Chicago who is writing a book about this subject, estimates that about 250 nonprofit architecture firms, advocacy organizations, and design centers have been launched since the early 1960s. While many of the organizations founded in the 1960s and 1970s no longer exist, there are currently about 100 in operation—many launched within the last decade—demonstrating a renewed interest in this work. These architects are directly addressing architecture's relevance in the face of local and global shifts in the world climate, economy, and building industries and seek to define a new utility for the architectural skill set and sensibility.

Jess Zimbabwe is executive director of the Daniel Rose Center for Public Leadership at the Urban Land Institute. She is an architect and planner with substantial community design and nonprofit experience focused on the public impacts of design, planning, and development.

THE AIA'S DEFINITION OF A CIVIC ARCHITECT

- Uses her/his insights, talents, training, and experience to contribute meaningfully, beyond self, to the improvement of the community and human condition
- Stays informed on local, state, and federal issues, and makes time for service to the community
- Advocates for higher living standards, the creation of a sustainable environment, quality of life, and the greater good
- Seeks to advocate for the broader purposes of architecture through civic activism, writing and publishing, by gaining appointment to boards and commissions, and through elective office at all levels of government

—From the "Citizen Architect Resolution" adopted by the AIA Board of Directors on December 5, 2008

CIVICLAB, A PROJECT OF AIA BALTIMORE

To encourage its members to take on leadership roles in their community, the AIA Baltimore component developed a program called CivicLAB (**L**eadership. **A**rchitecture. **B**altimore). CivicLAB participants are emerging professionals (Associate AIA members or those who have been licensed less than 10 years) with an active history of involvement with one or more community organizations. During interactive monthly evening sessions over dinner, participants learn from architects who have held a wide variety of leadership positions. The course is broken into four distinct units:

- Citizen Lobbying
- Economic Benefit
- The Art and Practice of Urban Design
- Sustainability, Smart Growth, and Preservation

The founders and leaders of CivicLAB recognize the importance of developing younger professionals in the field to leverage their architectural skills, training, and expertise in the broader community. Klaus Philipsen, FAIA, who coordinates the Sustainability, Smart Growth, and Preservation unit of the course, states, "We can only remain successful if we foster and support new talent."

CIVIC AND COMMUNITY ENGAGEMENT: DESIGN

Citizen Engagement

Architects regularly present their ideas in front of community stakeholder groups. Since the Model Cities program of the Lyndon Johnson administration first dictated that urban redevelopment projects should include the "maximum feasible participation," residents of wealthy and poor neighborhoods alike have been given a role in determining the future of their environment. Civically inclined architects realize that their role in the stakeholder engagement process does not begin with a single community meeting or end with simply listening to public demands. Through more extensive models of engagement such as community charrettes or serial public meetings, architects engage citizens in longer-term and more meaningful ways. Increasingly, architects are looking to develop their skill sets at charrette and meeting facilitation and other, deeper methods of stakeholder engagement.

Design is not the icing on the cake but what makes architecture out of buildings and the places we want to live and eat and shop rather than avoid.

—Alexandra Lange, Writing About Architecture

Though citizens can have a voice in a public hearing, their input is usually quite passive and their opinion often lacks real power. Through more interactive workshops and charrettes, architects and their sponsors can provide a more satisfying and effective experience for stakeholders. In such a setting, participants express their concerns, but they also get involved in exercises where the purpose is to reconcile a variety of competing interests, so they come to appreciate the importance of consensus and the need for compromise. At their best, such workshops can defuse controversy and help build a constituency for projects.

▶ Architects in the Nonprofit Sector (4.3) further discusses opportunities for civic engagement.

CASE STUDY: R/UDAT (2009) DOWNTOWN AND COMMUNITY REVITALIZATION, NEWPORT, VERMONT

In March 2009, an AIA R/UDAT team visited the community of Newport, Vermont. The community invited the R/UDAT team to explore key opportunities and issues facing the city. It was the 143rd R/UDAT in the nation, but the first in the state of Vermont. In typical R/UDAT form, the team of seven architects, planners, and designers toured the city and spoke with community residents, business owners, and other stakeholders. James Logan Abell, FAIA, an architect from Tempe, Arizona, led the group. Following their community engagement, site tours, and two and a half days of deliberation, the R/UDAT team made a final presentation to a 200-person audience in the community and issued a formal report with their key findings.

In March 2011, the City of Newport contacted AIA to indicate their interest in a follow-up visit to evaluate progress to date on key priorities identified by the team in 2009. The R/UDAT Team found that Newport has made remarkable progress in its first two years of implementation. They observed that much of the earlier public conversation was colored by nostalgia. R/UDAT participants lamented the state of the city, and focused on the issues and constraints facing the community. As the team wrote then, "Civic pride is an issue for Newport city residents. While citizens' sense of attachment to the community is strong, there is a prevailing narrative of decline among many residents…the team heard a repeated chorus which described the city's glory days in the past tense, and expressed nostalgia for days when the city was more vibrant and dynamic." The R/UDAT team found in 2011 that Newport was a "community on a mission." The deep engagement of the first R/UDAT endeavor completely reshaped thinking about the community in Newport.

Sometimes architects conduct this kind of community engagement even outside of the context of their own projects. One such example of this is the AIA's Regional Design and Urban Assistance Teams (R/UDAT). Since 1967, the AIA has run the R/UDAT (pronounced ROO–dat) program, a results-driven community design program based on the principles of interdisciplinary solutions, objectivity, and public participation. The program combines local resources with the expertise of a multidisciplinary team of nationally recognized professionals who volunteer their time to identify ways to encourage desirable change in a community. The team visits the community for four intense, productive days, and team members return within the year to advise on implementation strategies. The process is fast-paced, exciting, and energizing. This approach addresses social, economic, political, and physical issues. Stakeholders must come together and agree on a set of goals for the project in order to complete the application, so the program offers communities a tool that fosters new levels of cooperation. The R/UDAT program has used this grassroots approach across the nation to help create communities that are healthy, safe, and livable, as well as more sustainable.

The R/UDAT program is a good example of a perhaps unexpected lesson from several national design assistance programs: Programs like R/UDAT that bring volunteer architects and other experts from outside the community allow those professionals to give their expert advice with more candor than they sometimes can in their own communities. Since they aren't personally vested in the project or community, their creative participation is freed from typical political or economic constraints commonly found with fee-for-service projects.

Design Review Commissions and Boards

Design review boards or commissions are independent commissions charged with upholding design guidelines and reviewing the design components of development proposals. Communities generally establish volunteer boards consisting of residents who comprise a mix of design professionals (architects, landscape architects, engineers, or historians) and committed laypeople. In addition to their project experience, architects are especially useful to communities because of their analytical capabilities, technical experience, and aesthetic sensibilities.

Depending on the process established by the community, design review boards may conduct advisory or legal reviews of development applications. Many communities have advisory design review boards that meet with developers early in the site design process, prior to submission of a formal application. In this capacity, design review boards can react to concept plans and offer suggestions and recommendations that ultimately influence the final site plan submitted with a development application.

Public Design Education

AIA components and other design-related entities around the country have recently dramatically expanded their efforts in design education for the public at large. Pioneered by the Chicago Architectural Foundation with its long tradition of docent-led architectural tours of the city, several organizations have opened new exhibition and programming centers dedicated to delivering design programming beyond just the profession. With inviting storefront spaces, the BSA Space (Boston Society of Architects), Urban Center (San Francisco Planning and Urban Research Association), the Center for Architecture (AIA New York), and several others like them work to reach out to the general public and educate them about the value of design through exhibitions, lectures, tours, K–12 educational workshops, and festivals or special events.

Some programs are directly focused on building a better and broader clientele for architects. For example, several AIA chapters offer workshops on how to choose and work with an architect that are geared toward small projects or homeowners who might otherwise choose contractor-led design. But most of the programs developed for the public at large also emphasize principles of design like environmental sustainability, the health impacts of good design, and aesthetic sensibilities. The best architectural design competitions are also used to inform and engage interested citizens and raise awareness of the relationship between design and vital communities.

The Mayors' Institute on City Design is another long-standing program that serves to educate leaders outside the design profession. The program is currently operated as a partnership between the National Endowment for the Arts and the American Architectural Foundation. Since 1986, it has helped mayors better understand their role as chief urban designers of their cities. Each year, dozens of design professionals volunteer their time to serve on resource teams to work with mayors in small group settings to tackle major urban design projects in the mayors' home communities.

CIVIC AND COMMUNITY ENGAGEMENT: LAND USE POLICY, ZONING, AND BUILDING CODES

Planning and Zoning Commissions

Many architects serve their communities as members of local planning commissions. In this role, they assist the city or town with the review of planning and development projects, to facilitate conformance with zoning requirements and the master plan. These commissions also regularly review and update master plans, zoning ordinances, and specific or neighborhood plans. Having one or more members with an architectural background helps the commission understand how the project will affect the community's form, how users and passersby will interact with the development, and how the structure will affect the broader built and natural environments. An architect who can understand and visually communicate the three-dimensional aspects of the proposed design can improve land use planning efforts. Architects who serve in roles like Planning Commissioner usually develop their abilities to work with politicians, developers, and community groups more effectively; they understand the forces that shape the city.

Too often, designers bemoan the lack of voice we have in what we can or cannot do in a particular municipality. Rather than despair, we must ensure our place within the process. That's been my approach, and I like to think that I'm making a difference.

—Antoine Bryant, NOMA, Assoc. AIA

▶ See Planning, Urban Design, and the Regulatory Environment (13.2) for related information.

Architects on these boards and commissions often find their support sought by both opponents and proponents of development projects. Community advocates who oppose or push for changes to proposed products see architects as valuable trained professionals who aren't simply representing downtown business interests and are instead basing their decisions on technical information and professional judgment that includes consideration of historic resources, neighborhood context, and environmental impacts. At the same time, since architects earn their living in the construction industry, they have an understanding of what it takes to finance and build complex projects, so developers often value their insights in a board or commission's discussion. The elected officials who are usually charged with nominating and confirming members of these boards and commissions often seek out architects to play this dual role. Houston Mayor Annise Parker appointed Antoine Bryant, NOMA, Assoc. AIA, to the Planning Commission in 2011. In addition to recognizing the opportunity to turn his architectural training into implemented design and policy, Bryant sees his role on the Commission as an opportunity to educate his professional colleagues about improving the public realm.

Building Code Development and Review

Building codes and generally accepted practices largely define the acceptable standards of practice and technique for the design, construction, and performance of buildings as a whole. Model building codes and voluntary standards are often developed by groups or committees representing manufacturers, government agencies, contractors, and other building community sectors. Upon adoption by governmental authorities having jurisdiction, these model codes and voluntary standards become laws and regulations. The architecture profession possesses special knowledge that should be applied to the formulation of building codes and standards.

Fundamentally, building codes are an expression of acceptable means and technology to meet prescribed needs at a point in time. Over time, alternative means and advanced technologies must be considered or the building code can needlessly constrain technological advances and stifle other, more suitable alternatives and practices. By incorporating architects' knowledge and experience in the code development process, code interpretation and enforcement practices of a jurisdiction can be significantly improved. It is through open code development processes that new technologies are fairly evaluated, recognized, and more rapidly implemented. Equally important, by involvement in the model building code development process and the code adoption process, architects have the ability to see that building codes do not impose inappropriate responsibilities on architects.

CIVIC AND COMMUNITY ENGAGEMENT: ECONOMIC DEVELOPMENT

The lesson is to listen and engage. In an economy built to last, everybody needs to get a shot and do their fair share.

—Shaun Donovan, U.S. Secretary of Housing and Urban Development, address to the AIA Convention in Washington, D.C., May 18, 2012

Jim Determan, AIA, testified before Congress in 2010 and told lawmakers how the credit crunch in late 2008 contributed to the demise of his previous firm, CSD Architects. As lenders broadly refused credit to the design and construction industry, many CSD projects came to a halt. In Determan's case, he and his partners were left with no choice but to close their 60-year-old Baltimore firm that had successfully weathered previous recessions. As a result, more than 100 people—many of whom had been with the firm for more than 30 years—lost their jobs. This experience led Determan to a heightened awareness of the role that architects play in a community, regional, or national economy: "The pendulum has swung so far in the direction of restricted credit that even worthy, well-secured projects by clients with impeccable credentials and proven track records are being denied access to financing," he testified. Determan works with other architects to help them present the business case for design to elected leaders and decision makers: "If they understand that good design is good business, elected officials, media, and corporate leaders become allies," he says.

When the newly elected mayor of Kansas City called for nominations for new members of several city boards and commissions, the local AIA chapter actively solicited and promoted applications from its members. Ashley Wood of Architecture, Engineering, Consulting, Operations, and Maintenance Technology Corporation (AECOM) sought and received an appointment to the Planned Industrial Expansion Authority (PIEA) under the Economic Development Corporation, where she and her colleagues work to foster commercial and industrial development in specifically designated redevelopment areas. Wood explains that her architectural background helps her to consider aspects of the built environment that are often overlooked (or perhaps not fully understood) by others on the commission. Her technical expertise is specifically useful when the Commission reviews blight studies, the first step in designating an area for redevelopment under the PIEA's purview. Wood's architectural training allows her to question the proposals that developers are putting forward. "It's important to not act simply as a rubber stamp for the professionals who are introducing these development proposals, and my background affords me the opportunity to really understand the information being presented," she says.

CIVIC AND COMMUNITY ENGAGEMENT: BROAD SUSTAINABILITY

The most apparent success of the movement for a sustainable built environment has been led since 2000 by the U.S. Green Building Council (USGBC) and its highly visible Leadership in Energy and Environmental Design (LEED) rating systems. Hundreds of architects were among those involved in the technical development and review of these systems, and many more architects have used the systems or received training in the LEED system. Beyond the purview of most LEED tools, though, lies an emerging field of practice in broader sustainable urbanism beyond the individual building scale. (The USGBC's LEED for Neighborhood Development system addresses this scale.) Because this realm extends beyond the building, it may not seem like the obvious domain of the architect, but thousands of them are in hundreds of communities around the country. With urgency created by fear of the rising price and diminishing availability of fossil fuels, the consequences of carbon emissions, and the future availability of water resources, communities are rapidly ramping up their efforts toward sustainable development.

Ophelia Wilkins was at the center of this effort in Durango, Colorado, during her years as an Enterprise Rose Architectural Fellow. She served on the Steering Committee for the La Plata Climate and Energy Action Plan (CEAP), a report that proposes strategies for reducing greenhouse gas (GHG) emissions throughout La Plata County. The report was indirectly commissioned by three local government entities, and the Steering Committee was tasked first and foremost with the creation of a countywide GHG reduction plan. Between 2009 and 2011, local professional volunteers committed over 10,000 volunteer hours to the Plan, bringing their specialized expertise in energy efficiency. Wilkins co-chaired the working group on Residential, Commercial, and Industrial Buildings while practicing as an architectural designer specializing in affordable energy-efficient construction. She was able to draw on her knowledge of energy efficiency standards and building techniques as well as her extensive professional network of local green building experts to propose substantive emissions reducing strategies. Though the Plan has subsequently encountered political obstacles, the widespread community outreach effort has created a high level of citizen discourse and demand for more efficient practices.

It was a rewarding opportunity to think big and practical, while getting out into the community and collaborating to craft a shared philosophy.

—Ophelia Wilkins

▶ The backgrounder Resilient Design (4.2) covers ways in which buildings and communities can maintain safe, livable conditions in the aftermath of a disaster.

The AIA's Sustainable Design Assistance Team (SDAT) program is an excellent example of architects putting their unique skills into practice to assist communities with the principles of sustainability. SDATs bring teams of volunteer professionals (such as architects, urban designers, landscape architects, planners, hydrologists, economists, attorneys, and others) to work with community decision makers and stakeholders to help them develop a vision and framework for a sustainable future. The SDAT program is based on the AIA's goal of helping communities create a sustainable relationship between humans, the natural environment, and place.

In May 2007, the AIA joined the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Architecture 2030, the Illuminating Engineering Society of North America (IESNA), and the U.S. Green Building Council (USGBC), supported by representatives of the U.S. Department of Energy, to agree to establish a common starting point (benchmark) and a goal of net zero energy buildings. Edward Mazria, AIA, founded Architecture 2030 and issued the 2030 Challenge, asking the global architecture and building community to commit to significant reductions in reducing fossil fuel consumption and greenhouse gas emissions. Many individual architects and AIA components have engaged with the 2030 Challenge since then.

LEADERSHIP, POLICY, AND POLITICAL OFFICE

Elected Office

As discussed in the previous section, architects regularly build consensus to resolve environmental, traffic, and design issues with boards, clients, community groups, and city and state agencies. They are intimately familiar with building codes, land use ordinances, the management of complex construction projects, and principles of growth management, urban planning, historic preservation, and environmental impacts. Sometimes, architects consider the very public role of problem solver that can come with the profession, and ask themselves whether they should run for office—giving them a chance to do these same activities in a proactive way, rather than reacting to a client's program. The architects who have made the decision to run for office in their city, town, state, or even U.S. Congress or the Senate have realized that they have already been providing much of the leadership in shaping physical communities. With billions of dollars of investment in new public works projects, there is much at stake even in local elected offices.

Public Service Employment

Many architects devote years of their career to public service through employment at government agencies with a specialty in the planning, design, construction, and management of public facilities. These architects, who often have professional titles like "capital projects director" or "facilities manager," advocate for quality design and sustainable built outcomes in the projects that they manage. They work across large, complex public agencies to build consensus, balance competing demands, and provide strategic guidance and support to public officials on matters relating to planning, urban design, and architecture. They may also develop best practices to create better and more sustainable urban environments and buildings.

Architects who work in government formed an AIA committee for service in the 1950s, even though at that time only a few dozen state architects were serving in public roles throughout the country. In the 1980s the committee was reorganized into a Knowledge Community and renamed "Public Architects" to broaden its membership appeal to include architects working for federal agencies, states, cities, the military, school districts, and public universities, utilities, and transportation agencies. The committee meets regularly to discuss ways to foster design excellence with government clients, as well as how to effectively manage public dollars that pay for design and construction projects.

CASE STUDY: PRISON ALTERNATIVES INITIATIVE

Originally launched in 2004 as the Prison Design Boycott, the Prison Alternatives Initiative is a project of the nonprofit Architects, Designers and Planners for Social Responsibility. The Initiative calls on architects, other design professionals, and the public to support community-based alternatives to incarceration. Since launching in 2004, the campaign has secured over 1,000 endorsers to its pledge:

> I believe that too many people are being incarcerated and that our society must immediately develop and implement alternatives to incarceration. I believe in creating a society with real security and social justice for all, and I will not contribute my design to the perpetuation of wrongful institutions that abuse others. In recognition of the deep injustice of the present prison system, I pledge not to do any work that furthers the construction of prisons or jails.

Raphael Sperry, Director of the Campaign, is commonly asked whether the boycott will actually work (i.e., "Won't there always be architects who are not opposed to prisons, or who are willing to set aside their ethical objections at the right price?"). He responds:

> Probably not all architects will agree to boycott designing prisons. But that does not make our protest useless. Boycotts and other forms of protest work in many ways simultaneously—it did not take anywhere near full participation for the boycott of investment in South Africa to add substantial pressure to end apartheid, nor did Cesar Chavez's boycott of California grapes need full participation to make the treatment of farmworkers a national issue. Even absent the ability to directly impede prison projects, the pledges of design professionals to refuse to work on prisons will help to raise awareness of the problems inherent in the prison system. This boycott is a powerful tool with which to change public perceptions of the prison system, and thereby change the willingness of government decision makers to build new prisons.

CONCLUSION

As professionals, architects are trained to coordinate many disciplines and solve problems holistically and in context. But even for a profession that prides itself on being generalist, truly integrated problem-solving through design thinking often requires architects to move out of their comfort zone and into arenas that are sometimes dismissed as adjacent or outside the traditional field of training for architects: community engagement, lobbying and advocacy, and policy design and implementation.

As the case studies in this article demonstrate, these skills are not only essential for progress in our society but are also increasingly necessary for advancement in our industry. Architects who volunteer their personal time, serve professionally in a pro bono manner, or commit to full-time public service roles also have a unique perspective on the profession itself. Many architects who have served on their communities' planning commissions, for example, lament the uninspired and unhelpful presentations on proposed developments that their peers in the design professions deliver to public audiences. Professional practice without an eye toward public needs diminishes the credibility and accessibility of the profession.

The vast number of public and private construction projects being planned will profoundly affect the fabric of our communities for generations to come. There is no better time for the civic engagement of architects and design professionals. Indeed, there is a critical need for civic leadership, constructive criticism, visioning, and direction that only architects and design professionals can provide.

For More Information

Whitney Young Jr.'s address to the AIA (1968): http://isites.harvard.edu/fs/docs/icb.topic753413.files/14_Outsiders%20in%20the%20Profession/Young%201968%20AIA%20speech.pdf.

"Building Community: A New Future for Architecture Education and Practice" (Carnegie Foundation, 1996) by Ernest L. Boyer and Lee D. Mitgang.

R/UDAT report on Newport, VT (2011): http://discovernewportvt.com/sites/default/files/_Newport%20RUDAT2011_1.pdf.

BACKGROUNDER

INDEPENDENT COMMUNITY DESIGN CENTERS

Ceara O'Leary

This essay focuses on the primary characteristics particular to independent community design centers, focusing on the role of the architect practitioner in public interest design. Examples from the Gulf Coast Community Design Center in Biloxi, Mississippi, and buildingcommunity WORKSHOP in Dallas help illustrate the work of community design centers.

Ceara O'Leary is an Enterprise Rose Architectural Fellow at the Detroit Collaborative Design Center. Before joining the fellowship, O'Leary was the inaugural Public Design Intern at the Gulf Coast Community Design Studio in Biloxi, Mississippi, and worked as a community designer at bcWORKSHOP in Brownsville, Texas.

Independent community design centers are a central model for public interest design practice, in addition to university-based design centers and pro bono practices—both of which are detailed elsewhere in this chapter. Since the 1960s, independent community design centers have been defining a sustainable public interest design practice that is not dependent on university support or internal subsidy. Instead, independent design centers subsist on an alternate funding model focused on third-party investment, in addition to more traditional fees for service. External support most often comes in the form of grants from foundations and other philanthropic organizations, government initiatives, or strategic partnerships. An indicator of the sector's traction, there are a number of foundations that specifically support community-based design endeavors. Government funding supports projects and research related to disaster recovery and prevention, addressing hurricane conditions or extreme neighborhood disinvestment. Independent community design centers often secure project-specific funding as well as more flexible support for operational and ongoing project needs.

The collaborative design process is central to community-based design and has been since its inception. Accordingly, effective partnerships are imperative to today's public interest design practice. Two community design centers that exemplify this type of practice are the Gulf Coast Community Design Studio in Biloxi, Mississipp, and buildingcommunity WORKSHOP in Dallas.

GULF COAST COMMUNITY DESIGN STUDIO (GCCDS)

Although the GCCDS is a university-based endeavor, with administrative and faculty support from Mississippi State University, the office—founded in the wake of Hurricane Katrina—operates largely independently. As such, GCCDS funds projects and forms partnerships as an independent community design center.

For independent community design centers, partnering for funding opportunities and government support is key. However, the most critical collaboration is with the community that the practice seeks to serve, also known broadly as the client. David Perkes, AIA, the founding director of the GCCDS, was strategic on both counts. When the GCCDS first set up shop in Biloxi in the year following Hurricane Katrina, Perkes and his team joined a community struggling to recover. The office attended weekly meetings organized by city councilman Bill Stallworth that focused on meeting the needs of East Biloxi, the poorest and most devastated Biloxi neighborhood. It became clear that an inventory of properties was essential to the effort, so the GCCDS went to work mapping the peninsula, surveying the conditions of each parcel. By contributing to this larger partnership and responding to immediate needs, the GCCDS earned the trust of the community and established lasting relationships that fostered the subsequent success of the office. At the governmental end of the spectrum, the GCCDS found an important ally in the Mississippi Development Authority, which required that federal funding for rebuilding post-Katrina homes include design services. This arrangement resulted in robust partnerships with affordable housing developers across the Mississippi Gulf Coast over the next few years. Today the GCCDS boasts a greater variety of funding sources and a broader scope of work, ranging from government support for flood-proof construction research to an environmental foundation investment for bayou restoration projects.

buildingcommunityWORKSHOP (bcWORKSHOP)

Early on, the GCCDS formed strong partnerships with other professionals and nonprofits in the area, in addition to developers and builders. The same can be said for bcWORKSHOP in Dallas, founded by Brent Brown, AIA, in 2005. Now operating out of three offices in Texas, bcWORKSHOP is an independent nonprofit organization. In 2011, bcWORKSHOP established a new office in the Lower Rio Grande Valley, embarking on projects that respond to the specific needs of the border region. Importantly, these projects are grounded and informed by strong local partnerships. A community planning effort in several flood-prone *colonias*—severely underserved neighborhoods developed in a predatory manner—was made possible through collaboration with four distinct community organizing groups with deep roots in the local community. Through this partnership, architects, planners, and organizers collaborated with community members to develop plans for future improvements. Additionally, this collaborative effort spurred an ongoing partnership with CDC Brownsville, a highly effective community development corporation. This collaboration has resulted in an array of additional community-based projects and contributed to bcWORKSHOP successfully planting new roots in the Lower Rio Grande Valley.

Ideally, all models for public interest design are based on building relationships and trust within the community and partnering with community stakeholders. Independent community design centers strive to ensure ongoing investment in a more inclusive and collaborative design process. Importantly, this partner-based model of practice alters conventional project delivery, with an emphasis on building partnerships and forming collaborative agreements.

EXPANDED SERVICES

Alternative project delivery further speaks to an expanded scope of services for the public interest designer. For the GCCDS and bcWORKSHOP, as well as other independent community design centers, the average scope of services is quite broad. Technical assistance includes architecture and planning, as well as mapping and visioning. Both offices embrace research, community education, and intern training. They also dedicate significant resources and attention to outreach efforts and community engagement. By nature, public interest design is larger in scope than conventional practice, encompassing social, economic, and environmental concerns and espousing projects that are relevant to the general public rather than the interests of an individual client. Thus, public design seeks to serve a broad population and include stakeholders that are often overlooked in typical design practice. As such, the architect serves as an advocate on behalf of underserved communities.

In public interest design, the design professional plays an important leadership role, facilitating public participation, pursuing complementary expertise, and harnessing financial support. The architect also plays a new role in acquiring projects, a process often closely aligned with identifying community needs. While community-based organizations may seek out design professionals for assistance, public interest design professionals also reach out to stakeholders in communities where design-related needs are apparent and collaborate to better define such needs. Effective public design practices work in partnership with local communities and endeavor to establish lasting relationships. Collaboration is particularly important since design-related needs often require ongoing commitment as well as trust among partners.

CONCLUSION

Independent community design centers contribute to a larger field of public interest design practice that is united by a commitment to responding to local community needs and providing design services where there are none. The GCCDS and bcWORKSHOP illustrate the use of interdisciplinary collaborative solutions to identify and solve design challenges. Independent community design centers are unique in their public mission and organizational support, combining earned income with government and philanthropic funding to meet community needs. As the new wave of public interest design gains momentum, additional government and foundation support is essential. Regardless of how public interest practice takes shape, a more mainstream presence will make for a more effective and inclusive trajectory for the field of architecture at large.

BACKGROUNDER

THE AMERICAN INSTITUTE OF ARCHITECTURE STUDENTS FREEDOM BY DESIGN

Matthew A. Barstow, Assoc. AIA

AIAS Freedom by Design is the primary service program of the American Institute of Architecture Students. The program organizes teams of students from its chapters around the country to retrofit homes for people with disabilities.

Matthew A. Barstow graduated from the University of New Mexico with a Bachelor of Arts in Architecture and served as the 56th national president of the American Institute of Architecture Students (AIAS). Barstow owned and operated a real estate management and development firm.

MISSION

AIAS Freedom by Design, the community service program of the American Institute of Architecture Students, uses the talents of architecture students to radically affect the lives of people in their community through modest design and construction solutions. Vital modifications are made to enhance the homes of low-income people with disabilities by addressing their struggles with everyday tasks such as bathing, ascending stairs, and opening doors. The program's priority is improving the safety, comfort, and dignity of individuals with accessibility challenges.

TIMELINE

AIAS Freedom by Design was founded in 1999 by Brad Buchanan, FAIA, in Denver as an independent nonprofit

(continued)

organization. The program operated independently until 2003, when the then-president of the AIAS attended a presentation on Freedom by Design at the AIA national board of directors meeting. After this experience he offered to have the AIAS take on Freedom by Design as a national program of the AIAS. AIAS Freedom by Design launched as a pilot program in early 2004, beginning with six chapters: Arizona State University, Kansas State University, University of New York Buffalo, University of Colorado Boulder, University of Nebraska at Lincoln, and the University of Wisconsin–Milwaukee. Since then, the AIAS program has grown substantially:

- In 2005 the pilot program expanded to include five new chapters.
- In 2006 the program was released nationally and grew by thirteen chapters.
- In 2011 the AIA added AIAS Freedom by Design-specific programming to its Grassroots Leadership Conference.
- As of 2012 there were approximately 60 active chapters with AIAS Freedom by Design programs.
- 195 projects were completed from 2007 to 2012.

SERVICE LEVELS

In an effort to help AIAS chapter leaders have a better understanding of the time and resources necessary for the varying levels of AIAS Freedom by Design projects, the AIAS has established three service levels that outline the parameters of the program.

Service Level One

Service Level One projects are classified as projects that can be completed in a single workday with a team of four to six volunteers. Projects at this level should not require a building permit, should cost less than $250 in materials, should be completed within 60 days of project acceptance, and should require no prior knowledge or training. Example: replacing door knobs, forming and pouring an eight-foot ramp to replace a single exterior step.

Service Level Two

Service Level Two projects are classified as projects that can be completed in four workdays with a team of four to six volunteers. A building permit may be required, and the project materials should cost no more than $1,000. Example: building an exterior wood ramp where the first two days are spent forming and pouring the foundations and the last two days are spent framing the ramp.

Service Level Three

Service Level Three projects are classified as projects that can be completed in 10 workdays with a team of four to six volunteers and a building permit will be required. The project must be less than $10,000 and should be completed within 120 days of acceptance. Projects at this level allow students to schedule and coordinate skilled laborers, such as tile setters, carpenters, draftsman, and electricians. Example: Recently the AIAS Syracuse Freedom by Design program has completed an agreement to redesign a treehouse to comply with ADA accessibility. The project will allow children with disabilities to be more included in the camp experience.

PROCESS OF A PROJECT

- Information and resource gathering
  - Selection of client and mentors
  - Fund-raising and acquisition of building materials
- Design solution
  - Students work with mentors and the client to design an affordable solution for the client's specific problem. Once a feasible solution is accepted by the client, team, and mentors, the students attain permits, assemble a volunteer team of AIAS members, and work with their mentors to complete the project build-out in a timely and professional manner.
- Information and resource dissemination
  - Students provide project documentation in the form of videos; press releases; and local, social, and national media.

Although AIAS Freedom by Design projects work through the same design and building process as typical architecture firms, it is important to remember that the process is managed by volunteer students who are working with mentors to better understand the profession they are seeking to enter. Students act as architects, project managers, and fundraisers throughout the project. This exposes students to true design and building processes through civic engagement that ultimately provides design solutions for some of our local communities' most underserved individuals and families.

For More Information

The AIAS Freedom by Design Instructional Manual: www.aias.org.

The Beyond Architecture Campaign Support Manual: www.aias.org.

AIAS Facebook page: www.facebook.com/theaias.

PART 2

FIRM MANAGEMENT

Operating an architectural firm requires knowledge of marketing, financial management, and human resources. Firm development, including continuing attention to strategic direction, knowledge management, and administrative effectiveness, must be an ongoing concern for firms of all sizes. Throughout a firm's life cycle, from start-up through growth and development, ownership transition and potential expansion to global or multi-office practice, entrepreneurial architects benefit from increasing their understanding of management best practices.

CHAPTER 5

Organizational Development

5.1 Architects and the Law

Donald W. Doeg, Esq., PE, LEED AP

Architects, like other professionals, render their services in a difficult and complex environment. In order to be successful, knowledge of the basic components of the legal requirements that govern their profession is essential.

LEGAL OVERVIEW

Architects, like many other professionals, are confronted with legal issues on a regular basis and thus must have a basic understanding of the law in order to successfully practice architecture in today's complex world. A wide spectrum of sources creates legal requirements that dictate standards under which an architect must practice. These sources include, but are not limited to: statutes passed by federal, state, or local legislative bodies under their constitutional authority; administrative rules and regulations; building codes and standards; local ordinances; obligations established by contract between two or more parties; and law established by precedent of prior interpretations by the courts and administrative agencies regarding these requirements.

In order to meet the applicable standard of care (which will be discussed in more detail later in this section) it is the architect's obligation and duty to practice in

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compliance with all applicable laws, codes, and regulations. While most of the existing construction related law will apply to architectural practice in some manner, there are laws and other legal obligations that may not be applicable to particular parties, such as the architect. For instance, certain OSHA obligations are directed to the means and methods by which a contractor performs its work on a project. Unless the architect specifically assumes some specific obligation through its contract, those obligations may not extend to the architect.

In a very broad sense, issues of law impacting architects can be broken into two general categories: party disputes and administrative proceedings. Party disputes, the focus of this article, occur when problems arise on a project, such as delays, failures, or potential failures relating to the work performed, fee controversies, and a long list of other issues. Problems don't always result in disputes and disputes don't always result in legal action. However, it is important to understand that the outcome of many of those disputes will rest heavily on whether the parties have met their legal obligations.

▶ Dispute Management and Resolution (16.4) discusses the effective and strategic use of methods for resolving project disputes.

Administrative issues and proceedings also play a very significant role in an architect's life. Administrative issues arise from regulations developed to implement civil statutes and other legal requirements, such as the area of professional licensing. Typically, this area of the law is overseen by public officials charged with ensuring compliance with certain laws, standards, and regulations. Under their statutory authority, state registration boards, code officials, and other administrative agencies are given the power to develop, implement, and enforce regulations needed to do their jobs. Individuals and entities subject to regulation typically have opportunities to seek variances or appeal decisions through administrative channels (e.g., zoning boards of appeal). When administrative avenues have been exhausted, it is possible to seek review of administrative decisions in the courts.

▶ See Regulation of Professional Practice (3.1) for related information on licensing regulations.

▶ Building Codes and Standards (13.1) and Planning, Urban Design, and the Regulatory Environment (13.2) further discuss the myriad regulations concerning building design, planning, and zoning.

COMMON CLAIMS AGAINST ARCHITECTS

If formal disputes arise relating to construction projects, attorneys will articulate their clients' claims in the lawsuits based upon various legal theories. The two legal theories most often alleged in claims against architects are "negligence" and "breach of contract."

Negligence

Overview of Negligence

The existence of negligence is often more difficult to determine than whether a breach of contract has occurred. Under the law, there are four components that must be proven in order to prevail when asserting a negligence claim. They are as follows:

- *Duty*. The architect must owe a legal duty to the person making the claim. In other words, the architect has a legal obligation to do something or refrain from doing something.
- *Breach*. The architect fails to perform the duty or does something that should not have been done.
- *Cause*. The architect's breach of duty is the proximate cause of harm to the person making the claim. That is, was the claimant injured or harmed as a consequence of the act and/or omission of the architect without any intervening cause?
- *Damage*. Actual harm or damage must have resulted from the breach.

Standard of Care

In claims against professionals, including architects, it is often difficult or impossible for a layperson to unilaterally determine the duty component of negligence as defined above. As such, the law has established that that duty is to meet a standard of reasonable care for the performance of the work. The standard of care for an architect is generally defined as what a reasonably prudent architect would do in the same general locale, in the same time frame, given the same or similar facts and circumstances. The architect's legal responsibilities to a client are examined in light of what reasonably prudent architects would have known and done at the time services were performed.

In order to prove whether the standard of care has been met in a particular instance, the courts in most states require expert witness testimony. That is, since a layperson judge or jury would not have the requisite knowledge to determine what a reasonably prudent architect would have done under similar circumstances, each of the parties must retain an expert witness to provide an opinion as to the applicable standard of care for the case (what should or should not have been done by the architect). The judge or jury is ultimately charged with applying the standard of care that they believe is most credible to the facts of the case and determining whether the architect acted appropriately.

Despite the thoughts of some owners and/or their attorneys, the law does not require perfection from an architect based upon a typical standard of care scenario. If given enough time, an experienced third-party reviewer would likely find some glitches or inconsistencies on any set of architectural drawings currently in existence. However, the mere existence of a few minor glitches or inconsistencies within project documents does not mean that the author has failed to meet the prevailing standard of care. Despite the existence of alleged "flaws," another expert may well opine that the standard of care has nonetheless been met. The outcome of these types of disputes is dependent upon the particular facts in each case.

▶ Owner-Generated Agreements (17.3) discusses a systematic approach to evaluating terms in agreements provided by owners.

It should also be noted that since architecture is an integration of art and building science, in virtually all situations there is more than one way to design a project or even a portion of a project. The fact that another architect would have used different details or materials does not necessarily dictate a violation of the prevailing standard of care. The successful practice of architecture is based upon reasoned judgment and skill and the law recognizes that even if there is differentiation among various designs, it does not necessarily mean any of them were performed negligently.

▶ Insurance Coverage for Business and Professional Liability (16.2) covers the terminology and the necessary considerations and alternatives when selecting insurance for one's firm.

The standards of care applicable to a particular project can be modified by contract or conduct. The most frequent example of this practice is an attempt by owners to elevate the standard of care. Rather than applying the typical standard of care described above, some owners' contracts seek to require a standard of "best practices," "highest prevailing standards," or some other similar language that elevates the mandated standard of care for those projects. Architects should be wary of such heightened standards for at least two reasons: (1) the new standard may not be adequately defined in the industry, which may lead to a great deal of subjectivity and debate if a conflict ever arises; and (2) such standards may not be insurable under many typical professional errors and omissions policies.

Each of the components of the aforementioned definition of the professional standard of care can be subjective in nature. Depending on the specific issue at hand, courts have given some latitude to the "in the same general locale" component. For instance, it would not be prudent for an architect in the southern states to incorporate a large factor for snow load on the roofs of their designs, and, similarly, architects in the north central states may not have the same concerns about hurricane loads as their colleagues in the southeastern states. Yet in other instances, courts have held that knowledge about basic design concepts and/or certain building products (both good and bad) should be known by architects throughout the country. This nationwide knowledge can be applied in several manners by the courts. For instance, the level of knowledge of certain questionable materials may be consistent throughout the country (e.g., use of asbestos or the risks of fire-retardant plywood) regardless of the size or nature of the specific architectural practice. In other situations, architects with certain building type specialties (e.g., large sports stadiums, large museums, and major hospitals) may have a national practice and may be compared to other architects with the same specializations, even if their respective offices are many states away.

The "in the same time frame" component has also been heavily litigated. In general, the applicable standard of care is the one in place at the time of the project, not the one in place at the time of the dispute, which can be years later. As such, experts who subsequently assert that the prevailing standard should have resulted in the use of materials or techniques that were unknown or in their formative stages at the time of the project are not persuasive with the courts. Last, but not least, the "same or similar circumstances" component must also be strongly considered. For instance, the owner's budget will significantly impact a project. The standard of care must be determined for an architect working within the same budget, and under the same constraints, as were encountered for the underlying project. Alternatively, the "same or similar circumstances" also includes the type of project and the experience of the architect. That is, a small local architectural firm designing residences in a certain locale will not be held to the same standard as a national architectural firm that routinely designs large and complex facilities such as sports stadiums or health care facilities. Unfortunately, meeting the relevant standard of care may not be enough to protect an architect from litigation. A lawsuit can be commenced by almost anyone, in most states even by a party with whom the architect had no contractual relationship. However, if an architect is mindful during the course of the project of the standard of care that must be met, it will go a long way toward both diminishing the chances of the commencement of litigation as well as providing good defenses to the architect if litigation does arise.

Modifying the Standard of Care by the Architect's Actions

Even though the law requires only reasonable and prudent behavior, an architect can expand or raise the standard of care. This may be done either consciously or inadvertently. The standard of care can be altered in literally countless ways by the architect's actions, such as promising a specific project result (e.g., that the roof or basement will not leak); taking on the contractor's responsibilities (e.g., dictating means and methods or designing something that the contractor was required to do as part of a performance specification); or promising a specific supplier performance result (e.g., delivery of certain materials by a specific date).

It is important to realize that raising the standard of care increases the architect's liability exposure by making the architect responsible for more than the professional standard requires. Sometimes design professionals—under pressure from clients or contractors or propelled by their own drive for perfection—raise the standard of care that will be applied to their services without intending to do so.

► Risk Management Strategies (16.1) addresses how to determine whether a risk is worth taking and how to manage risks.

Damages

Damages for negligence claims are typically measured by the standard of the plaintiff being entitled to compensation to remedy the negligence of the architect. If the case were litigated or arbitrated, the judge, jury, or arbitrator would have to decide what that compensation would entail based upon the arguments set forth by the litigants. For instance, if litigation resulted in a finding that an architect improperly designed a set of stairs that did not meet the applicable building code and those stairs were subsequently constructed in accordance with those faulty plans, an owner may be entitled to the cost of removing the stairs and installing another set of stairs that met the applicable code.

Breach of Contract Claims

Overview of Breach of Contract Claims

"Breach of contract" claims are relatively self-explanatory. Such claims are based upon an allegation that a specific duty or duties existed pursuant to a contract between two parties and one of those parties either failed to perform that duty or did not perform it properly. For instance, an owner/architect agreement may specifically require that the architect provide record drawings at the conclusion of the project. If the architect fails to do so, a breach of contract claim may ensue.

The elements of a breach of contract action are the formation of an agreement, performance by one party, breach of the agreement by the other party and damages. To form a valid and binding contract there must be a mutual understanding of the terms that are definite and certain between the parties. Each must be found to have been based on an identical understanding by the parties and an agreement must be definite and certain as to its terms and requirements.

Contractual Protections

Logic dictates that the quality of the architect's contract will have a large impact on the potential claims and defenses against the architect. It is imperative that the architect spend time on each and every contract to understand and negotiate each of the clauses. Each and every contractual clause may prove to be either a significant defense available to the architect or a huge detriment.

Owner/architect contracts can be either written or oral. Written contracts are preferred by almost everyone in the design industry. Perhaps the largest benefit of a written contract is the fact that it preserves a written articulation of the agreement between the parties, including all critical components, which can be referenced if a subsequent dispute arises. Coming to a common understanding of the terms of the original agreement often proves very difficult if an oral agreement is in place and a dispute subsequently arises. In addition, the applicable statutes of limitation may vary depending upon whether the contract was in written or oral form.

▶ The AIA Documents Program (17.5) details what AIA Contract Documents offer the parties involved in the design and construction of buildings.

It is important to recognize that written architectural contracts take many forms, depending upon the particular project and parties. The most common construction contracts in the industry are form contracts that are published by various construction industry groups, the industry standard being the AIA documents. The provisions included in these form contracts have been formulated over many years' use in the industry. While many parties opt to use the industry forms "as is," there are other situations in which one or both parties may seek to modify one or more of the provisions, sometimes significantly. In addition to the industry form contracts, there are many other types of contracts prepared by specific owners, design professionals, or others that also are used.

The following are some key provisions that, if properly included in an architectural contract, will go a long way toward protecting the architect.

The Absolutely Essential Terms: Whether an agreement is written on the back of a napkin or consists of a long-form agreement, it is absolutely critical that the agreement include a written summary of the project scope, the time frame in which it will be performed, and the fee agreement for the project.

▶ Defining Project Services (15.1) addresses the centrality of scope definition in developing effective agreements for professional design services.

- *The Project Scope:* It is critical to describe the scope of work to be accomplished. In some instances, it is equally or even more critical to describe any exclusions (e.g., in some instances the architect does not plan to be involved in the construction administration phase, but the owner may not comprehend that fact).
- *The Project Time Frame:* Many disputes have occurred because the owner and architect did not specifically discuss the time frame for the project and assumed vastly different parameters for the start and completion dates (and other critical milestones) of the work.
- *Project Fees:* It is essential that the architect and owner agree on the type of payment (e.g., lump sum, hourly, not to exceed, etc.) and the time frames for the payment (e.g., monthly, one payment at end of project, percentage of project completion).

▶ Services and Compensation (15.2) discusses the variables for architects to consider in setting compensation, as well as various methods of compensation and strategies for getting paid.

Other Key Terms: The following are a few of the many contract terms that can have a significant impact on an architect's exposure should problems arise during the course of the project. These terms are but a few of the many critical contract provisions that may exist for a particular project:

- *Limitations of Liability Clauses:* These clauses will limit claims by the owner against the architect to a certain amount (e.g., a set dollar limit or the balance of the remaining insurance policy) should a dispute between the parties arise. These clauses have been enforced in many, but not all, states.

- *Mutual Waiver of Consequential Damages:* This is a standard clause in many AIA form contracts, but is often stricken by owner's counsel. Consequential damages are those that are not direct damages, but only arise as a consequence of some act or omission. In the prior example, if an architect failed to design a set of stairs to code and they subsequently had to be replaced prior to a certificate of occupancy being granted, the cost to do the replacement work would be direct damages. The delay in the opening of the facility would be consequential damages and, if the waiver was part of the contract, the owner would not be able to collect damages of this type from the architect.
- *Indemnification Provisions:* Many owners attempt to add indemnification clauses to the agreements with their architects, which, in essence, are a contractual requirement that the architect reimburse the owner for damages caused by the architect's acts and/or omissions. It is absolutely critical that the architect confer with his/her insurance broker and/or attorney prior to agreeing to any such clause. Many of these clauses, as proposed, are so broad and onerous that they are not insurable by the architect's professional malpractice carrier and therefore put the architect at tremendous risk if the language is not modified.

Changes in Scope of Service

It is equally important that architects properly document any changes to their agreement with the owner during the course of the project. Almost every project is a very dynamic process, with changes occurring rapidly that impact the architect's scope of work and fee as well as the project schedule. Just as it is critical to properly document the agreement between the parties in the initial contract, it is equally important to document any subsequent changes during the course of the project. If a subsequent dispute arises, written change orders documenting any changes to the original agreement will be essential to allow a court to determine the agreement between the parties. It is essential that the architect documents these changes and brings them to the attention of the owner. If possible, a formal change order should be prepared and signed by all parties. In some instances, it may be difficult to get the owner to sign off on a change order during the course of a project. In those instances, it is critical to nonetheless document the changes in writing and send it to the owner advising them that a change has been made to the contract scope/time frame/fee and outline those changes. That documentation will be very helpful in proving the changes were known and agreed upon should a subsequent dispute arise.

Damages

Damages for breach of contract claims are typically measured by the standard of the plaintiff being entitled to compensation that would put them back in the position they would have been in if the contract had not been breached. If the case were litigated or arbitrated, the judge, jury, or arbitrator would have to decide what that compensation would entail based upon the arguments set forth by the litigants. In the previous example regarding the failure to produce record drawings a judge, jury, or arbitrator may decide that the owner is entitled to the cost of having another design professional prepare those documents.

Vicarious Liability

In General

Agency relationships are common in everyday practice. That is, one party acts on behalf of another relating to a particular project or task. However, certain obligations and liabilities arise out of these relationships. The world of construction is no different. For instance, an architect's employee acts as an agent of the architect on a project. A corporate officer acts as an agent of a corporation in signing an agreement for professional services. Partners are agents and, under the law, also principals for each other. That is, partners are agents when they act for other partners (principals) and principals when their other partners (as agents) act for them.

Under an owner-architect agreement, the architect may have an agency relationship with the owner for certain designated activities. The central question in agency relationships is the scope of authority the agent has been granted to act on behalf of the principal. Thus, architects acting as agents of the owner need to know the limits of their authority in dealing with the contractor and other third parties. Firms will want every person who can be perceived as acting as the firm's agent to understand the limits of his or her agency authority. Staying within the limits of their authority is the best protection agents can give themselves and the principals they serve.

For Consultants

▶ Project Team Agreements (17.2) addresses agreements between architects and consultants and those that establish joint ventures between firms.

In many typical projects, the architect enters into a contract with the owner for all, or virtually all, of the design services for the project. The architect, in turn, retains consultants (typically engineers in various disciplines) to perform portions of the overall scope of design work. Consultants who perform professional services on behalf of architects under the terms of an architect/consultant agreement are independent consultants. In those situations, the consultant may sometimes act as an agent of the architect.

While the law will hold these consultants to the standard of reasonable care applicable to their professional expertise, the architect may be found to have liability for the consultants should an issue arise during the course of a project. In essence, many courts have found that the architect was contracted to provide the entire scope of design services and therefore has liability if a problem arises. While the architect may likely have a claim against its consultant for indemnification in such instances, such a claim may not fully exonerate the architect for future claims by an owner if, in the intervening period, the consultant has become financially unable to take responsibility or the consultant's insurance coverage proves to be inadequate.

In some instances the owner, not the architect, engages certain consultants and the architect's obligations with respect to those consultants may be limited. Typically, the architect has far more limited exposure relating to the acts and/or omissions of those consultants. In these types of situations, the terms of engagement should be clearly stated in writing. Architects usually are not responsible for project consultants hired directly by the owner unless the architect agrees to this responsibility in the owner-architect agreement or acts in a way that makes the architect responsible, such as signing a Certificate for Payment or a Certificate of Substantial Completion for the consultant's work.

For Employees

Similarly, the architectural firm is responsible for its employees during the course of a project. The Courts will generally hold the architectural firm itself responsible for the acts and/or omissions of each employee. A possible exception to this responsibility is if the employee clearly acts beyond its role and tasks required of it by the architectural firm. For instance, if, unknown to the architectural firm, the employee sells illegal drugs while on the job site, the architectural firm will likely not be culpable for those acts.

Alternative Project Relationships

▶ Project Delivery Methods (9.1) presents an overview of available models for project delivery.

The types of relationships between members of the construction community seem to constantly evolve and expand. In addition to the conventional owner, design team, and construction team relationship, a number of other alternative relationships are being employed in the industry. Two examples of these alternative relationships are contractor-led design-build and joint ventures.

Contractor-Led Design-Build: In this variation of the conventional construction project delivery, the owner contracts with one entity, the contractor, to provide all design and construction services for the project. The architect typically subcontracts directly with the contractor to provide services for the project. While this type of arrangement may offer many advantages on certain types of projects, it also raises certain potential risks to the architect that do not exist with the more conventional project arrangement. For instance, the conventional construction project arrangement is set up, in part, to provide a layer of checks and balances that protect the owner. In such situations, the architect typically has certain obligations to identify problems relating to the contractor's work and the contractor has similar obligations regarding the architect's work. These obligations may not exist, or at a minimum are severely compromised, in a design-build relationship. Many architects have been placed in very difficult situations when their client, the contractor, wishes to perform work in a way the architect may not agree with. The drafting of the agreements in these types of arrangements is critical in order to protect the architect from these types of problems.

Joint Ventures: It is common for the courts to consider the parties to a joint venture to be jointly and separately responsible for the actions of the joint venture. That is, if an injury occurs because of the negligence of either party to the joint venture, the joint venture can be sued collectively or the parties to the joint venture can be sued individually. Therefore, professional responsibility and liability should be carefully allocated in contractual agreements between the parties to a joint venture. Because many states qualify how and under what circumstances professional responsibility may be shifted to another party, legal advice should be sought when preparing such agreements.

▶ See Contractor-Led Design-Build (9.4) and the backgrounder Design-Build Agreements (17.2) for related information.

Third-Party Actions

In addition to their obligations for damages to the party with whom they contract, architects can also be held liable for negligent acts, errors, or omissions that physically injure or damage third parties with whom the architect has no contractual relationship. These third parties include construction workers, passersby, and occupants or users of projects.

The obligations to third parties stems from a variety of sources. In many states, statutes, regulations, and prevailing case law requires architects to safeguard life, health, public safety, and property and to promote the public welfare. In fact, many of those states use this obligation for licensed architects as one of the key considerations to justify the licensing and registration statutes themselves.

Prior to 1956, the legal concept of privity barred third-party actions. Privity required the litigating parties to prove they had a direct contractual relationship with each other and that the injury occurred in the course of that relationship. Since that time, the courts in many states have, with regard to physical injury and in some cases property damage, extended the group of individuals to whom architects may owe duties to include third parties whom architects can reasonably foresee will depend on them to provide services in a non-negligent manner. However, the law differs from state to state regarding the issue of privity and it is important to get legal advice to determine the law that applies to each particular project.

The types of potential third-party actions vary widely. For instance, a worker hurt on a construction site may opt to sue a wide range of entities involved in the project, including the architect, despite the fact that they had no direct contract with any of those entities. Alternatively, a visitor to the facility after completion may option to commence litigation against the architect, owner, or others if they are injured during their visit due to alleged design or construction defects.

DEFENSES TO CLAIMS

Overview

In the unfortunate, but not infrequent, event that a dispute does arise on a construction project, the architect may have a variety of contractual or statutory defenses to bolster the factual arguments that may be made. While the law varies from state to state, the following are some issues that may impact claims against an architect:

Statute of Limitations

With very few exceptions (such as criminal charges for murder), the states have established specific time frames in which claims must be asserted, or they are permanently barred. For instance, generally stated, a claim based upon negligence against a design professional must be asserted within 3 to 10 years (depending upon the particular state's statute) after the completion of the project. As such, an aggrieved party could know about a potential claim during the construction phase of the project, but not be obligated to commence litigation until just before the statute of limitations expires. That is, the party could wait the full 3- to 10-year period of the applicable statute and then file a claim a few days before the statutory time frame expires. A breach of contract claim may be subject to a different time frame, even within the same state. While there are a few situations that would allow an exception (e.g., the existence of fraud on the part of the architect), these statutes have proven to be very helpful in protecting architects from older claims.

Statutes of Repose

Some states have incorporated statutes of limitation, while others use statutes of repose. Statutes of repose are similar to statutes of limitation and serve to set time limitations under which claims can be made against architects and others. Differing slightly from the statutes of limitation, statutes of repose commence running at the time that the alleged digression is discovered, and the statutory period for bringing a claim after discovery of the discretion is typically much shorter than a statute of limitation period. In addition, there is also a strict cutoff date for rights of action. For instance, a statute of repose against an architect could run for two years from the date a plaintiff knew or should have known about a claim, but that same statute would limit any potential claims to those filed less than six years from the date of substantial completion of the project. Under the preceding example, if a potential plaintiff knew or should have known of a potential claim at the time that the project was substantially completed but did not initiate a lawsuit until three years later, the claim would be barred. Similarly, under the same statute, if the potential plaintiff first learned of the potential claim five years after substantial completion, they would only have one year to make a claim since all claims would be barred that are not initiated within six years under that theoretical statute.

Betterment

This concept applies to some negligence claims asserted against architects. A negligence claim can be asserted against an architect either for (a) an error in some act performed (such as not designing the stairs to code, resulting in the necessity of replacing them); or (b) an omission (the architect did not include a component of the project in its design (such as not showing carpeting that was required in a hallway) and that component needed to be part of the project for a successful completion. While the law differs from state to state, generally the architect would be responsible for the costs arising from its errors, but may only be responsible for a fraction of the cost attributable to its omissions. In a situation such as described above, in which the architect did not specifically designate carpet for a particular hallway, resulting in a change order from the contractor, the courts have generally found that the owner would have had to pay for the carpeting anyway, had it been shown on the plans originally. Since the courts do not want to allow the owner to get something for free, and many courts recognize that a contractor may charge a premium for such a change order, the damages typically awarded by the courts against the architect are only the costs of that premium.

Collection Actions for Architectural Fees

Studies by some professional malpractice carriers have shown that one of the leading reasons for claims against an architect is the architect's initial pursuit (whether in formal litigation or not) of fees due on the project. There is a belief in the industry, although not scientifically proven, that the reason that some owners file counterclaims against architects is an attempt to get the architects to compromise, or walk away from, their outstanding fees.

The time and cost expended in defending such a claim may exceed any fees that are ultimately realized. As such, all architects must thoroughly consider the potential risks and benefits of asserting such a claim before commencing such a demand. It is critical that architects employ diligence during the course of the project to ensure that their fees do not fall into significant arrears, as well as to include contractual provisions when first forming their contract with the owner that will assist them if such a situation arises.

CLAIMS AVOIDANCE

There is a belief held by many in the construction industry that if an architect practices long enough, they are almost certain to be involved in a claim of some sort. In reality, many architects are never formally personally made a party to litigation, but almost everyone is ultimately involved in one or more disputes involving a project and at least threatened with litigation. Notwithstanding that fact, the architect can definitively and substantially reduce the odds of being included in a claim as well as the odds of being found liable if a claim unfortunately arises by taking proactive preventative steps. For instance, having a proper contract, as discussed above and elsewhere, is invaluable. Two other key steps that each and every architect should employ on a regular basis are proper communication with their client and using proper documentation on each project.

► Suggestions regarding proper documentation are more fully discussed in the backgrounder, Project Documentation, which accompanies this article.

A staggering percentage of claims in the construction industry are based, in whole or in part, on the failure of the parties to properly communicate. On construction projects, problems often arise when the failure in communication leads to a failure to manage the expectations of the other party. On construction projects, project participants often come to the table with markedly different backgrounds, experiences, and goals, which all result in each of the participants having significantly different expectations. Those differences are typically most acute in the relationship between architects and clients. Many clients have limited or no prior construction experience and do not understand the nuances involved in the process. Such clients have high expectations for their projects, beyond anything ever contemplated by the architect. The problem is often that both sides *assume* that the other has similar thoughts and expectations as they do regarding critical components of the project. By the time those differences become evident, significant problems may exist on the project.

It is incumbent upon the architect not to assume that the owner is of the same mindset of the architect. At the risk of being too elementary or redundant, the architect must continuously endeavor at each and every step of the project to assist the owner in knowing what to expect in both the short term and long term during the design/construction of the project.

For instance, owners may also fail to realize that professional judgment, and potentially owner input, is required at each step, since the architect makes the recommendations and the owner makes the decisions. Architects need to remind these project participants that buildings, unlike automobiles, cannot be pretested. Despite the effort, care, and conscientiousness of the architect, the process of taking a project from drawing to reality has a lot of unknowns. The architect must make the owner aware of these unknowns, their potential impact on the project, and what is being done to address them.

BACKGROUNDER

PROJECT DOCUMENTATION

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Perhaps the most critical component to a successful construction project is effective communication. Among the many benefits of proper communication, one of the most compelling is that it will mitigate, and perhaps even eliminate in certain circumstances, any potential claims. Project documentation is perhaps the most essential element of communication in the construction industry.

It is critical that architects maintain appropriate documentation for each and every project. Not only is it beneficial to the daily activities for each project, it is invaluable if claims ultimately arise. If a construction dispute goes to litigation, the adjudication of many construction claims often takes place literally years after the event(s) in question occurred. In many of those disputes, the exact wording and timing of the critical communications plays a large role in the outcome of the case. Unfortunately, many of us cannot remember what we had for dinner a few days ago, let alone all of the nuances of a conversation that occurred several years prior. However, contemporaneous documentation during the project is generally allowed as evidence during a trial and can greatly influence the final outcome of the trial, in either a positive or negative way.

Documentation accomplishes a number of purposes:

- Provides a written record of the contractual relationships between the parties
- Provides a written record of the scope of the work to be accomplished
- Serves as an ongoing communication process that tends to raise the level of understanding between the parties and eliminate problems
- Provides a chronology of the events of the project
- Provides a consolidated record if the parties have to revisit the project at a later date

Written contracts provide a critical part of each and every construction project. These contracts define the relationships between the various parties, including identifying the scope of work to be performed by each party.

On virtually every construction project, the scope of work is readily defined in the project documents. From these documents, an interested party can determine the intended final result of the project and construct the project accordingly. In addition to the project specifications and drawings, a number of other documents are critical to this goal. These include shop drawings, submittals, change orders, sketches, and Request For Information (RFI) responses issued during construction, project correspondence, construction change directives, and a host of other documents. Each of these documents can be critical to the final result.

Constant communication tends to raise the understanding of each party with respect to their responsibilities and the roles of others. In addition, since no one likes surprises, it is a means by which potential surprises and problem areas can be mitigated or eliminated at a very early stage. Correspondence, clarifying sketches/drawings, and RFIs all serve this goal. More often than not, problems that are discussed during the project can be resolved with no permanent downside to any party. Without communication, if a party attempts to sweep a potential problem under the rug, it will typically lead to far more serious consequences down the road.

Unfortunately, the possibility of a lawsuit is a very real threat on almost every construction project. These claims can involve a combination of the multitude of parties central to the construction, including the owner, the surety, design professionals, the contractor, subcontractors, suppliers, or any of their employees. Lawsuits can also involve outsiders, such as visitors to the construction site. The possibilities of potential claims are seemingly endless. In such an environment, the importance of proper documentation only increases. Often, trials involving construction disputes happen years after the actual events leading to the claim. It is not uncommon for trials to take place four to seven years after the project was completed. Without proper documentation, it is difficult to properly recall the key events surrounding the alleged claims. Even the best-intentioned people have trouble remembering details, and especially when it comes to monetary or liability issues, some may have “difficulty” remembering precise details. As you might expect, there is often a heated dispute over certain key events on any trial. Contemporaneous documentation is critical in resolving those disputes or influencing the decision maker(s) several years later.

Courts often look to documentation based on the fact that court cases occur years later and memories can be faded or slanted during that time. In some instances it may seem that the party who has the most proper documentation wins.

Conversely, there are also certain potential problems associated with project documentation. If a party spends too much time attempting to document every conceivable detail (an admittedly impossible task), the project will likely become either cost prohibitive or impossible to complete in the given time frame. In addition, documenting files and sending frequent “CYA” type letters to everyone on the job, including the client, often leads to another set of problems, not the least of which may be a sense of distrust or unease created for the client.

The amount of paperwork necessary for proper communication on any given job can be extremely subjective. An architect must balance a wide range of considerations, including but not limited to the size and complexity of the project and the personalities and reputations of the other entities involved. There is a certain amount of required paperwork on any project. For instance, contracts, change orders, drawings, specifications, shop drawings, and documents relating to any governmental approval process are critical to any job. However, the required amount and nature of other project documentation is not an absolute quantity and often comes down to common sense, or a gut instinct.

Perhaps one of the best rules of thumb to use when deciding the amount of paperwork to generate is for the architect to try to put himself in the shoes of the recipient. In generating paperwork to the client, the owner, the architect wants to keep the owner informed of all of the significant events of the project. However, the architect may not want to besiege the owner with superficial details or small issues that the architect, as the professional that the owner retained to perform the project, should handle.

Another key consideration in deciding the type and volume of paperwork to generate is that, as the project architect, it is critical that an architect ***manage the expectations*** of the owner and others on the project. The architect should generate paperwork that enables other parties to understand his position and what may be expected in the future. Managing expectations goes a long way toward mitigating or eliminating problems on construction projects. Proper management of expectations can be accomplished in a variety of ways; it is important that the architect finds a style that works best for him and his firm.

ESTABLISH PROPER OFFICE PROTOCOL FOR RECORD KEEPING

As indicated above, if a matter ultimately goes to litigation, the courts will often be persuaded to allow many, but not all, project documents into evidence. In order to be permitted into evidence, the party seeking to admit the documents must get around the fact that the documents themselves generally constitute hearsay and could be precluded on that basis. Hearsay is a statement (either oral or written) made out of the court that is offered as evidence to establish the truth of the facts contained in the statement. For instance, an expert's report regarding an investigation into a roofing problem and the conclusions of that investigation are hearsay. That report will likely not be admitted into evidence. However, many documents that are generated during the construction project, while technically hearsay as well, will be admitted into evidence under the business records exception to the hearsay rule. While the rules may vary slightly from state to state, in essence, for a document to be admitted under this exception to the hearsay rule it must be shown that (1) the document was made during the regular course of business; (2) it was the regular course of business to make such a record; and (3) the record was made when the act, transaction, or event occurred, or shortly thereafter.

Accordingly, it is essential for architects to establish office protocol that requires the keeping of certain records for each and every project, and maintaining them in a timely fashion. If an architect is inconsistent with the types of records they keep from project to project, or are not timely making such records, they run the risk of having certain records excluded from evidence if litigation does arise. Given that project documentation is often very beneficial to the architect if a claim arises, it is well worth the effort to keep proper records.

The office protocol should also include provisions under which senior personnel review the work of junior associates on a periodic basis. The experienced architects can assist associates in preparing proper documentation and recognize issues soon after they arise rather than letting them fester and grow.

CONTENT OF PROJECT DOCUMENTATION

The wording of an architect's documentation is also critical. A concise description of the relevant facts, without editorializing, is essential. When problems inevitably arise during the course of a project, it is very important that the description of the issues in the contemporaneous documentation do not hastily come to any conclusions regarding the cause or liability. All too often, given limited facts available at the time that the incident first arises, architects jump to conclusions in their daily log or site observation reports as to the cause, sometimes making incriminating comments about themselves, their firm, or their consultants. ***Do not jump to hasty conclusions regarding cause or liability for problems***. Frequently, additional facts subsequently come to light after the initial discovery of the problem that shed an entirely different light on the likely cause or culprit. However, if the architect has admitted fault in their earlier documentation, it is almost certain that admission will be used against them at the time of trial.

If a problem arises, the project documentation should consist of the facts that are known, possibly as well as a listing of potential causes to be investigated further if known at the time. For instance, if a residential roof starts to leak, the architect's documentation should not consist of an entry reading, "The roof now leaks due to my failure to include the proper flashing," even if at the time this seems to be the cause. Instead, an entry should state something along the lines of, "Roof is apparently leaking. Need to investigate installation of shingles and review flashing details." Further investigation often reveals that the initial determinations of cause and liability were incorrect, either in whole or in part. However, a poorly written initial report in which liability is admitted can be fatal in subsequent litigation.

REQUIRED DOCUMENTATION

In order to persuasively present or defend a claim, adequate documentation will be needed. The goal should be to be able to re-create exactly what happened on a job, when, and why. Among the documents suggested for use from the beginning of a job, before there is any reason to even think about claims, are:

- Diary/daily notebook or site observation reports (if electronic devices are not used).
  - Write in ink.
  - Use bound or spiral notebooks (they add credibility that the notes were contemporaneous if a dispute later arises since one cannot add new pages between existing notes).

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  - Number and/or date pages sequentially (no gaps).
  - Keep contemporaneous records: The purpose of the project diary is to identify and discuss key events on the project at the time they occur for reference at some time in the future.
- Electronic devices: Establish an office protocol for contemporaneously accumulating in one location all notes taken in the field.
- Photographs/videos.
- Correspondence.
- Status letters: As part of efforts to manage expectations, your client should be updated on a regular basis.
- "Issue" letters. Flag significant changes or potential problems, because no one likes surprises:
  - Confirm issues that can later become subject to debate; for instance, changes to scope of work or determining owner's desires for project (such as owner identifying on a certain date that he wanted to accomplish X).
  - Letter sent to confirm owner's position can serve to lock him in said position.
  - Letter sent to question owner's position if contractor or others (with whom you have no contractual ties) dictate certain changes and indicate that owner has represented that it is to be done.
  - When writing letters, do not assume that the owner knows everything or is doing certain tasks. If your response to the issue or recommended actions are based on assumptions, **let the owner know each and every assumption in the letter**.
- Minutes of meetings.
- Memos of telephone conversations.
- Project scheduling information.
- Change order logs.
- Shop drawing logs.
- Progress payment logs (both from owner and to consultants).
- Payroll records.
- Equipment use records.
- Accounting records/cost reports.
- Estimates.
- Bids.
- Material invoice files.
- Claim reports.

BACKGROUNDER

COPYRIGHT LAW FOR ARCHITECTS

Joseph H. Jones Jr., Esq., AIA

Original creative expression is an intrinsic part of an architect's professional services. An understanding of copyright law and how it applies to an architect's professional service is an important part of any successful architectural practice.

Joe Jones is a risk management attorney and director of Schinnerer's risk management services. He provides risk management advice to Schinnerer and CNA insureds, and is a resource on evolving areas of professional liability exposure for both design professionals and contractors

U.S. copyright law protects the creativity captured in the architect's instruments of service, such as design and construction drawings, models, and other design representations, as well as the built structure. To protect themselves from copyright infringement, architects should be familiar with their rights under the law.

Architects need to understand the intellectual property rights intrinsic in their professional services. With some clients viewing professional services as a commodity and the plans, specifications, reports, and other documents that architects produce as products, architects should understand the business and liability issues relating to the use, ownership, and control of their designs and instruments of service.

As clients look for more ways to reduce the costs of design and construction, many view the "reuse" of designs as a way to eliminate the need to hire another architect and save money. Actions like this may put the architect at risk for professional liability from any problems that develop from subsequent uses of the same plans. In addition, the architect may lose fees if the client neglects to acquire the copyright to a design.

Maintaining the copyright to their designs gives architects a level of control over their creative and professional endeavors. Clients will have to retain them for future projects, which may help an individual architect or firm maintain a steady stream of new business. As well, surrendering copyright could lead to liability problems for the architect if that issue is not properly addressed in the professional services agreement.

COPYRIGHT BASICS

Intellectual property rights fall into three main areas: trademarks, including service marks; patents; and copyrights. Trademarks and patents are registered by the U.S. Patent and Trademark Office, while copyrights are registered with the U.S. Copyright Office. Architects appear to have the greatest exposure to copyright issues, which are the focus of this discussion.

According to statistics from the CNA/Schinnerer design professional liability program, 44 percent of intellectual property claims against architects and engineers from 2002 to 2011 involved allegations of copyright infringement. Of those claims, 66 percent involved architects and 55 percent involved residential projects. Interestingly, these statistics show that design professionals brought more than 57 percent of all claims for copyright violation.

It is a common misconception that copyright is a subject of interest only to the creators of copyrighted material. Both users and creators of copyrighted material must understand the limits of copyright protection as well as what constitutes fair use of copyrighted material.

WHAT CAN BE COPYRIGHTED

In brief, the U.S. Copyright Act protects "original works of authorship fixed in a tangible medium of expression." It does not extend to items such as procedures, processes, and systems, which are typically matters for patent law.

Many instruments of service prepared by the architect qualify for copyright protection. Article 1 of AIA Document A201™-2007, General Conditions of the Contract or Construction, defines the architect's instruments of service as "representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials." The words "other similar materials" may refer to renderings, reports, photos, models, and videos. The major requirement for defining such materials as an instrument of service is the same requirement for qualifying for protection under U.S. copyright law—they must be works "fixed in a tangible medium of expression." Ideas, therefore, are not instruments of service. To be protected, the "original work" must have been set down on paper or in some other tangible form.

USE OF COPYRIGHTED MATERIAL

A common misconception is that *ownership* of a thing is the same as *copyright* of that thing. The difference between ownership and copyright can be illustrated by what happens when you purchase a book, burn it, or give it as a gift, but you do not own the copyright. Copyright laws give the creator of an original work the exclusive right to reproduce or display that copyrighted work.

Clients often believe that since they paid the architect and have a set of drawings in their possession, they own the copyright to these materials. However, this is not true. As in the example above, the fact of purchase does not give the client the copyright to the architect's instruments of service. For the client to own the copyright, the architect must assign and transfer ownership of the copyright to the client in a written document. This document must be signed by the architect or the architect's duly authorized agent.

Clients who fail to realize that the architect's designs and instruments of service are copyrighted may duplicate a set of drawings and specifications with the intention of using them for future projects. This misuse of the architect's materials opens the client to a possible copyright infringement claim and may cause liability problems for the architect because the project may not be properly designed for another site. The requirements of a different set of codes, the soil-bearing capacity of the site, and other site conditions are just a few of the concerns that make reusing an original set of drawings and specifications for other projects highly risky. If, despite these issues, a client desires to reuse an architect's design, it is important for the architect to understand his or her rights as the creator of copyrighted material.

CATEGORIES OF COPYRIGHT PROTECTION

Copyright protection covers a variety of ways in which creative works can be expressed. U.S. copyright law identifies these within the following categories:

- Literary works
- Musical works
- Dramatic works
- Pantomimes and choreographic works
- Motion pictures and other audiovisual works
- Sound recordings
- Pictorial, graphic, and sculptural works
- Architectural works

The architectural works category is an obvious choice for protection of designs and instruments of service produced by architects, but the pictorial, graphic, and sculptural works category also affords architects some protection. These types of work, also termed "visual works," include two-dimensional and three-dimensional works of fine, graphic, and applied art. Examples include technical drawings, architectural plans, diagrams, and models.

In 1990 the Architectural Works Copyright Protection Act (AWCPA) became effective. Prior to that, only instruments of service identified as "pictorial and graphic" works were protected under the Copyright Act. The AWCPA specifically added "architectural works" as a protected category of original expression. An architectural work is defined as "the design of a building as embodied in any tangible medium of expression, including a building, architectural plans or drawings. The work includes the overall form as well as the arrangement and composition of spaces and elements in the design, but does not include individual standard features."

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The AWCPA does not define "building." However, U.S. Copyright Office Information Circular 41, "Copyright Claims in Architectural Work" (available at www.copyright.gov), states that the AWCPA protects "structures that are habitable by humans and intended to be both permanent and stationary, such as houses and office buildings and other permanent and stationary structures designed for human occupancy, including but not limited to churches, museums, gazebos, and garden pavilions." Equally important are the items the AWCPA does not protect. Among these are "structures other than buildings, such as bridges, cloverleafs, dams, walkways, tents, recreational vehicles, mobile homes and boats."

Although the AWCPA does not define "building," several courts have attempted to interpret the provisions of the act. In *Yankee Candle Company, Inc. v. New England Candle Company, Inc.*, 14 F.Supp.2d 154, the plaintiff, holder of a copyright and trademark on the design of a colonial-style candle store, sued a competitor for copyright infringement after the competitor opened a retail store in a mall that the plaintiff claimed was substantially similar to the design of its own retail store. The court had difficulty concluding that a "room" within a retail mall fit the definition of a "building" within the meaning of the AWCPA. The court noted that to hold that a mall store constituted a "building" would distort the plain meaning of the term, and "surely Congress did not intend for individual offices in an office building, though elaborately designed, to qualify as 'buildings' themselves."

In another case, a court ruled that buildings had to be built after AWCPA went into effect to be protected under the act. In *Richard J. Zitz, Inc. v. Dos Santos Pereira,* 232 F.3d 290, an architecture firm brought a copyright infringement action against builders of a townhouse it alleged infringed on its copyright. The court first noted that for an architectural work to qualify for protection under the AWCPA, the subject of the infringement must have been constructed or otherwise published after December 1, 1990. The court rejected the plaintiff's argument that "constructed" means "finished," or at least finished to the point of being habitable. Since the plaintiff's townhouse was not finished until *after* December 1, 1990, the plaintiff argued its design was eligible for protection under the AWCPA. The defendant argued that "constructed" means "substantially constructed," and that therefore the plaintiff's townhouse was not eligible for protection under the AWCPA. In agreeing with the defendant and the lower court, the appellate court held that "an architectural work that was substantially constructed as of December 1, 1990, is ineligible for copyright protection under the AWCPA."

The AWCPA does not prohibit protection of an architect's drawings under the "pictorial and graphic" category, and in some circumstances protection under this category may be broader. Some attorneys who have used this approach believe the plaintiff generally has to prove only that the defendant had access to the instruments of service and that substantial similarity exists between the original and the alleged copy. Since the AWCPA is meant to protect the "design," and exceptions have been made for "unprotected elements," proving copyright infringement under the architectural works category may be more challenging.

COPYRIGHT INFRINGEMENT

The question is often asked, "How much copying is copying? 50 percent? 75 percent? 90 percent?" Unfortunately, the answer is not that simple. Certain elements are required for a claim of copyright infringement to be successful. A plaintiff must prove ownership of a valid copyright and an infringement (copying) of the protected work.

Registration with the U.S. Copyright Office is not required for a copyright to be valid, although it is prima facie evidence of such copyright, which shifts the burden to prove invalidity to the defendant. Registration *is* required before a claim of copyright infringement can be filed, however, and can be a factor in the award of damages and attorneys' fees. More in-depth information on the requirements for registration, length of protection for copyrighted works, and damages available for copyright infringement can be found in information circulars available from the U.S. Copyright Office website at www.copyright.gov. Because this is a specialized area of law, consultation with an attorney who understands intellectual property law is advisable.

Ownership of a copyright is vested with the creator of the work, except in the case of "works made for hire." Under U.S. copyright law, "works made for hire include work prepared by an employee in the scope of employment," as well as works "specially ordered or commissioned." Architectural works, however, are generally not considered "works made for hire" unless the agreement between the parties explicitly states so. Article 7 of AIA Document B101-2007 explicitly states, "The Architect and the Architect's consultants shall be deemed the authors and owners of their respective instruments of Service, including the Drawings and Specifications, and shall retain all common law, statutory and other reserved rights, including copyrights." The duration of a copyright depends on several factors, including whether the creator is an individual or corporation or the work was produced in a work-for-hire arrangement. The general rule is that a copyright lasts for the life of the author plus 70 years.

As previously noted, proof that the defendant had access to the copyrighted work is another required element of a copyright infringement claim. Generally, this is not difficult to prove. All that is required is evidence that the protected expression, such as a set of plans, was published or otherwise in the public domain where the defendant could have seen it. On the other hand, if only one set of plans was created and this was never published, proof of access is more difficult.

Once ownership of a valid copyright has been established and access has been demonstrated, the next step in an infringement claim requires proof that portions of a copyrighted work have been copied. In *Sturdza v. United Arab Emirates,* 281 F.3d 1287, a case involving allegations of infringement of an architectural design, the court concluded that to prove infringement the plaintiff must show that the defendant's work is "substantially similar" to protected elements of the plaintiff's work.

The court noted that proof of substantial similarity requires identification of aspects of the author's work, if any, that are protected and identification of the infringing elements that are "substantially similar" to the protected work. According to the court, "substantial similarity" exists when "the accused work is so similar to the plaintiff's work that an ordinary reasonable person would conclude that the defendant unlawfully appropriated the plaintiff's protectable expression by taking material of substance and value." The *Sturdza* court took this precedent further, noting that substantial similarity requires a comparison of both individual elements of the two works in isolation and the "overall look and feel" of the work, even if the individual elements do not qualify for individual copyright protection.

COPYRIGHT LICENSE AND TRANSFER ISSUES

The discussion in this section on copyright license and transfer issues and license termination assumes the parties will use AIA Document B101–2007 as their agreement for professional services. For architects who may use their own professional services agreement or one offered by their client, the B101–2007 can serve as a model for addressing these issues contractually.

Although architects hold the copyright to their instruments of service, the reality is that the client, contractor, and other parties will need to access and use the architect's instruments of service for a particular project. To address this issue, the AIA has created in B101–2007 a series of licenses for those who will need to use the architect's instruments of service to construct and use the project.

The proper use of licenses is key to maintaining the architect's copyright and at the same time meeting the owner's needs—most often, the need to use the instruments of service for the construction, use, and maintenance of a project. In paragraph 7.3 of the B101, the architect grants the owner "a nonexclusive license to use the Architect's Instruments of Service solely and exclusively for purposes of constructing, using, maintaining, altering and adding to the Project, provided that the Owner shall comply with all obligations, including prompt payment of all sums when due, under this Agreement." It is important to remember that the license is contingent upon the owner meeting its obligations under the agreement. The same paragraph also requires the architect to "obtain similar nonexclusive licenses from the Architect's consultants consistent with this Agreement." This is necessary because architects can only grant a license for their own copyrighted materials. Architects have no copyright or control over the instruments of service of consultants such as structural and MEP engineers; these consultants have to grant their own licenses. Finally, paragraph 7.3 permits the owner to authorize contractors, subcontractors, and material suppliers to reproduce applicable portions of the architect's instruments of service for their use in connection with construction activities. The license granted in paragraph 1.3.2.2 thus effectively meets the client's and contractor's needs while maintaining the architect's copyright.

The B101–2007, however, does limit the license granted to the client. Paragraph 7.4 prohibits the client from transferring, assigning, or granting the license to another party without the written permission of the architect. Should the client choose to reuse the instruments of service without retaining the architect or the architect's consultant, paragraph 7.3.1 requires the client to release and indemnify the architect and the architect's consultant from all claims arising from such use.

A license is one way to meet the needs of the owner and other parties to have access to and use of the architect's instruments of service. Transferring the copyright to another entity for a fee is also an option. However, certain issues that stem from this option should be carefully considered. First, what is the proper fee for such a transfer? In calculating such a fee, the architect should account for both the cost of producing the instruments of service and the loss of potential profits, because the entity holding the copyright will not have to retain the architect for future services.

COPYRIGHT LICENSE TERMINATION

As stated above, AIA Document B101–2007 grants the owner a limited license to reproduce instruments of service solely for purposes of construction, operation, and additions to a project. The document also states that a termination of the design contract due to the owner's default automatically terminates the owner's license and thus the owner's permission to use those instruments to complete the project. If the owner terminates the contract for its convenience, or the architect terminates the contract due to the owner's suspension of the project, and the owner later resumes the project with another architect, paragraph 11.9.1 allows the initial architect to receive compensation for the owner's use of the instruments of service solely to complete, use, and maintain the project.

COPYRIGHT TRANSFER

Through a contract, a copyright license to use the design documents can be granted or the copyright can be transferred to another party. However, it is important to note that such licenses and transfers do not completely absolve the architect from all liability of the professional services provided, even if such liabilities are expressly transferred in the contract.

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In most states, courts have held that it is against public policy to contractually allow one party to transfer all its liability to another party. Therefore, in most jurisdictions, architects will not be allowed to transfer all risk of professional liability. Architects will be held responsible for their negligence based on the original professional services provided, regardless of who holds a license or to whom the copyright has been transferred.

If an architect chooses to transfer their copyrights, language similar to paragraph 7.3.1 of AIA B101-2007 should be included and effective the date of the transfer. This will not prevent future claims from third parties based on the original unmodified design, but does contractually require the party that has assumed the obligation and benefit of the transfer of copyright to also assume any liability that may flow from modification or unanticipated use of the design after the date of transfer.

AVOIDING COPYRIGHT INFRINGEMENT

Once architects understand the basics for protecting their copyright in their designs and instruments of service, they should consider the question of copyright from the other point of view: How does an architect manage the risk of infringing upon the protected work of another architect or design professional? A simple answer is, "do not copy someone else's copyrighted material." Unfortunately, a more realistic answer is not that simple. Architects often look to other creative works for inspiration or ideas about solving a particular problem, making the "perception of copying" a common issue in architectural services. Architects can take some steps, however, to minimize the risk of having to defend against a copyright infringement claim. In most cases, these suggestions are easily applied to "expressions" protected as "visual works" or "architectural works."

Maintain Copyright

Increasingly, clients are asking architects to transfer ownership of the copyright in their design. Architects need to realize that once they have transferred copyright to a client or any other party, that party has acquired all the rights of the copyright holder, including the exclusive right to reproduce the architect's original expression embodied in the design or instruments of service. In short, if an architect creates an original design, transfers the copyright for it to the client, then uses the same or similar design on a subsequent project, the architect has made it possible for the client to file a copyright infringement claim.

Read Agreements Carefully

Although the creator of an original work owns the copyright in that work from the moment of creation, copyright can be transferred to other parties unintentionally. Architects should carefully read their agreements with clients, looking for provisions stating that the services they provide are works made for hire or that the architect assigns all rights in the instruments of service to the client. Services provided as works for hire automatically grant copyright to the entity engaging the architect's services. If a client insists on a work-for-hire agreement, the architect should request an indemnity agreement for all claims that may arise from use of the instruments of service without the architect's involvement.

Project owners may require in the professional services agreement that the architect warrant that it has not infringed on another party's copyrights. In addition to the warranty requirement, project owners may also require the architect to defend and indemnify them should a claim be made against them alleging copyright infringement. Warranties and defense obligations are excluded under professional liability policies, as are indemnity obligations beyond allegation of negligence. However, this is a risk that can be managed by obtaining proper licenses from other parties if copyrighted material is used in the design.

Obtain Proof of Copyright Release or an Existing License

Architects are often asked to provide services based on another architect's efforts or to complete the services of another architect. In such instances, the "new" architect should request proof in writing from the client that the first architect has transferred copyright to the client or that the client has been granted a license to use the instruments of service. Proof of copyright release or an existing license can reduce the likelihood of claims of copyright infringement from other architects.

Use the Copyright Notice and Register Your Material

Although use of the copyright notice is no longer required under U.S. copyright law for drawings to be protected, placing the notice on the architect's instruments of service offers some protection by warning that the materials are copyrighted and discouraging copyright infringers from claiming they were unaware of that fact. To protect a work further, however, registration of the copyright with the U.S. Copyright Office is highly recommended. Most important, registration is required before an infringement claim can be filed. In addition, remedies such as attorneys' fees and statutory damages are available for protected works properly registered before an infringement occurs.

Avoid "Substantial Similarity"

As the court stated in *Sturdza,* infringement occurs when the defendant's work is "substantially similar" to protected elements of the plaintiff's work—that is, when an ordinary and reasonable person would conclude the defendant had appropriated the plaintiff's original expression. If an architect sets out to make a project look like that of another, a reasonable person would likely believe the architect copied the other work and therefore would hold the architect responsible for copyright infringement. Architects should also remember that substantial similarity requires not only comparison of the individual elements of the two works, but also of the "overall look and feel" of those works.

The best way to manage the risks of a copyright infringement claim is for architects and their legal counsel to gain knowledge and understanding of the U.S. Copyright Act. Consultation with an intellectual property attorney is strongly recommended. However, it is a good idea to familiarize yourself with the information on the U.S. Copyright website (www.copyright.gov). In particular, architects may want to download the following circulars:

- Circular 1: Copyright Basics
- Circular 9: Work-Made-for-Hire Under the 1976 Copyright Act
- Circular 40: Copyright Registration for Works of the Visual Arts
- Circular 41: Copyright Claims in Architectural Works

For More Information

Architect and Engineer Liability: Claims Against Design Professionals, 3rd edition (Aspen, 2006), edited by Kevin R. Sido.

5.2 Entrepreneurial Practice: Starting an Architecture Firm

Derrick Choi, AIA, LEED AP, and Rena M. Klein, FAIA

Twenty-first-century practice requires architects to adopt an entrepreneurial approach dependent on risk-tolerance, self-awareness, and comfort with unpredictability. Starting a firm gives architect's opportunity to leverage talent and drive to create a work-life that is both personally satisfying and financially rewarding.

The Great Recession that began in 2008 has had significant impact on the American design and construction industry. Along with the new tools of twenty-first-century technology, the changing economy is creating irreversible industry transformation. While entrepreneurship has always been part of architectural practice, changes to the business environment have created a new normal, wherein entrepreneurial traits—business acumen, nimbleness, risk-taking, and the capacity to assess opportunities—are increasingly essential for success as an individual professional and as a design firm.

The Freelancer's Union of New York City estimates that nearly one-third of Americans are self-employed, adding up to almost 42 million people. As an advocate and insurance provider for the self-employed, the Freelancer's Union sees entrepreneurial individuals as the true engine of economic growth in the United States. They dub the new normal "the gig economy."

For architects, engaging in the entrepreneurial economy is not new. The 2012 AIA Survey found that 81 percent of architectural firms have fewer than five members, and that these firms employ over one-quarter of all architectural staff. The design and

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▶ For more on the findings of the 2012 AIA Firm Survey, see Demographics of Practice: 2012 AIA Firm Survey (2.2) and Navigating Economic Cycles (7.1).

construction industry has been aptly described by Barbara Golter Heller as an "immense aggregation of cottage industries" (*DesignIntelligence*, Greenway Group, 2009). That the industry is still, for the most part, local and diverse in scale creates a myriad of opportunities for entrepreneurial activities. The preponderance of very small firms and self-employed architects is in itself proof that a financially successful and personally satisfying career is possible through starting a firm.

The ability of start-up and small firms to succeed in the new economy has increased owing to a number of factors that enable expanded capacity and reach. These are: Infrastructure, Collaboration, and Global Practice.

▶ Small Firms, Small Projects, and Building Information Modeling (11.3) discusses the benefits, challenges, and best practices of BIM in smaller architecture practices.

Infrastructure: Technology is enabling architects who start their own firms to expand their capacity and the possible types of engagements. The choice to leave a larger firm and go out on one's own does not necessarily mean giving up large projects or participation on the teams that execute them. And working with larger projects or firms does not necessarily require a big operating budget. The evolution of file-sharing technologies, building information modeling (BIM), multiplatform collaboration, and online project communications and management tools have enabled small and start-up practices to quickly develop offices that are cost-effective, flexible, and scalable.

▶ Small Firm Collaboration (5.7) discusses various collaborative models and the keys to successful collaboration among small architecture firms.

Collaboration: New firms can serve as expert consultants, contract production staff, or valued collaborators. Founders of start-up firms have the opportunity to thoughtfully assess their skills, strengths, and areas of interest to determine project opportunities that are a good fit. Depending on the nature of the project team arrangement, firms can often take on discrete tasks or serve in a support role, demonstrating value and expertise.

▶ For related information about this project delivery method, see Architect-Led Design-Build (9.5) and the accompanying backgrounder, Architect-Led Design-Build and Architect as CM for Small Firms and Small Projects.

New firms also have the option of expanding their services to include the construction phase through ongoing collaboration with contractors. For instance, if the founder has the interest and aptitude, incorporating Construction Management into a practice, either as Adviser or as Constructor, is a possibility to expand one's scope beyond the design phase of the project. Architect-Led Design-Build offers the possibility of influence and revenue (commensurate with the additional risk) beyond the design phase of the project.

▶ Practicing in a Global Market (5.8) addresses international design opportunities and the related methodologies and rules of engagement.

Global Practice: Advances in production technologies and telecommunications have greatly improved access to the global design market for firms of all scales. With the appropriate roles and responsibilities, it is possible for a variety of practices to work and compete successfully in the global marketplace. Smaller firms, or those in a start-up mode, with an appetite for international work may want to consider entering the international marketplace as a designer (perhaps in collaboration with a local associate firm), or in a consulting or support role.

XCHANGE ARCHITECTS

In 2008, Derrick Choi, AIA, was presented with a rare opportunity–an unsolicited offer by a former client in the Middle East to serve as a design and planning consultant for a quarter-million square foot airport expansion. Accepting this project, Choi founded his practice, XChange Architects LLC, in July 2008, not fully cognizant of the Great Recession on the horizon.

Choi began his firm with a wide range of experiences in office management, marketing, design and planning, and construction contract administration from a decade of experience working in large firms on complex public projects. He quickly developed a firm that leveraged his accrued knowledge and problem-solving processes developed across various building typologies within the public realm.

While working on infrastructure projects with a national AE firm, he enjoyed the benefits of collaborating closely with people who possessed varied skill sets, experiences, and connections. In his new firm, Choi actively sought to replicate the same collaborative relationships with many of these contractors, consultants, and former colleagues. He pursued this course for two reasons—first, the working relationships and trust built over the years were critical to project success; and, second, the access provided by former collaborators in the public realm work was invaluable.

In the first two years of XChange Architects' existence, Choi didn't have the requisite completed projects in the firm's portfolio to competitively seek out opportunities on his own. He determined that it was more time-efficient and cost-effective to assemble a project portfolio by serving in a subconsultant role to his former business partners, consultants, and colleagues on projects that aligned with his firm's mission. Consequently, his firm's first two years of billings required Choi to be a flexible, competent collaborator, assuming myriad project roles on institutional and public projects, including:

- Code and permitting consultant
- Construction administration staff
- Executive architect
- Master plan consultant
- Peer reviewer/quality control consultant
- Programmer
- Project design staff
- Project management team member
- Sustainability and LEED certification consultant
- Visualization/rendering consultant
- Urban designer

Leveraging Choi's access to aviation client contacts, the firm's initial consulting assignments were international ones—including being a sustainability coordinator for Schiphol International Airport in Amsterdam and a terminal designer and planner in Abu Dhabi International Airport in the United Arab Emirates. Serving in a consultant role helped to build the firm's portfolio quickly, providing a reliable revenue stream in the critical start-up phase, and exposing the firm's staff to project types that were aligned with XChange Architects' mission to work on projects in the public realm.

For Choi, consulting on larger projects and working with others also helped to alleviate many of the initial requirements of building a practice. Serving as a consultant to a larger design and planning firm, Choi could tap into the larger firm's global resources for immediate infrastructural support. The ability to have access to facilities and production support significantly reduced the start-up time and costs for XChange Architects.

Collaboration in larger projects does not necessarily mean giving up complete control. In the case of XChange Architects, proving to be a reliable collaborator, with a deep commitment to providing high quality work products and results, was essential to gaining the trust of fellow collaborators. Striving to be a reliable collaborator at the outset of starting a new firm was also instrumental in gaining good will leading to follow-on work opportunities. Previous good results and good relationships led to more influence over the course of projects. The experience of gaining trust and being afforded room to innovate as a consultant led Choi to similarly offer his project staff and subconsultants more latitude in assignments where XChange Architects was prime.

While in 2012 the transition from consultant to prime contractor was not complete, XChange Architects has been able to capitalize on its firm experience working as a consultant on multiple public projects—libraries, schools, community facilities, and airports—and is now the prime contractor on several new Massachusetts public projects, including a new airport terminal and an urban design and planning project.

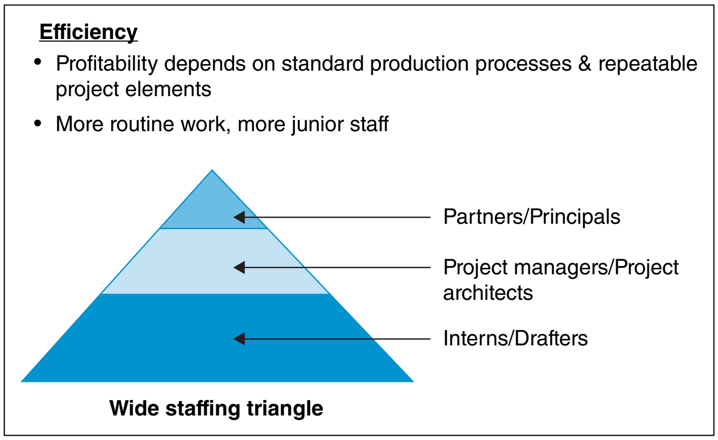
DESIGN FIRM BUSINESS MODELS

When starting a firm, being intentional and strategic about a business model may be challenging. Nevertheless, understanding the options and proceeding with self-awareness is essential. The material in this section was sourced from *The Architect's Guide to Small Firm Practice* (Wiley 2010), by Rena M. Klein, FAIA.

In general, a business model is a plan that articulates what business is being conducted and how the business will generate income. Renowned consultant David Maister, author of many books on management of professional service firms, has identified three business models that are common in organizations that offer professional services: efficiency-, experience-, and expertise-based. Each of these business models can yield growth and profitability, assuming that they are operated appropriately.

Efficiency-Based Firms

Efficiency-based firms are focused on fast and less-expensive project delivery. These firms often specialize in one project type or a narrow range of services and tend to serve clients that are looking for standard solutions and quick turnaround. For example, a small architectural firm that serves residential developers might operate effectively within this "efficiency" model (see Figure 5.1.).



The Architect's Guide to Small Firm Management (Wiley, 2010)

FIGURE 5.1 Efficiency-based Firms Rely on Repeatable Processes.

Because efficiency-based firms do projects with a significant amount of routine work, founders may be able to hire a less experienced person for production assistance as soon as workload permits. This will help to keep production costs down, while freeing the founder to acquire more work. Routine work may also lend itself to having a remote virtual workforce or to subcontracting production work. With repeatable elements and standard processes, project delivery can be streamlined. Profitability is dependent on volume and productivity and is relatively easy to obtain once systems are in place. Sustainable success in these firms requires continuous improvement of work processes and staying current with technology and trends.

Experience-Based Firms

When asked, most small firm leaders will describe their firms as operating within the second business model—experienced-based—and most are correct in their assessment, to a greater or lesser extent. In contrast with efficiency-based firms that have deep experience but engage in routine projects, true experience-based firms are proficient at solving non-routine and complex design problems. While their experience may be in a certain project type, such as public schools or museums, their core competency is the ability to successfully organize and deliver significant and complicated projects. Many successful experience-based firms find they are able to apply their accrued knowledge to a diversity of project types, a strategy that can help weather economic downturns in individual market sectors. (See Figure 5.2.)

Starting an experience-based firm requires a founder to have knowledge and experience in solving complex design problems and serving on teams that regularly execute significant projects. The initial management challenge for this type of firm is to match the project task to the "pay-grade." Much of a design fee can be spent when the founder performs work that could be done by someone with a lower salary. For solo practitioners who have meaningful experience in complex projects, a first hire might be administrative support, rather than production help. This will free the founder to do more billable work and nurture relationships that will lead to more opportunities.

DESIGN FIRM BUSINESS MODELS

EFFICIENCY

- We can do it better, faster, cheaper.
- We do projects that are not complex and have many repeatable elements.
- We employ the latest production technology and continuously improve production processes.

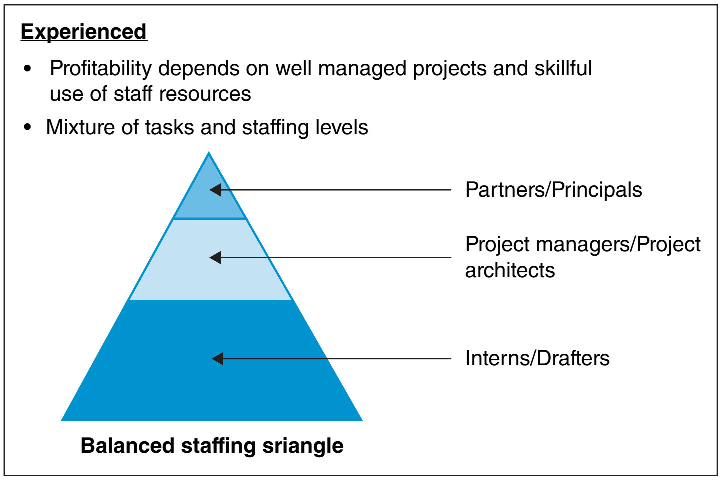
EXPERIENCED

- We know what we are doing.
- We can do unique complex projects by applying our accrued knowledge.
- We leverage relationships to acquire projects and collaborate to deliver them.

EXPERTISE

- We have special knowledge or talent.
- We serve as expert consultants or are design stars.
- We continually work to innovate and to create and acquire new knowledge.

Excerpted from *Architect's Guide to Small Firm Management*, Klein, 2010



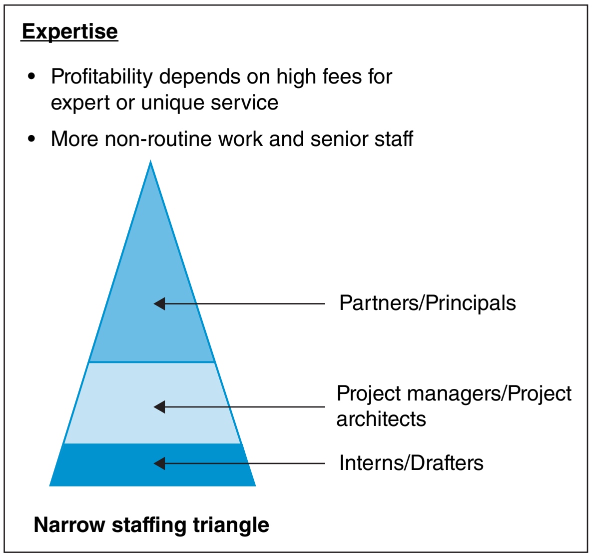
The Architect's Guide to Small Firm Management (Wiley, 2010)

FIGURE 5.2 Experience-based firms Rely on Applying Accrued Knowledge.

Once the workload of a start-up firm grows, hiring a skilled and experienced architect to assist the founder, as opposed to an intern, may be the best practice. This person should be able to manage projects and provide reliable assistance to the founder in delivering complex projects. Virtual collaboration with other experienced collaborators as subconsultants or joint venture partners is also an excellent strategy for project delivery in start-up experience-based firms. Sustainability for experience-based firms is enhanced when they are adept at creating and acquiring new knowledge from doing projects that can be applied to future commissions.

Expertise-Based Firms

Expertise-based firms have service offerings that rest upon deep knowledge and/or exceptional talent. (See Figure 5.3.) These firms include those headed by



The Architect's Guide to Small Firm Management (Wiley, 2010)

FIGURE 5.3 Expertise-based Firms Rely on Deep Knowledge or Unique Talent.

“starchitects,” with their unique style and abilities, or, more commonly, specialists in a narrow band of professional knowledge such as acoustical design or commercial kitchen design.

For founders who have deep knowledge or unique talent, an expertise-based firm may allow a financially successful one-person firm to be established and sustained. Administrative help is advisable to free the principal to complete billable work. However, the straightforward nature of this kind of practice might keep administrative demands to a minimum, allowing the principals to do it themselves. Since most of the work is non-routine, few, if any, middle-level and junior staff are needed to complete the work. More commonly, expert practitioners will partner with experts in their related field to offer a broader range of services. Many also connect with academic institutions that allow expert practitioners the opportunity to teach and facilitate research activities that forward knowledge creation. One- or two-person firms can be very successful using this model since profitability often depends on high hourly rates for services.

Any Project That Comes Through the Door: Opportunistic vs. Strategic

Most design firms will start in an opportunistic manner—a project is offered that allows an architect’s initiative, talent, and training to be exercised and showcased. Whether making the leap from employment by others to being self-employed, or starting a firm because no other option is available, since design services are project-based, having a project to do is usually a prerequisite to starting a firm. This may make the discussion of choosing a business model academic, as the kind of firm being established may be dependent on the job opportunities present in the marketplace. Given this reality—an environment where it appears that all opportunities must be explored and accepted—how is it possible to be strategic?

The answer to this question is simple. All opportunities need to be explored, but not all opportunities must be accepted. The interests, skills, and aspirations of the founder must be considered at firm start-up in order to set a course toward both personal satisfaction and financial success.

Nevertheless, accepting any project that comes along can lead to a strong generalist practice and can be a strategic choice in itself. Generalist practices may be particularly successful for firms established in smaller communities, where the work available is likely to be varied in building type and scale. These firms prosper from the broad generalized knowledge they have acquired and can become stable and well-rounded. The downside of this strategy for many practitioners and start-ups is that it may limit the depth of professional knowledge acquired over time, leading to fewer opportunities for complex projects. Firms that accept “any project that comes through the door” can become unfocused and spread too thin.

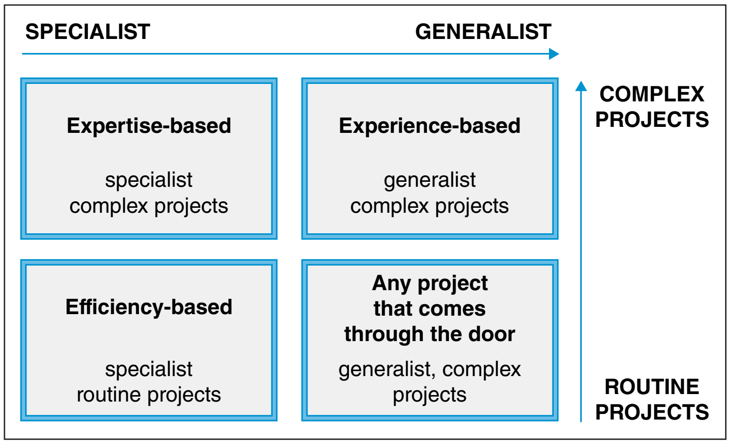
Naturally, the core competencies, personal connections, and interests of firm leaders will attract certain clients and projects even if there is no intentionality. At some point in the firm’s life, especially if firm growth is a goal, a more intentional approach to the firm’s business model will be required. Figure 5.4 illustrates how the business models are formed by the interrelationship between a firm’s level of specialization and its ability to deliver complex projects.

Once a firm’s business model is understood, firm growth or sustainable stability as a solo practitioner or small firm becomes more possible.

START-UP BUSINESS PLANNING

Legal Requirements

There are several choices for a firm’s legal structure regardless of whether a firm is founded by a single individual, a two-person partnership, or a group of owners.



The Architect's Guide to Small Firm Management (Wiley, 2010)

FIGURE 5.4 Business Models for Design Firms Relate to the Level of Project Complexity and Specialized Knowledge Required.

According to the 2012 AIA Firm Survey, 28 percent of all firms were formed as S corporations, making this the most common legal structure among all firms in 2011. This exceeded the percentage of firms formed as sole proprietorships (20 percent). Setting up as a partnership of two or more requires additional considerations besides the legal structure of the firm. It is important to consider the makeup of agreements between those entering a partnership.

► See the backgrounder accompanying this article, Firm Legal Structures, regarding the key factors to consider in choosing or modifying an architecture firm's legal structure.

PARTNER AND SHAREHOLDER AGREEMENTS

Fresh beginnings are exciting. The potential for success can seem a certainty for an enthusiastic new firm starting out. Principals with diverse backgrounds and talents can join forces to create a greater whole, but partners are distinct people who bring their own strengths and weaknesses to a firm. As hard as this can be to envision at the beginning of the new firm, disagreements among partners can ruin a business. In five or ten years, one partner can forget how important the talents of another were to starting a new business, and focus instead on something less positive.

A contract between partners can seem unnecessary when things are going smoothly, but will be a necessity when rough spots arise. Avoiding some conflicts is possible with a partnership agreement that specifies the following:

- Names of all partners, their legal relationships, and their ownership percentage. Some things that help decide who owns how much of a business include who initiated it, who brings the strongest reputation or expertise, who made financial contributions for start-up, and who does what work.
- How compensation and financial earnings are to be calculated and distributed among partners (or owners, if a corporation).
- Financial responsibilities. How will expenses be divided and paid? Who has the right to financially indebt the firm and its principals?
- Decision making and the organizational hierarchy. Determine from the beginning who is in charge and of what. When a partner has a certain skill set or specialized knowledge, responsibility for decisions in those areas can be assigned accordingly.
- Credit for work. Architecture is a creative endeavor. Decide whose name will appear first and any circumstances that might change the order.
- Dispute resolution. If a disagreement does arise, everyone will know in advance whether it will be resolved through earnest discussions, arbitration, mediation, or a court of law.
- What happens when a partner is sick for an extensive period, becomes disabled, or dies.
- How a partner can leave and divest his or her interest to the remaining partners.
- The procedure for bringing in new shareholders.

Reprinted from the AIA *Handbook* 14th edition, "Starting an Architectural Firm," Moreno.

Financial Setup

▶ Chapter 7, Financial Management, further discusses financial terms and financial management systems for the architecture firm.

Financial planning is a vital part of getting ready to open a new firm. Key tasks in the financial setup of a firm may include the following:

- Selecting and setting up an accounting system
- Establishing tax identification and filing status based on legal structure
- Establishing a business bank account
- Engaging trusted professional advisers, including an accountant and attorney, if needed, to help set up legal structure or agreements
- Acquiring start-up funding from outside sources, if necessary

Logistics

Facilities

Since home offices keep overhead low and are eligible for tax deductions, their inherent cost-effectiveness and flexibility is a natural fit for many solo practitioners and start-ups. While individual work settings can be increasingly remote, singularly efficient, and still be fully "connected," many find working alone day after day to be unsatisfying. Firm founders who have recently left a larger firm may miss the collegial company of others during the workday. In addition, the continuing need for face-to-face meetings as part of the project acquisition and delivery process requires most practitioners to have access to conference rooms and meeting spaces.

As founders contemplate the leap from the home office, or options to augment and mitigate its limitations, a number of flexible space arrangements are available for consideration:

Rental Office Spaces or "Executive" Suites: The predominant typology of emerging office arrangements, these are fully furnished, rentable office spaces for hourly, daily, or monthly rental. Office rental arrangements of this type commonly provide offerings beyond the rental of physical workstations, including social/meeting/conference spaces, high-speed Internet bandwidth and connectivity, and telephone and receptionist service, as well as mail handling. However, the typical production necessities of an architect, such as large-scale plotting and scanning, are usually not readily available in executive suites, and there are generally no spaces or accommodations for equipment storage or services like model-making or photography.

Those with a consistent need for meeting space may benefit the most from this kind of arrangement. Sole practitioners, specialty design consultants, and others not providing a full range of architectural services may also find these arrangements beneficial. Since rental costs are typically on a per-use basis, this arrangement can be cost effective.

Virtual Offices: This office arrangement offers users a professional ambience and permanent telephone number with answering services, and in some cases mail handling, while reducing the overhead costs of a traditional office.

As this is not a physical space rental, this amenity is particularly attractive to firms without a dedicated or permanent office space that would benefit from having fixed contact information for calls and mailings. This can provide stability for client correspondences regardless of where the practitioners are. For firms just starting out as well as those exploring multiple temporary or satellite locations, there may be considerable benefits to having a fixed office address and virtual phone line system.

When using an office address located in a state where an architect is not licensed, practitioners should check with the state's Architectural Licensing Board for relevant requirements or regulations.

Coworking Spaces: A work space shared with other professionals, within or outside the design disciplines, is a popular office concept. Unlike executive suites, these workplaces are set up to foster interaction between users. Sole practitioners seeking potential synergies and collaboration with other like-minded industry colleagues, or simply seeking to simulate the congeniality of the office environment, may benefit the most from this space arrangement. Rental costs are typically on a per-use to monthly basis, and can be cost effective with some limitations on the type of work done there. Similar to the rental offices/executive suites, most coworking spaces are generally "plug-and-play," and any equipment storage (e.g., laptops) is typically offered to monthly subscribers. As such, these types of workspaces can be less convenient on a per-use basis.

In many cities, design-focused coworking facilities have been established, such as the Design Annex located in Somerville, Massachusetts. The Design Annex offer amenities that cater to a design office culture, specifically, architecture, graphic design, and web design. In the Design Annex, a dedicated model-making facility encourages a robust range of creative design work.

Some coworking spaces participate in global reciprocity programs that allow their members to use other spaces in the United States and abroad. Under the Co-working Visa Program, the Design Annex allows active members of one space to use other coworking spaces around the world for free for a set number of days.

Shared Office: Subletting office space from an established firm or sharing permanent office space with a number of other sole practitioners is the most conventional of the flexible office arrangements. For the leaseholder, there are some obvious benefits such as sharing overhead (e.g., rent/mortgage, utilities, Internet service, printers, paper, and ink, etc.) as well as having tenants who offer unique skill sets and professional services. More important, if collaboration is encouraged, new tenants may provide access to new markets and clients.

For start-up renters looking for a space requiring limited customization, a shared office space could offer benefits such as reduced start-up time and cost efficiencies. While these arrangements are often short-term, since firms outgrow their shared office space arrangement, some firms may find natural synergies and ultimately consider long-term lease commitments to capitalize on both the cost-sharing benefits and the partnering opportunities.

Infrastructure

Never has the basic operating toolkit for the start-up had such relatively low barriers to entry. Full suites of Internet-based applications can be easily hosted with basic functionality at no cost, and open-source (nonproprietary) applications from sites like Oracle's OpenDocs.org have lowered the historical software acquisition investment costs for new businesses.

Telecommunications tools, such as Skype® Internet phone service and web-meeting services such as GoTo Meeting™, provide relatively low-fee services while considerably improving the lines of global teleconferencing for firms of all scales. Cloud-based data sharing tools like DropBox® allow multiple users to access electronic files from a remote, independently hosted server that is hosted for a monthly fee, thereby alleviating the business owner of the typically higher hard and soft costs of maintaining and periodically upgrading a conventional in-office server.

For project management, new integrated project tracking and management applications can provide a wide range of functionality that could put off the need for dedicated accounting staff as a firm grows. Current design-friendly software such as ArchiOffice™ provides customized project controls for timecards, project scheduling, and project tracking. A complementary accounting application can integrate with ArchiOffice™ for invoicing and expense reporting to clients. For many start-ups, more affordable and less industry-specific small business accounting software, such as Intuit's QuickBooks™, may be adequate.

Financial Resources

Start-up financing is increasingly difficult to obtain as architecture firms and their owners are often required to meet stringent loan eligibility criteria. Without considerable personal savings or personal loans, start-ups need to be wise with their resource allocation and thoughtfully prioritize office start-up investments. While firm IT infrastructure needs can be obtained at a minimal cost, there are still significant financial considerations to address at the outset of setting up a professional services firm, including but not limited to office fixtures and furnishings, licensing and insurance, marketing and business development, salaries (for the founder and/or staff), and supplies.

Traditional sources of small business loans and start-up capital made available through agencies such as the Small Business Administration (SBA) are increasingly limited and not always accessible for many founders of start-up firms. It is recommended that firms contact their local banking institutions that provide SBA loans to determine their eligibility to participate. Typically, there are two types of SBA loans: the basic 7(a) Loan Program, which is the most used type of loan the SBA offers and is available in amounts up to $2 million; and the MicroLoan Program, which specializes in loans for small business up to $35,000. According to the SBA website, their 7(a) Loan Program may be the most inclusive of all their resources, as it provides "financial help for businesses with special requirements. For example, funds are available for loans to businesses that handle exports to foreign countries, businesses that operate in rural areas, and for other very specific purposes."

In the case of new firms without established credit history, it can be difficult to qualify for loans and lines of credit, and, as such, other approaches to gathering start-up financing may need to be considered, including but not limited to these:

1. Secure personal funding and loans through:
   a. Credit cards. This is often the least desirable option, as interest rates are typically quite high and overburdening a balance can adversely affect the guarantor's credit history.
   b. Personal loans. Family, friends, and personal contacts.
   c. Vendors and supplier loans and lines of credit.
2. Securing investors through:
   a. Funding "spin-offs." New independent firms can be financed as offshoots of an existing practice or as a result of a strategic alliance with a larger firm. Sometimes large organizations are interested in funding smaller, start-up firms or even academic research units that can help advance a specific technology or practice initiative that may provide a strategic advantage or unique access to new or emerging markets.
   b. Partnership arrangements. Firm founders may consider negotiating a long-term agreement with future shareholders to consider "sweat equity" in the firm's nascent period. In the start-up phase, potential shareholders could work in exchange for future shares of the practice. It is important for potential shareholders to review all state licensure requirements for firm shareholders and to get any agreements in writing.
3. Secure grant funding through:
   a. Microfinancing or "crowd funding." Grassroots fund-raising, usually via online platforms, from many funders (often in limited and small amount) to support a particular cause, project, or organization.
   b. Not-for-profit organization status. Some firms establish themselves as 501(c)(3) entities, with a focus on public interest and pro bono design work. Organizations of this type tend to be community design centers and these entities typically do not engage in for-profit work.

► See Chapter 4, Public Interest Design, for more on community design centers and socially responsible design.

Marketing

Social media tools provide a means of online communication between the user and a larger audience. With the relative abundance of powerful and popular Internet-based social media applications—specifically Facebook©, Twitter©, Pinterest© and Linked In©—marketing for a start-up is a relatively accessible and cost-effective endeavor. Start-ups can use these social media applications to create a platform for broadcasting updates and virtually any message at the click of a button. Firms considering the relative value of social media should consider at least the following: (1) who is the potential audience, (2) the motivations and objectives behind such a marketing approach and the value of the content being broadcasted through these potentially "viral" media tools, and (3) the commitment and level of effort to maintain these applications. Lastly, it is not uncommon for firms to find themselves networking among themselves, when it may be more effective to fine-tune a social networking strategy that reaches out to a larger public audience, particularly potential clients.

The use of the Internet to market start-ups also includes participation in competitions and other online gallery opportunities. Exposure on multiple Internet sites can increase a firm's visibility on search engines and, ultimately, accelerate a firm's name recognition with relatively little financial investment, if any.

Start-ups with limited marketing budgets may find that participation in civic engagement commitments, AIA events, and public interest design projects may yield meaningful results. This is especially true when volunteer engagement is aligned with a founder's genuine interests. For example, practitioners that are committed to public realm design may be inclined to serve on planning boards and design advisory committees in their local municipalities. These types of engagements can bolster the reputation of a firm and demonstrate the founder's competence and capability to colleagues and potential future clients.

► Chapter 6, Marketing and Business Development, covers effective marketing strategies and methods for architecture firms.

► See Strategic Planning for the Design Firm (5.3), Developing Marketing Strategy (6.2), and Networking and Business Development (6.4) for more on business planning.

Writing a Business Plan

For design firms, business planning can be divided into four primary aspects: purpose, finance, operations, and marketing. Once purpose is understood, plans can be developed within each of the other three functional arenas. Please note that the business plans discussed in this section are not the kind needed for securing a bank loan. Those may have a particular form that is provided by the lending institution. Instead, these business plans are meant as documentation of intentions and the proactive measures designed to accomplish goals. Business planning brings intentionality to the management of a small firm, which is a distinctly different approach than being moved primarily by external circumstances. Much of the material in this section was sourced from *The Architect's Guide to Small Firm Practice* (Wiley, 2010) by Rena M. Klein, FAIA.

Although the components of the business plan appear as distinct parts, in reality they are interconnected. Each aspect is an element of a whole firm system and, as such, they impact each other continuously. Marketing efforts must link closely with aspirations, which often determine operational choices; operational effectiveness will impact financial growth, and market position may determine what is possible financially.

In Figure 5.5, each aspect of the business plan is shown to have each of the other aspects within. For example, consider Marketing—each quarter of the Marketing quadrant is related to one of the four major quadrants. The financial aspect of Marketing is a marketing budget; the purpose aspect of Marketing is alignment of the marketing message with vision; the operations aspect of Marketing has to do with improving job acquisition processes such as the proposal writing; and, finally, the marketing aspect of the Marketing quadrant is outreach to new prospects and forming new relationships.

ELEMENTS OF A BUSINESS PLAN

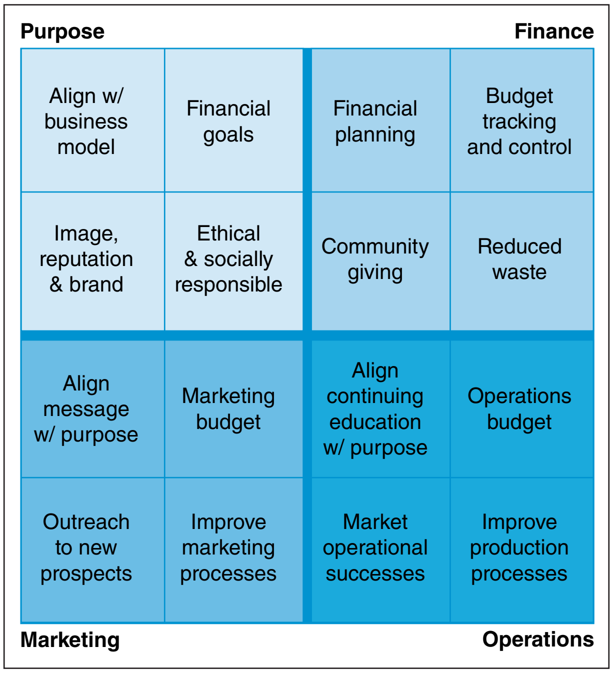
A. PURPOSE/BUSINESS MODEL
- Philosophy/core values
- Project types? Client types?
- Career contentment and disposition of owners
- Core competence and core weaknesses
- Market opportunities and threats to market position
- Firm size
- Firm future, including transition plan

B. FINANCIAL PLAN
- Financial expectations of owners
- Revenue goals over time
- Operating budget expectations over time
- Profit plan over time
- Scenario plans for firm revenue and staffing over time

C. OPERATIONS PLAN
- Organization structure
- Technology upgrades and integration
- Project delivery model
- Knowledge acquisition and development
- Promotion, recruitment, and compensation

D. MARKETING PLAN
- External market conditions and competition
- Target market
- Key differentiators
- Image and brand
- Relationship-building and networking plan

Excerpted from *Architect's Guide to Small Firm Management by Rena M. Klein* (Wiley, 2010).



The Architect's Guide to Small Firm Management (Wiley, 2010)

FIGURE 5.5 Each Box in This Diagram Represents a Different Yet Interconnected Aspect of Business Planning.

Firm owners can customize this diagram to suit their own business plan and update the diagram as some goals are completed and some are altered by external circumstance. This fractal diagram can be used as a tool to plan and track firm development activities over time.

For start-ups, marketing is likely to be the most important aspect of the business plan initially, but marketing is not possible without knowing purpose. It is not possible to effectively deliver projects acquired without holistic knowledgeable operations. Overall profitability will be elusive without financial management. All the parts of business planning are interconnected.

ENTREPRENEURIAL PRACTICE

Self-Awareness

As a founder, the key to successful strategic and opportunistic choices is self-knowledge in two key areas: level of comfort with collaboration and tolerance for risk. Founders with self-awareness and integrity about these two issues can successfully shape a firm based on their own values and proclivities, using their understanding of self as a primary firm design criteria.

▶ Qualifications, Proposals, and Interviews (6.5) discusses approaches to RFPs and preparation for short-list interviews.

In the race to win work, keep staff billable, and build up a firm's portfolio, founders should assess the advantages and disadvantages of pursuing or accepting certain projects or tasks. This underscores the importance of being strategic about identifying assignments that reinforce the firm mission or help build the firm's brand and identity. Eugene Kohn, Founder and Chairman of KPF Associates, frequently recounts advice given to him by a friend during the recessionary times of the mid-1970s: "Your success will be measured by the work you turn down."

Level of Comfort with Collaboration

How much trust and how much control feels comfortable to a firm's founder is a function of personality and inclinations. The comfort zone will vary for different types of decisions; for example, a founder may feel comfortable collaborating on project management, but not allow collaboration on design decisions.

In control-centered practices, architects keep a tight rein on information, knowledge, and drawings (or models), sharing only the minimum necessary for subconsultants to perform their work. In collaboration-centered practices, information, knowledge, and drawings (or models) are readily shared and the entire team participates, to varying degrees, in the co-creation of the design.

Founders with a high degree of comfort with collaboration have the opportunity to participate on collaborative teams, either as a leader or an expert contributor. In addition, a highly developed interest in collaboration may lead to joint ventures with other firms, or participation in emerging project delivery methods such as Integrated Project Delivery (IPD). Founders who enjoy collaboration are likely to have success in growing their firms through cultivating an empowered and engaged staff.

▶ See Small-Firm Collaboration (5.7) for more on collaborating with other design firms.

Founders who prefer a more controlling style may choose to be solo practitioners or leaders of very small firms where they can track everything and be completely in charge. Firms such as these can also be successful, especially when the founder has specialized knowledge, unique talent, or access to high margin markets. Being a solo practitioner or leading a very small firm can also be the choice of those who enjoy external collaboration but prefer to do much of the internal project work themselves.

Clearly, there is a spectrum of practitioners within the boundaries of both extremes, but firm founders who have self-awareness about their place on this continuum are more likely to acquire and execute their projects with integrity—to say what they mean and to mean what they say. In addition, self-awareness about level of comfort with collaboration will help to unapologetically develop a firm that truly takes advantage of the founders' strengths.

Risk Tolerance

Starting a firm is risky. Architectural firms operate in an environment of unpredictability where success or failure is not solely predicated on the talent and effort of the founder(s). There are ways to mitigate unpredictable risks, such as purchasing professional liability insurance and planning contingencies on projects. Practice risks can be mitigated through the careful choice of clients and projects and by following best practices in terms of agreements and documentation.

Other risks must be accepted as inevitable, with corresponding actions taken to prepare for these risks. For example, there is likelihood that the founder's personal income may be very low in the first few years of firm operations. Founders should be prepared to partially fund their own salaries for at least 12 months and for various periods of time throughout the life of the firm.

In addition, founders must be able to provide health insurance coverage for themselves and their employees. The Affordable Care Act is expected to increase health care insurance options for individuals and as such may be beneficial to those starting a firm. As an illustration of the effects of health insurance costs on starting a business, a study by RAND corporation (*Is Employer-Based Health Insurance a Barrier to Entrepreneurship*? [RAND, 2012] by Robert W. Fairlie, Kanika Kapur, and Susan M. Gates) found that an increase in entrepreneurship at age 65 is attributable to eligibility for Medicare.

Because of the need to self-fund benefits that are usually supplied by employers, minimizing other kinds of overhead will help mitigate the financial risks incurred. If a person is uncomfortable with the notion of not receiving a predictable paycheck at regular intervals, and with providing their own insurance and retirement savings, being self-employed will be very difficult.

Architects who feel uncomfortable with the unknown— "Will the phone ever ring again?"—may find self-employment to be overly stressful. Many deal with the unpredictable nature of practice by simultaneously engaging in other endeavors that supply more reliable incomes in more predictable time frames, such as teaching, or becoming a construction management adviser or building inspector.

▶ Risk Management Strategies (16.1) and the accompanying backgrounder, Risks in Design, discuss strategies for calculated risk taking.

Despite the risk, many find the rewards of autonomy, the opportunity to design, and the ability to self-determine one's work life to be well worth it.

Why Firms Fail

Data collected by the Small Business Administration between 1992 and 2002 indicates that less than a third of new businesses started in 1992 survived their first decade of existence. Martin Zwilling, a venture capitalist and contributor to *Entrepreneur* magazine, has developed a list of 10 reasons why first-time entrepreneurs fail ("10 Top Reasons Why First-Time Entrepreneurs Fail," *Entrepreneur*, September 2012):

- Lack of or inability to execute a business plan
- Slim or no-revenue pro forma (projections)
- Limited business opportunities
- Inability or ineffectiveness in execution
- Too much competition
- Limited or lack of valuable intellectual property
- Inexperienced team/staff
- Underestimating resource requirements
- Lack of marketing
- Lack of resilience—giving in too early

The list may be helpful to consider as an internal checklist for architects about to start their own firm. Most of the items can be addressed through careful planning, realistic assessment of strengths and opportunities, and thoughtful self-awareness. Writing a business plan that includes an operations and financial plan is one way to bring discipline and careful preparation to the endeavor. Architects, who are trained as planners and designers, can bring their abilities to the creation of their firms. No architect would consider designing a building without a purpose, site, structure, or budget. Starting a firm without articulating the mission, markets, project execution, or potential revenue stream is equally foolish. Considering these issues early in the firm planning process and throughout its start-up phase is the key to sustainable success.

CONCLUSION

Like the design of a custom home, starting a design firm presents the opportunity to create a business entity and firm culture that truly reflects the strengths, tendencies, and proclivities of its founder and by extension, its staff. The skills architects apply to their work as design professionals should be used to plan the start and ongoing evolution of their firms. Designing a firm entails considering financial goals, purpose, size, optimal structure, business development strategy, and the best possible integration of the interest, skills, and aspirations of its founders. While there may be no formulas, secret techniques, or consultants that can deliver a custom-designed practice, one's awareness of self, knowledge of the basics of running a business, and understanding of the drivers of change are important first steps in the journey. Recognizing trends and patterns at the global, organizational, and interpersonal levels offers founders an insight into the potential for firm development and a growth strategy.

Planning a new design practice, like planning a new space, also entails the consideration of sustainability, something that can stand the test of time. In the midst of change and unpredictability, it is important that founders prioritize personal values and preferences that will lead to professional satisfaction, which in turn is closely connected to potential for profitability. Therefore, a key aspect of founder self-awareness is an understanding of how success and satisfaction in their work is defined.

When thinking about starting a firm, consider the following:

- How important is financial success?
- How much money is enough?

- How will direct and indirect value of firm output be measured?
- How important are name recognition and design awards?
- Does success include "doing good" for the local community?
- Does success include having a healthy and contented office culture?
- How important is fun and creativity in the firm?

Firm founders, in shaping their practice, should consider these personal factors along with external realities such as demographics, global practice, overall economic health, target market project opportunity, and the firm's role in civic engagement. Appreciation of these trends in unpredictable times is essential for firm founders to navigate through uncharted territory in the New Normal.

In some ways it has never been easier, or perhaps more necessary, to start one's own firm. The advent of "telecompanies" ("When Job-Creation Engine Stops at Just One," *New York Times*, Oct. 04, 2012) allows solo practitioners to expand their capacity with a flexible virtual workforce. Web- or cloud-based IT infrastructure and new advances in business administrative support expand capabilities at a low cost. Furthermore, social media is providing a new and unprecedented ability to reach out to and engage potential clients and collaborators. Entrepreneurial architects who are self-aware, risk tolerant, and have a vision of how their offerings can fit into the marketplace have a unique opportunity to reap the benefits of designing their own work-life that is both personally satisfying and financially rewarding.

For More Information

Freelancer's Union: http://www.freelancersunion.org/index.html.

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Architect's Guide to Small Firm Management: Making Chaos Work for Your Small Firm (Wiley, 2010) by Rena M. Klein, FAIA.

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Managing the Professional Service Firm (Simon & Schuster, 1997) by David Maister.

BACKGROUNDER

FIRM LEGAL STRUCTURES

Jay Wickersham, FAIA

This backgrounder describes the most commonly used legal structures for architectural firms, and key factors to consider in choosing or modifying a firm's structure (Table 5.1).

Jay Wickersham is a founding partner of the Cambridge, Massachusetts, law firm Noble & Wickersham LLP, and a lecturer at the Harvard Graduate School of Design, where he teaches courses in the history, law, and ethics of practice.

Every architect who establishes an independent practice should consider creating a separate legal entity to serve as the framework for practice. What we commonly call a "firm" can take on many different legal forms, from sole proprietorship to partnership, limited liability partnership (LLP), corporation, or limited liability company (LLC). Even a sole practitioner can create a corporation or LLC as the vehicle for practice. What follows is an overview of the most commonly used legal structures for firms and factors to consider in choosing and shaping an entity.

The laws governing legal entities, and their availability for architectural practice, vary from state to state. The choice of entity can also have important financial and tax implications. A practitioner should always obtain legal and accounting advice to guide the process of creating or modifying an entity.

CHOICES OF LEGAL STRUCTURES FOR PRACTICE

Sole Proprietorship

An individual architect who has not taken any formal action will, by default, be considered to be practicing as a sole proprietor. A sole proprietorship may be given its own name, but in legal terms it has no independent identity. Because the owner does not enjoy any liability protection, all of his or her

(continued)

personal assets are at risk if there is a claim. From a tax perspective, a sole proprietorship is a disregarded entity; it does not file a return or pay tax, but instead all of its income and losses are reported on the owner's tax return and are taxed only there. A sole proprietorship dissolves upon the owner's death.

General Partnership

Two or more architects practicing together may be deemed to be practicing as a general partnership—regardless of whether they have taken any formal legal steps. Every state has passed a law that is a version of the Uniform Partnership Act, defining baseline assumptions about ownership and control of a partnership. However, it is extremely important for architects who intend to create a partnership to draft and sign a written partnership agreement that sets out the detailed terms of their association. In a general partnership, all of the partners actively participate in management. (Limited partnerships are generally used as investment vehicles and not for professional services; limited partners have an ownership share, but only limited management roles.) Each general partner is potentially liable for the actions of the other partners; a partner's liability may extend beyond one's partnership interest, to reach the partner's personal assets as well. A general partnership does not pay federal taxes; each partner's share of income and losses is passed through and reported on the individual's tax return.

Limited Liability Partnership (LLP)/Professional LLP

Most states have passed laws that permit the creation of a partnership variant known as an LLP. In general, LLPs offer liability protections that are not available to general partnerships; the personal assets of partners, other than their ownership interest in the LLP, are protected against liability for business claims against the partnership, except in the case of fraud or other extreme wrongdoing. But partners typically remain liable for their own professional negligence, even when acting on behalf of the LLP. In addition to a written partnership agreement, the governing documents for an LLP will include an LLP certificate filed with the Secretary of State's office.

In many states, architects can only practice through a *professional LLP,* which may be subject to further restrictions on ownership, liability protection, and insurance (see the accompanying chart for further details).

Business Corporation

The most common form of legal entity for an architectural firm is the business corporation. All corporations have three levels of participants:

- Stockholders are the owners of the corporation, with their ownership evidenced by shares of stock.
- Directors are elected by the stockholders, and have a fiduciary duty to act in their best interests. They are responsible for broad policy decisions.
- Officers are elected by the directors; they carry out the day-to-day management of the corporation.

Stockholders' personal assets, other than their ownership interest in the firm, are protected against liability for business claims against the corporation, except in the case of fraud or other extreme wrongdoing. But stockholders typically remain liable for their own professional negligence, even when acting on behalf of the corporation. The governing documents for a corporation will include articles of organization filed with the Secretary of State's office, and written corporate bylaws.

Within the category of business corporation, there are two broad subcategories.

Publicly Traded/Subchapter C Corporation

A handful of architectural firms are so large that their stock is publicly traded on a stock exchange. In publicly traded corporations, the controlling ownership interest is typically held by outside stockholders who are not actively involved in management of the firm. There is limited overlap among stockholders, directors, and officers. Publicly traded corporations pay corporate taxes on their income; their after-tax profits can then be passed through to the stockholders in the form of dividends, to be taxed a second time on the stockholder's individual tax return. (This system of double taxation is defined in subchapter C of the Internal Revenue Code—hence the name of this type of corporation.)

Closely Held/Subchapter S Corporation

Most architectural firms that choose the corporate form of entity are what is known as "closely held corporations"—they are owned by stockholders who are actively engaged in the practice, and some or all of the stockholders also act as corporate directors and officers. To ensure that ownership of a closely held corporation does not pass to outsiders, the stockholders will typically execute a stockholders agreement that contains restrictions on the transfer of stock. Under subchapter S of the Internal Revenue Code, corporations with no more than 100 stockholders, all of them being U.S. citizens or resident aliens, may elect not to pay federal taxes; instead, profits in the form of dividends, and limited amounts of corporate losses, are passed through and reported on the individual stockholder's tax return.

Professional Corporation

In many states, architects may elect a special form of entity known as a professional corporation. Because professional corporations are subject to further restrictions on ownership, liability protection, and insurance (see the chart for further details), they are rarely selected in states where architects may also practice as a business corporation. In a small number of states, the professional corporation is the only corporate entity permitted for an architectural firm.

Limited Liability Company (LLC)

The LLC is a form of legal entity that has come into widespread use in the past 20 years, following the passage of enabling laws in all 50 states. An LLC has two levels of participants:

- Members are the owners of the LLC.
- Managers are elected by the members, and have a fiduciary duty to act in their best interests. They are typically responsible for both policy decisions and the day-to-day management of the LLC.

Members' personal assets, other than their ownership interest in the firm, are protected against liability for business claims against the LLC, except in the case of fraud or other extreme wrongdoing. But members typically remain liable for their own professional negligence, even when acting on behalf of the corporation.

As with corporations, most architectural firms that choose the LLC form of entity are "closely held"; they are owned by members who are actively engaged in the practice, and who may also act as managers. Under the Internal Revenue Code, an LLC may elect to be treated for tax purposes as a sole proprietorship (if it has only one member), as a partnership, or as a corporation. If it elects sole proprietorship or partnership treatment, it will not pay federal taxes; instead, a member's share of income and losses are passed through and reported on the individual's tax return.

In many states, architects can only practice through a professional LLC, which may be subject to further restrictions on ownership, liability protection, and insurance (see the chart for further details).

ADDITIONAL CONSIDERATIONS

Government filing requirements—Secretary of State's offices. In order for an LLP, corporation, or LLC to come into legal existence, it must make an initial filing with the office of the Secretary of State (or comparable agency) in the state in which it has been formed, and pay the required filing fee. Entities must also file annual reports, or they run the risk of being dissolved. Sole proprietorships and general partnerships do not need to make these filings.

Firms are increasingly being required to make comparable filings as out-of-state ("foreign") entities with the Secretary of State's office in all states in which they practice architecture. These filing requirements are distinct from the firm practice requirements defined by the state architectural registration boards (see chart).

Government filing requirements—State architectural registration boards. Although architects are universally aware that they must become individually registered by each state in which they practice, many are not aware that in most states, in-state and out-of-state ("foreign") firms are also subject to legal requirements set forth by the state's architectural registration board. In most states, a firm must make a filing with the registration board and obtain a certificate of authorization (COA), or comparable document, before it can practice. Even those states that do not issue a COA typically impose requirements upon firm practice. Registration boards may require the registration of owners and/or managers, in the home state and/or the state of practice; they may also limit or ban certain types of legal entity, or even set rules for names under which a firm may practice.

Actions on behalf of the firm. To maintain liability protections, all formal actions of a firm (signing contracts and other legal documents, issuing letters and drawings, etc.) should be taken in its name, so that parties with whom it deals are put on notice that they are dealing with an independent legal entity and not an individual.

Informal management practices versus legal responsibilities. It is common for architectural firms to give key employees titles such as "principal" or "associate." Such titles may accompany well-defined responsibilities for project and/or firm management. Firm owners should carefully review such informal management titles and practices, to see that they are appropriately coordinated with the responsibilities set forth by law for management of the chosen form of legal structure.

TABLE 5.1 Summary of Legal Structures

	Ownership	Management	Liability Protection for Personal Assets	Tax Treatment	Secretary of State Filings	State Registration Board Filings/ Requirements
Sole Proprietorship	Individual practitioner	Individual practitioner	None	Does not file federal return or pay taxes—income/losses passed through to individual owner	None	Typically not required
General Partnership	Partners	Partners	None	Files federal return, but does not pay taxes—income/losses passed through to individual owners	None	Many states require certificate of authority (COA): varying requirements for licensing of partners

(continued)

TABLE 5.1 ***(continued)***

	Ownership	Management	Liability Protection for Personal Assets	Tax Treatment	Secretary of State Filings	State Registration Board Filings/ Requirements
Limited Liability Partnership (LLP)	Partners	Partners	Partners may be personally liable for their own professional negligence, but are typically protected against other claims (except for fraud and other extreme wrongdoing)	Same as above	LLP certificate, for formation state and foreign states	Same as above; some states permit only professional LLPs (see below)
Professional Limited Liability Partnership (LLP)	Partners—all must typically be licensed	Partners—all must typically be licensed	Same as above	Same as above	Same as above	Many states require COA: all partners must typically be licensed; LLP may need to carry minimum level of professional liability insurance (PLI)
Subchapter C Corporation	Stockholders	Directors, officers	Stockholders may be personally liable for their own professional negligence, but are typically protected against other claims (except for fraud and other extreme wrongdoing)	Files federal return, pays taxes; profits passed through as dividends to stockholders, who pay double taxation on individual returns	Articles of organization, for formation state and foreign states	Many states require COA: varying requirements for licensing of stockholders, directors, and officers; a few states permit only professional corporations (see below)
Subchapter S Corporation	Stockholders (no more than 100, who must be U.S. citizens or resident aliens)	Directors, officers	Same as above	Files federal return, but does not pay taxes—income (and some losses) passed through to individual stockholders	Same as above	Same as above
Professional Corporation	Stockholders—all must typically be licensed	Directors, officers—all must typically be licensed	Same as above	Same as above	Same as above	Many states require COA: all stockholders, directors, and officers must typically be licensed; corporation may need to carry minimum level of PLI
Limited Liability Corporation (LLC)	Members	Managers	Members may be personally liable for their own professional negligence, but are typically protected against other claims (except for fraud and other extreme wrongdoing)	If LLC selects, partnership treatment, files federal return but does not pay taxes—income/losses passed through to individual owners	LLC certificate, for formation state and foreign states	Many states require COA: varying requirements for licensing of members and managers; a few states permit only professional LLCs (see below)
Professional Limited Liability Corporation (LLC)	Members—all must typically be licensed	Managers—all must typically be licensed	Same as above	Same as above	Same as above	Many states require COA: all members and managers must typically be licensed; LLC may need to carry minimum level of PLI

5.3 Strategic Planning for the Design Firm

Raymond Kogan, AIA, and Cara Bobchek

If firm leaders want to achieve something they've never had before, they must do something they've never done before. Through strategic planning, firm leaders can envision the future of their firm, and then implement strategies and action plans that will help the firm achieve positive results.

WHY BUSINESSES USE STRATEGIC PLANNING

Strategic planning involves thinking about the future. Companies large and small use strategic planning to envision their objectives for the future and lay out the steps they will take to achieve them. The strategic planning process begins with envisioning a desired future state of the firm, a destination toward which the plan itself will plot a course for the firm to follow. If this vision for the future is considered the destination of the firm, then the strategic plan provides the road map to reach it.

The purpose of strategic planning is to create positive changes and outcomes for a firm that aligns with its values and professional aspirations. In its strategic plan, a firm can articulate its fundamental mission, describe its long-term vision, and address its issues, initiatives, and goals in management, operations, and other crucial firm functions. The strategic plan is different from a marketing plan or a business plan in that it typically encompasses a broader scope of topics over a longer period of time, combining long-, mid-, and short-term strategies and action plans.

Architecture firms—from sole practitioners to large multinational firms—can prepare for, understand, and respond to the dynamics of the ever-changing economic, social, and political environment in which they practice: They can plan for change, which is inevitable, and design their own futures through strategic planning. Business studies confirm that companies and organizations in any industry that employ strategic planning tend to be more successful than firms that do not.

A good hockey player plays where the puck is. A great hockey player plays where the puck is going to be.

Wayne Gretzky, National Hockey League record-holder for Most Career Points Scored

A STRATEGIC PLAN FOR FRANKLIN & ASSOCIATES

Throughout this article, the development of a strategic plan for a fictional firm, Franklin & Associates, will be used to illustrate the process described herein. Franklin & Associates is an architecture and interiors firm with two offices in the Pacific Northwest. The firm engages mainly in K–12 education projects, with occasional work in higher education and civic buildings. The firm was founded 25 years ago by Leigh Franklin, who remains the majority owner; he plans to retire in the next 5 to 10 years. The firm is experiencing changing dynamics in its key market sector and has had difficulty in sustaining its once steady growth, having peaked at a staff size of 18 people and recently downsized to 12 people.

Raymond Kogan is a management consultant and architect with more than 35 years of experience. He founded Kogan & Company in 2004 to advise design firms nationwide in strategic planning.

A senior consultant with Kogan & Company, Cara Bobchek has 30 years of experience working with design firms in strategic planning, marketing and communications, and market research.

"Would you tell me, please, which way I ought to go from here?"

"That depends a good deal on where you want to get to," said the cat.

—Lewis Carroll, Alice Through the Looking Glass

ELEMENTS OF THE STRATEGIC PLAN

Firms that employ strategic planning use the strategic plan as a management tool, making all of their key decisions within the context of moving toward a carefully thought-through vision that they wish to reach. The elements of a strategic plan, each of which is discussed in more detail in this section, are as follows:

- Mission
- Vision
- Issues and Initiatives
- Goals
- Strategies
- Action Plans

DESIGNING A FIRM

In strategic planning, a firm has the opportunity to design its future. The process is comparable to the steps that an architect takes to design a new house (or most any project):

PROGRAMMING

At the outset of an engagement, the architect meets with the client to determine the functional and aesthetic needs and desires for the project. This prelude to design relates to the first step in strategic planning: an objective analysis of a firm to identify the key *issues and initiatives* that affect its ability to succeed.

SCHEMATIC DESIGN

Next, the architect exercises their creativity and translates the building program into images in the form of renderings, conceptual plans, and elevations; the house begins to take shape. This first design step is comparable to the big-picture and creative process of developing a firm's long-term *vision*. At this phase in strategic planning, a firm may also develop a *mission statement* as an expression of its primary purpose for being in practice.

DESIGN DEVELOPMENT

To make the conceptual design more detailed and understandable, the architect refines the plans and elevations, describing basic building systems and materials, and more actively involves other specialists, such as engineers, in the process. This midterm design phase parallels developing specific *strategies* to undertake, as well as setting measurable, quantifiable *goals* to achieve in order to move toward your firm's vision.

CONSTRUCTION DOCUMENTS

The house cannot be built—at least not easily or accurately—from design development documents, so the architect next produces detailed construction documents. These give the contractor a set of instructions to convert the two-dimensional concepts into three-dimensional reality. This step is parallel to developing specific *action plans* that make the strategies tangible and actionable. These nuts-and-bolts action plans will be just as detailed as a set of construction documents, with each task assigned to a responsible champion with an agreed-upon deadline.

CONSTRUCTION CONTRACT ADMINISTRATION

The house isn't complete when the construction documents are prepared. The architect still needs to monitor the construction so that the project achieves its original objectives. The architect holds meetings with the owner, contractor, and subcontractors, and assesses progress to make sure that everything is being done as prescribed, or sees that, if a change is necessary, it is *implemented*. In strategic planning, a firm will also continue to manage progress toward its goals through regular meetings of the strategic planning team, assessing progress toward completing action items, adjusting the course when necessary, and also *communicating* with all employees that the firm is making deliberate forward motion toward the vision.

The parallel elements of project design and strategic planning line up neatly (see Table 5.2).

TABLE 5.2 How the Design of a Project Compares with the Strategic Planning Process

Designing a Building	Strategic Planning
Programming Determining the client's needs	**Issues and Initiatives** What works, what doesn't work, and what opportunities lie ahead?
Schematic Design Creative, big-picture concepts	**Mission** Purpose of the firm **Vision (long-term)** The firm's aspirations for the future
Design Development More defined building systems	**Goals (midterm)** Quantifiable, measurable targets **Strategies (midterm)** Good ideas to push the firm in the right direction
Construction Documents Detailed drawings and specifications	**Action Plans (short-term)** Who is going to do what, and by when?
Construction Contract Administration Assessing and maintaining progress	**Implementation and Communication** Sharing the plan and keeping it on track

Mission

By capturing the essence of a firm, a mission statement provides employees, as well as the marketplace, with a common understanding of the firm's purpose. Many firms find that a mission statement helps to rally everyone in the firm under one "flag." Any size firm may adopt a mission statement; for a smaller firm or sole practitioner, a mission statement can be an effective way to express the identity of the practice and the practitioners, lending a greater sense of permanence.

If a firm chooses to adopt a mission statement, it should be:

- Meaningful and unique to the firm.
- Inspiring and positive.
- Timeless—which means it is worth taking the time to wordsmith.
- Memorable—and therefore brief.
- Sincere—avoiding management clichés and buzz words.
- Reflective of the core values, both personal and professional, of the firm founders/leaders and the firm as a whole. Many firms, large and small, express core values as the driving motivator for their choice of vision, clients, projects, and employees. Core values may relate to topics such as sustainability, diversity of the staff, community involvement, and approach to conducting business, among others.

Because the mission statement represents the identity and purpose of the firm, employees should feel a sense of ownership in it. Therefore, it's important that the leadership of the firm models the intent of the mission statement in their everyday actions.

Vision

While a firm's mission statement is intended to stand the test of time, the vision is time-oriented. The vision describes a specific long-term future that the firm would like to reach, the destination toward which the strategic plan will serve as a road map. The vision should be evocative and inspiring, ambitious yet realistic, multidimensional and descriptive.

As a long-term description of the firm in the future, the vision should be a 5- to 10-year objective. Most firms find that 5 years is a comfortable long-term planning horizon, far enough into the future to be truly visionary as well as to provide enough time to achieve it, yet not so distant as to be too esoteric.

A firm's vision may address many items, including the following:

- Optimum organizational structure
- Services offered
- Client-type markets served
- Geographic presence
- Number of employees
- Revenue and profit goals
- Leadership
- Ownership philosophy and structure
- Culture and working environment
- Project delivery
- Technology
- Any other topics that describe the firm as it is desired to be at a point in the future

FRANKLIN & ASSOCIATES' STRATEGIC PLAN: MISSION AND VISION

MISSION

Through the environments that we design for teaching children, teachers, administrators, and community members, we shape future generations of highly educated adults.

VISION

In five years, Franklin & Associates will:

- Have grown to a staff size of 20, with two offices in the Pacific Northwest
- Derive 20 percent of our revenue from our growing higher education market sector
- Have transitioned ownership from our founder to three to five next-generation leaders
- Be named among the "Best Places to Work" by the major business publication in each city in which we have an office, setting an industry standard for recruiting, retention, and employee development

Smaller firms need a well-articulated vision as much as larger firms do. Sometimes, because of fewer underlying resources a smaller firm may take on virtually any type of work, and may, as a result, after some time lose a sense of direction. Looking ahead to the future of the firm in five or more years can provide a clear direction as well as a focus for a smaller firm leader's decision making, just as it does for a larger firm.

Firm leaders need input into and enthusiastic support for their vision and should share that vision with everyone in the firm. The vision will serve as a touchstone for the firm as its leaders and managers make key strategic decisions. As the foundation of the firm's strategic plan, the vision deserves focused attention and deep thought, as it sets the tone and provides the context for future decision making.

Issues and Initiatives

Issues are obstacles, circumstances, or attitudes—both internal within a firm and external in the world around the firm—that stand in the way of a firm's achieving its vision. *Initiatives* are positive ideas and activities that would propel a firm toward its vision. A firm should base its strategic plan on the key issues that it must address and the key initiatives that it will undertake in order to reach its stated vision.

It takes research, courage, and an open mind to uncover and fully understand a firm's key issues and initiatives. The best approach to identifying the key issues and initiatives for the firm is to begin by interviewing managers, selected staff members, and clients of the firm. Query them regarding the strengths of the firm—the things that should be preserved and built upon to achieve the vision—as well as the challenges or obstacles that are facing the firm. Then look for the patterns and trends in their responses, which should point to the key issues and initiatives. Prioritize the identified issues and initiatives in developing the plan. Sometimes it can prove difficult, or even unfeasible, for a person inside the firm to ask probing questions of other managers or staff members in the firm. Therefore, many firms engage a third-party consultant to conduct this type of investigation in order to elicit truly candid thoughts and process them objectively.

In addition to this valuable input from the firm's managers, selected staff, and the firm's clients, consider supplementing the information gleaned with additional research, especially into external trends and drivers that affect the firm's clients' businesses. The "Preparing for Strategic Planning" section of this article, which follows, contains more ideas for research avenues to explore.

To maximize the value of strategic planning, it is best to capture all of the findings from the various sources of input—internal interviews as well as external market research—in a written report. With this report, the participants in the process will be fully aware of the firm's collective thinking as illustrated in their comments about their vision and the strengths and shortcomings of the firm. And by providing verbatim quotes, there can be no dispute about any subjective interpretation of people's thoughts. This level of candor, as captured in the report, will substantiate identifying the firm's key issues and initiatives, as well as begin to prioritize them for the strategic plan itself.

In the context of the vision, a firm's strategic plan may address issues and initiatives, including the following:

- Achieving and managing growth
- Strategic market focus
- Prospective client profiles
- Design attitudes and direction
- Organizational structure
- Management roles and responsibilities
- Leadership succession planning
- Ownership transition

- Firm governance
- Marketing and business development
- Financial performance
- Firm financial management
- Employee recruiting, development, and retention
- Changes in project management and project delivery
- Applications of technology
- Adherence to firm values
- Scenarios and contingency plans for the future

It is important to rigorously prioritize the number, complexity, and balance of issues and initiatives that the firm will address in its strategic plan. The greatest obstacle to successfully implementing the plan is taking on more strategies and action plans than the firm can manage. Therefore, when developing the firm's strategic plan, recognize the finite capacity of the firm's management in light of their day-to-day duties, and perform a reality check upon drafting the plan. Asking the following questions will be helpful in performing this reality check:

- What can the firm really afford and allocate the resources to take on vs. what can the firm not afford to take on?
- What can the firm not afford *not* to take on? In other words, what is the most important or challenging item to tackle? If an item is not addressed, is there a good reason not to do so?

Issues and Initiatives for Smaller Firms

Because smaller firms and sole practitioners can be especially susceptible to certain factors and influences, such as the temptation to reactively pursue many types of project opportunities in an effort to bolster revenue, their strategic plans might typically address the following topics:

- *Marketing and business development.* Small-firm leaders and sole practitioners balance many responsibilities. They are often so consumed with "doing" the work and meeting client deadlines that proactive marketing and business development take a back seat. Therefore, it is all the more important for a smaller firm's strategic plan to address a focus on target markets and the specific actions that the firm will take in marketing and business development.
- *Financial management and performance.* Very few architects have formal business training, and smaller firms rarely have in-house financial management capabilities. For these reasons, some small firms lack a strong sense of their business performance. Identifying in the plan just a few key financial metrics to monitor can give small firms a "dashboard" view of their performance, so that they can take corrective steps to improve where needed.
- *Employee development.* Smaller firms must maximize the resources that they can devote to employee development and training, so their strategic plans should call for personal mentoring from the founder(s) and leaders as well as judicious use of highly tailored outside instructional programs. In addition to promoting the progressive responsibility and career paths of employees, an additional—and very important—benefit of mentoring can be that the firm leader(s) will identify one or more people within the firm prepared to succeed them.
- *Succession and transition.* Many smaller firms remain profoundly dependent on their founders and some make little or no preparation for future leadership succession or ownership transition. If the firm founder or leader intends to perpetuate the firm beyond him- or herself, this important topic must be addressed in the strategic plan with enough lead time to identify and develop future leaders as well as execute a mutually profitable ownership transition.

► See Chapter 6, Marketing and Business Development, for detailed discussions of marketing, communications, and business development strategies.

► Ownership Transitions (5.6) further addresses succession and transition planning.

FRANKLIN & ASSOCIATES' STRATEGIC PLAN: ISSUES AND INITIATIVES

- The firm's key market sector of K–12 education is shifting toward a preference for design-build procurement instead of a traditional qualifications-based design-bid-build model.
- The firm's ownership is currently too concentrated to effect an internal ownership transition.
- The firm has difficulty attracting and retaining employees.
- The higher education market sector remains largely untapped by the firm.

GOALS

After identifying and prioritizing the key issues and initiatives to be addressed in the strategic plan, the next step is to set shorter-term (a three-year period is generally appropriate), quantifiable targets that the firm will attempt to reach on the path to its five-year vision (see Table 5.3). Goals should be measurable in some way, whether or not they are financially related, so that the firm can aim for them with accuracy, track progress toward achieving them, and be able to mark when they are achieved.

When setting goals for a firm, set the bar high, making the attainment of the goals a stretch, but keeping them within the realm of the possible. While the types of goals that come to mind most frequently are financial—anything with a dollar sign in front of it or a percent symbol after it—some areas in which goals may be applicable are as follows:

- Revenue generation, both net and gross revenue
- Profitability, usually expressed as profit margin as a percentage of revenue
- Number of employees
- Number of offices
- Approximate market share
- Diversification into specific new markets
- Achievement of specific number of LEED-certified buildings or accreditation for professionals within the firm
- Employee turnover
- Marketing hit rates, both proposal to short list and short list to win

Goals are just as meaningful to smaller firms as they are to larger firms. While the number of actual goals may be fewer, setting the bar and marking a path toward the firm's vision is especially important in small firms, considering the unpredictable path that they can take through their business lives.

STRATEGIES

After setting midterm goals, the next step in strategic planning is to commit to general strategies. Strategies are the new directions and attitudes that the firm will pursue in order to reach its vision, the good ideas that the firm will adopt to address its issues, enact its initiatives, and achieve its goals.

TABLE 5.3 Franklin & Associates' Strategic Plan: Goals

Franklin & Associates' Three-Year Goals	Year 1	Year 2	Year 3
Net Revenue	$1.5 million	$1.8 million	$2.0 million
Staff Size	12	14	16
Ownership Distribution	1 owner	2 owners	3 owners
Employee Turnover Rate	15%	12%	10%
Number of LEED-Accredited Professionals	2	4	6
Number of Qualified Resumes Received/Month	2	3	5

The strategic planning team should brainstorm strategies to address an issue, enact an initiative, or achieve a goal. As the team discusses a given issue facing the firm, the participants should ask themselves, "What are we going to do about it?"

It's imperative that in developing strategies the firm is open to accepting and embracing constructive changes. This may mean doing things that the firm hasn't done before, or ceasing to do things that the firm has always done in the past. As strategies are brainstormed, recognize that they represent investments—of time, money, energy, attention, or other resources—in the firm's future, and consider the implications of these investments individually and collectively.

The strategies to which the firm commits will depend on the issues and initiatives to be addressed in the strategic plan. Reflecting the more limited resources available, strategic plans for smaller firms should typically contain fewer—but still high-impact—strategies and action plans. Some examples of issues, initiatives, and topics regarding which a firm's planning team might brainstorm strategies are shown in Table 5.4.

As the planning team develops the good ideas that the firm will include in its strategic plan in order to achieve the vision for the future, it is important to keep the thinking at a high, strategic level. For example, issues surrounding an individual manager or day-to-day firm administrative or housekeeping matters, such as the need to resurface the parking lot, are not strategic issues, while a program to

TABLE 5.4 Examples of Issues, Initiatives, and Strategy Development

If the firm's issue is related to…	The strategies might consider…
Strategic market focus	Market trends and potential Current capabilities Competitors
Organizational structure	Staff size goals Internal project delivery processes and client/market project delivery trends Geographic or multi-office considerations
Management effectiveness	The firm's optimal organizational structure Roles, responsibilities, compensation, and accountability
Leadership succession planning	Organizational structure Training and development Recruiting

develop future leaders for the firm and the need to lease office space in a geographic location new to the firm are strategic (see Table 5.5).

Ending the strategic planning process with the development of strategies would leave the plan incomplete. In addition to the good ideas represented by the strategies, the firm will need to adopt specific action plans that specific people will undertake to make the strategies happen.

ACTION PLANS

Action plans are the specific, short-term (up to one year) tasks that a firm implements in order to convert the good ideas represented by the strategies into results. Action plans consist of three components: A specific, well-defined, and discrete *task,* which often includes a deliverable; a *champion* responsible and accountable for completing the task; and a *date* by which the champion will complete the task (see Table 5.6). The plan will be more effective if the champions participate in creating the plan in the collaborative group setting of the strategic planning workshop, therefore having had a hand in developing the action plan at the outset.

For each strategy included in the plan, the planning team should develop and document at least one commensurate action plan so that the good idea represented by the strategy can be converted into a result for the firm.

TABLE 5.5 Franklin & Associates' Strategic Plan: Strategies

Strategies Addressing Growth, Project Delivery, Ownership Transition, and Recruiting and Retention

1. Expand our practice throughout the region
2. Develop relationships with general contractors
3. Increase proposal hit rate
4. Improve average client quality rating by 10%
5. Establish a larger presence in the higher education market sector
6. Improve profitability
7. Broaden ownership of the firm
8. Become the go-to employer in each city where we have an office; recruit and retain top talent
9. Launch an in-house employee development program

TABLE 5.6 Franklin & Associates' Strategic Plan: Action Plans

Strategies Addressing Growth, Ownership Transition, and Recruiting and Retention
Note that the strategies/action plans are now organized in chronological order of their completion deadlines.

Strategies	Action Plans	Champion	Deadline (mo./yr.)
6. Improve profitability	Engage consultant and provide negotiating training to principals and project managers	Adam	1 month
	Develop and adopt new quality assurance/quality control procedures to avoid rework and write-offs	Jerry	1 month
	Invoice continuously throughout each month to improve cash flow	Julia	2 months
2. Develop relationships with general contractors	Compile contact list of local contractors who have completed design-build work	Dennis	3 months
	Call on selected local contractors to discuss strategic alliances	Leigh	4 months

(continued)

TABLE 5.6 *(continued)*

	Strategies	Action Plans	Champion	Deadline (mo./yr.)
3.	Increase proposal hit rate	Design and implement more rigorous go/no-go criteria	John	4 months
4.	Improve average client quality rating by 10%	Assign Quality Manager position Develop and launch post-project client "report card" survey	Chris Steve	5 months 5 months
1.	Expand our practice throughout the region	Research and identify a potential new office location	Leigh	8 months
5.	Establish a larger presence in the higher education market sector	Make strategic hire of higher education market leader	Leigh	10 months
9.	Launch an in-house employee development program	Develop curriculum for "Franklin & Associates University" with in-house and outside instructors	Caroline	10 months
8.	Become the go-to employer in each city where we have an office; recruit and retain top talent	Convene a focus group of employees to identify recruiting and retention issues	Caroline	11 months
7.	Broaden ownership of the firm	Engage an ownership transition consultant to develop an internal ownership transition plan and schedule	Mike	12 months

PREPARING FOR PLANNING

Before anything else, preparation is the key to success.

—Alexander Graham Bell

As discussed in the previous section, it is necessary to develop a strategic plan within the context of the internal vision, issues, and initiatives of the firm as well as the larger world within which the firm does business, taking into account trends, drivers, and forces that comprise these external dynamics. In order to determine the basis on which to make the decisions that form a firm's strategic plan, the planning team needs to understand what's going on both within the firm and in the wider world. Therefore it is important to gather and analyze relevant information externally, as well as from within the firm.

Conducting Research

Some internal research tools that yield actionable information include the following:

- Employee survey
- Interviews with key managers
- Financial reports showing gross and net revenue patterns, profit margin trends firm-wide and by target market, and other financial metrics including utilization, multiplier, revenue factor, as well as non-financial metrics such as resumes received, employee turnover, proposal hit rates, etc.

Some sources for external research include the following:

- Industry and general business reports regarding trends and drivers that would affect demand in the market sectors of interest, typically those publications that could be found on a client's desk, such as *Modern Healthcare*, *American School & University Magazine* for higher education, *Urban Land* for private sector development, and local/regional publications such as business journals and newspapers.
- Published data to provide peer and competitor benchmarking, widely available from the several private survey and publishing firms that serve the architecture and engineering industry.
- The firm's own survey of marketplace perceptions, including past, current, and prospective clients of the firm, as well as partner firms (peers, strategic partners such as

specialty consultants, prime firms, or subconsultants). A marketplace perception survey is particularly valuable when the insights of the participants are collected and analyzed by an objective third-party source at arm's length from the firm.

Whenever engaging in gathering information through market research, it is important that, in analyzing the data, firm leaders take a step back and perform a "reality check" on the findings and conclusions drawn. In general, firm leaders can trust their own sense of market conditions and dynamics and how they relate to the firm—a topic on which the firm leaders are the ultimate experts.

Analyzing the Findings

After completing any internal and external research in preparation for strategic planning, objectively and dispassionately examine the information that has been collected. Identify the real issues that affect the firm (and its clients) today, as well as into the future. A valuable tool that organizations in all industries employ in order to synthesize the findings from disparate sources into a systematic approach for strategic decision making is an analysis of the firm's strengths and weaknesses, opportunities and threats, known as a SWOT analysis.

The SWOT analysis allows a firm to objectively analyze its various internal and external drivers (see Table 5.7).

The top row contains the internal factors of strengths and weaknesses, those items that occur within the firm and are completely within its capability to influence. The bottom row contains opportunities and threats, items that occur outside the firm that can be researched, anticipated, and prepared for, but over which the firm does not have influence.

The left column contains the positive items of internal strengths and external opportunities, while the right column contains the negative items of internal weaknesses and external threats.

Once the firm has arrayed its strengths, weaknesses, opportunities, and threats on the diagram, it is easier to derive strategies, again by focusing on each one individually and asking "What are we going to do about this?"

Preparing the Strategic Planning Team

When the research and analysis are complete, provide the results of all of the preplanning materials—the previously mentioned report containing findings from the internal interviews with managers and key staff of the firm; results of an employee survey; results of a marketplace perception survey; and additional findings of internal and external market research—to the strategic planning team to provide ample opportunity to digest the findings, consider implications, and prepare for brainstorming and decision making.

TABLE 5.7 SWOT Analysis Template

	Internal Factors		
Positives	Strengths 1. 2. 3. 4.	Weaknesses 1. 2. 3. 4.	**Negatives**
	Opportunities 1. 2. 3. 4.	Threats 1. 2. 3. 4.	
	External Factors		

Give homework assignments to the planning team members so that they can develop their own individual visions and goals for the firm, which can be compared and reconciled during the planning workshop.

Obtaining valid input into the planning process from a range of sources remains important in a strategic plan for any size firm. For a smaller firm, conducting formal interviews with the firm's staff is also important. However, leaders of small firms, especially sole practitioners, have to be extremely introspective and honest about their vision for the firm's future and their own capacity to implement that vision. Because smaller firms are often more tightly knit and enjoy a strong sense of interdependence and camaraderie among the employees, soliciting ideas from all of the employees is not only worthwhile, it is also much more feasible than in a larger firm. Also, smaller firms are just as dependent on their clients as larger firms; so seeking objective input from their external perspective lends a market-realistic context to the plan.

To help achieve greater success in strategic planning, the firm leaders can access additional background reading materials on the subject. See the "For More Information" section at the end of the article for good references on strategic planning for architecture firms of any size.

DEVELOPING THE PLAN

In the long run, men only hit what they aim at. Therefore, though you should fail immediately, you had better aim at something high.

—Henry David Thoreau

In addition to the research and preparation that will inform a firm's strategic plan, it is also important to involve the right participants—in the right place—to develop the plan.

Strategic Planning Team

Just as a firm strives to convene the best project team for a client, firm leaders should be thoughtful in selecting the participants on the strategic planning team. The team should include, from both the operations and administrative/corporate teams, thought leaders and subject matter experts who represent the firm's leadership and management, market and practice leadership, and the best from among future firm leaders, as they will have the greatest vested interest in the firm's future.

In forming the planning team, consider the following:

- *Size of the team.* For a firm with sufficient staff size, the ideal size for the team is 6 to 12 people. This will provide enough minds for brainstorming, yet preserve a comfort zone and a sense of intimacy in the planning workshop to facilitate discussing anything and everything.
- *Responsibilities of the team.* Participating on a strategic planning team is a major commitment, so in choosing the team members, firm leaders should include only those who will contribute actively to the process. The highest and best use of some of firm's key personnel—even principals—may be to stay with their clients and projects while the planning workshop is underway, participating in implementation of the plan after it is developed.

Planning Workshop

The planning workshop is an opportunity for open and straightforward discussion of the most important matters affecting a firm: its future vision and what it will take to reach it. This means that the workshop should be in a location, and with appropriate arrangements, to facilitate these types of candid conversations.

Developing the strategic plan is an important enough activity to deserve the fully focused time and attention of the planning team, apart from their usual responsibilities. Therefore, the strategic planning team can set itself up for success by committing to a one- to two-day dedicated planning period.

Consider the following items in setting up a place and time in which to develop a firm's strategic plan:

- In order to be free of interruptions and the lure of day-to-day project demands, hold the workshop off-site. An off-site location also helps to create a "special" atmosphere in which to brainstorm and design the future of the firm.
- To make the meeting time effective and to encourage active participation and free discussion among all of the team members, set ground rules for the workshop. Chief among these are that each participant must take a big step back from his or her everyday role and take a broader, firm-wide view, think strategically, and actively participate.
- Rigorously prioritize the issues and initiatives to be included in the workshop agenda. Allow plenty of time for open discussion.
- Although a strategic planning workshop is a great opportunity to strengthen and improve the dynamics among the planning team, and may include a social activity such as a group dinner to that end, it's best to focus on the work of strategic planning and leave golf or other recreational activities to another, more appropriate event.
- Many firms benefit from involving a third-party facilitator in their strategic planning process. The facilitator can help to structure the entire process from preplanning internal and external research, such as interviews with key managers and staff and a survey of clients and partner firms in the marketplace; analysis and reporting of findings that will serve as the premises for the strategic plan; designing an ambitious and motivational—yet achievable—agenda for the workshop; and facilitating the brainstorming and documentation of the strategic plan as it is developed during the workshop.

The concept of a "workshop" in which to develop a strategic plan applies to any size firm. In the spirit of inclusiveness (and because it is more feasible), small firms sometimes involve their entire staff in the planning workshop.

For sole practitioners, it may be especially important to have an objective third party participating with them while developing the plan, primarily as a sounding board and reality check. This could be a professional colleague (not necessarily a design professional), a consultant, or even a willing friend or spouse.

Consensus

A firm makes many decisions during its strategic planning workshop. But it is a rare occasion on which a decision is so obvious that those in the workshop will voice unanimous agreement; more often there will be differences of opinion to be reconciled. While a democratic vote of ayes and nays is one way to arrive at a resolution, such a vote lends itself to "winners" and "losers," and the losers may find it difficult to support the decision. A better method is to talk through matters to reach consensus. Achieving consensus means that even those who had differing ideas are convinced by the group to support an action—always with the greater good of the firm in mind—with the same vigor as if it had originally been their own idea. The other side of reaching consensus is allowing anyone on the team to object to a decision if they can voice a reason; sometimes the person objecting can sway the consensus to their way of thinking. In the end, it is most important that the entire planning team portrays their support of the strategic plan components with one enthusiastic voice to the rest of the firm.

IMPLEMENTING THE STRATEGIC PLAN

Because the purpose of strategic planning is to bring positive change to a firm, it's imperative that plans are put into motion and are carried through to the next planning cycle, managing and delivering the elements of the plan with the same priority as the firm's most important projects. Everyone in a management role needs to model through their own actions that people's "day jobs" cannot interfere with the strategic plan; and in fact, implementing the strategic plan is a part of everyone's "day job." Implementing the strategic plan is certainly one of the most important aspects of the firm leader's "day job."

Plans are only good intentions, unless they immediately degenerate into hard work.

—Peter Drucker, noted management consultant

Implementing the Plan

The firm should employ a system for implementing the strategic plan so that it can harness the momentum gained during the preparation and workshop. The following tips will improve the firm's success in implementing its plan:

- Consider the champion responsible for each action item to be equivalent to a "project manager," with the firm leader as the "principal-in-charge" of the entire plan. Each member of the strategic planning team should be conspicuously enthusiastic about the plan as they carry out their assigned actions, report progress to their own staff, and elevate staff input back to the planning team.
- The strategic planning team should stay together through a series of regular meetings throughout the months and up to a year following the launch of the plan, using the action items as a simple agenda, to constantly assess progress on the plan's implementation. Firms that keep up monthly meetings throughout the year enjoy the greatest success from their strategic planning.
- In order to encourage accountability for completing the action plans, manage the established deadlines by using them as agenda items in the strategic planning team's regular meetings. A good rule to employ: if a champion misses a deadline once, immediately reschedule it. If the champion misses the new deadline, assign a different champion. In the long run, it's much more important that the action plans are completed than who actually completed them.
- Keep the plan relevant and active throughout the year by reviewing the effects of each action plan as it is implemented. Ask the team to reflect and report on the following:
  - Did the action item affect positive change for the firm? If so, report that positive effect to the staff and take time to celebrate the success. If not, analyze the reasons why and reexamine whether to repeat that action in the future.
  - If the action item is still relevant, have circumstances changed such that a course correction is required? If so, document the changed circumstances and update the plan accordingly, making any new assignments that may be required.

Many firms struggle with implementing their strategic plan, regretfully noting that the plan that they worked hard to develop ends up as just another notebook on their office shelf. It's wise to employ constructive peer pressure to promote mutual accountability for implementing the plan, through team meetings and regular report-outs to the staff.

Smaller-firm owners may need to be judicious so that the ambitions expressed in their strategic plans don't exceed their own capacity to implement them, and will likely need to prioritize implementation actions and execute them over a longer period of time. Owners of smaller firms will also need to be realistic when it comes to implementing their plans. Time spent to implement strategic plans will need to be carved out from the everyday demands of project acquisition and delivery.

Communicating the Plan

The strategic plan greatly affects the firm's future and requires the support of every member of the firm. Therefore, the firm leader should share the plan with all employees and refer to it often to keep it top-of-mind and inspire confidence in the firm's leadership and direction.

Consider the following in communicating the strategic plan:

- Involve the entire staff in developing and implementing the plan. Collect staff ideas through an employee survey, focus groups, or regular staff meetings during the preplanning stage, encouraging candor. Provide a conduit for suggestions from the staff for consideration at any time.
- Immediately after the team develops the plan in the workshop, communicate its highlights to all staff members. This will calm any concerns that members of the

staff may have upon knowing that the firm's management team has been sequestered in a workshop setting for the past two days.
- Share the entire plan shortly after the workshop with all staff, encouraging their questions and feedback. Provide a handout for staff members to have, hold, and even take home as a commemoration of this important advance in the history of the firm.
- Report progress often, mark positive changes, and celebrate successes.
- Use the strategic planning experience as an opportunity to commit to open and transparent communication at all levels within the firm. The more knowledgeable the employees, the more likely they are to support and help implement the plan. Many employees—the best of them—will look for ways to help.

MAINTAINING A STRATEGIC PLANNING CULTURE

Rather than being an "event," strategic planning is a process that businesses use to envision their desired future, foster continuous improvement, manage change, and achieve their goals and objectives for growth. A firm should consider its strategic plan a ready management tool. For example, when making key decisions, firm leaders and managers should ask, "Is this in concert with our vision and our plan?" If the decision diverges from the vision or intent of the plan, then a good business reason for the deviation should be documented—which may in itself signal the need to update the plan with a course correction.

A ship in port is safe, but that's not what ships are built for.

—Rear Admiral Dr. Grace Murray Hopper

Talk About It

Firm leaders can foster a strategic planning culture within their firm by keeping the plan an important topic in conversations among firm stakeholders. A discussion of the firm's progress toward achieving the action plans, as well as any questions or further input from managers and employees, should be a standing agenda item at staff meetings, management meetings, and board of directors meetings. In addition, progress can be reported periodically in a firm's internal newsletter, in a featured blog on the Intranet, at all-hands meetings, and through ongoing e-mails to all staff members.

The Firm Leader's Role

Just as each action item in the strategic plans should be led by an enthusiastic and empowered champion, the entire strategic plan is the responsibility—if not the raison d'être—of the president, CEO, or managing partner of the firm. It is the leader's charge to rally others in the firm to share a vision for the future and determine how to get there. In addition, it is generally the firm leader's responsibility to allocate investments and other resources that are necessary to pursuing the strategies and carrying out the action items laid out in the strategic plan, supporting the individual champions in their missions.

Updating the Plan

If a firm is to rely on the strategic plan as a management tool, then it will be important to keep it fresh, up-to-date, and relevant. Far too many changes occur—both outside and within most firms—for a strategic plan to remain a static document. For most firms, this means updating the plan annually or biannually, with fully rendered renewals every three to five years.

For More Information

Strategic Planning for Design Firms (Kaplan, 2007) by Raymond Kogan, AIA, and Cara Bobchek.

The Architect's Guide to Small Firm Management: Making Chaos Work for Your Small Firm (Wiley, 2010) by Rena M. Klein, FAIA.

How Firms Succeed: A Field Guide to Design Management (Greenway Communications, 2004) by James P. Cramer and Scott Simpson.
Architect's Essentials of Starting, Assessing and Transitioning a Design Firm (The Architect's Essentials of Professional Practice) (Wiley, 2008) by Peter Piven, FAIA, and Bradford Perkins, FAIA.

5.4 Firm Growth and Development: How to Build a Creative Culture

Kirsten R. Murray, AIA

This article focuses on how to cultivate and maintain excellence in a firm as it grows and develops. The importance of core values, organizational structure, firm culture, and balanced leadership is discussed.

INTRODUCTION

At the core, a strong set of skills and a mutually agreed-upon belief system are critical to maintaining a culture of excellence

Most firms begin very small, as entrepreneurial architects practicing on their own or as partners working in collaboration. After an initial start-up phase, founders who are successful in establishing a reputation for excellence will likely have an opportunity to grow their firm. If growth is managed well, the firm will be able to maintain the intensity and creativity typical of smaller practices while adding the resources and capabilities characteristic of larger firms. To maintain a culture of excellence during and after the transition to a larger practice, firm leaders need to be mindful of critical decisions that will define the quality of the firm's work: its culture, its people, and its legacy.

Some firms are founded by talented, driven sole practitioners, while others begin with small groups of like-minded colleagues seeking professional independence, oftentimes as offshoots of other organizations. In each case, the founders bring their experiences and preferences with them.

The growth of a firm can be reactionary—changing in response to immediate opportunities or a crisis—or it can be highly strategic, designed with the intent of achieving sought-after goals. In either case, taking time at frequent intervals to understand the drivers that underlie change and growth is critical to the development of the firm, as are planning, research, and analysis. This approach provides opportunities to assess effectiveness, observe results, and course-correct when necessary, enabling the firm to navigate change gracefully.

THE BASICS

To be successful, all firms need to address, and periodically review, the basics of running a practice—from getting the work, executing the projects, and handling administrative tasks to adopting a vision and core values. Whether they are two-person firms just starting out, midsize firms with a well-established record of achievement, or internationally renowned firms, this is essential to maintaining the health of the firm.

The Firm's Shared Vision

Most firms that establish a successful growing practice have, at their core, a strong set of goals and values and a clear vision of the workplace culture they want to cultivate.

Kirsten R. Murray is a principal and owner at Olson Kundig Architects, where she started as an intern in 1989 when the practice was a 10-person office. She acts as both design principal and president of the 100-person firm, now in its fifth decade.

Strongly held and shared values serve as the touchstone for decision making and relate to every aspect of the practice. While some strive to design highly recognized and published "critical work," others place a high value on serving the local community and providing a broad range of services. In some firms principals seek to position themselves as thought leaders in a specific practice area, and some choose to strike a balance between achievement in practice and academia. From the sole practitioner just starting out to the 100-person practice, leaders of firms that grow successfully know that all decisions about growth must rest on the foundation of their vision and be aligned with their values.

Firm operations are a direct outgrowth of a firm's values and vision. These include level of risk tolerance, expectations about work-life balance, and a desired workplace atmosphere, both physical and cultural. As a firm grows, established norms in these areas need to be maintained, but with flexibility, so that the firm responds to the changing needs of the practice. Open forums that empower staff to discuss values and priorities help these operational and cultural aspects to be continually updated and understood firm-wide.

Balanced Leadership

Leaders thrive when they contribute complementary skills and also have the ability to work in a highly creative and integrated way. Successful firms are likely to be founded by people who have the skills and desire to seek out and cultivate clients. These individuals might also possess a well-rounded set of design, technical, and management skills. However, growing firms benefit from the teamwork of multiple well-rounded people.

As part of the planning for firm growth and development, consider the skills within the firm's leadership group, develop agreements as to the way the group will work as a team and, if needed, look for ways to supplement qualities not yet present. The best practice for cultivating creativity and excellence is to cross-fertilize the office with team members who bring multiple strengths, adopting specialized or highly specific roles only when the need becomes truly evident.

Getting the Work

All architectural firms begin as entrepreneurial entities. It takes a combination of confidence in an excellent product and tireless enthusiasm for telling its story to convince clients that a particular firm is best for their project. A range of different but complementary strategies can help build the professional and client relationships needed to foster a steady flow of the right type and amount of work to provide continual opportunities for a firm.

► See Developing Marketing Strategy (6.2) and Networking and Business Development (6.4) for information on project acquisition.

Initially, a firm may be able to rely on the skill and personal connections of key firm leaders, but as a firm grows, it is no longer the sole responsibility of one or two leaders to garner work. Increasingly, the effort will need to be supported by business development specialists and by staff who are able to nurture strong relationships with consultants, other organizations, and potential clients.

As a firm grows and begins to pursue work in increasingly competitive arenas, the training and coaching of staff becomes even more important. Skills in visual, written, and verbal communication, as well as in strategy and negotiation, are critical tools, and staff development can be provided internally or with the help of outside consultants. It is also important to identify and cultivate appropriate ways for staff to participate in business development. Often referred to as the seller-doer model, this approach helps a firm retain highly motivated individuals and increases the likelihood that the firm continues to succeed.

The power of No: Not all business is good business. Sometimes, the best choice for the firm in pursuit of new business is to say "no" to a prospective client. Turning down a project is often a difficult decision for seasoned veterans; it can be an excruciating decision for new firms or smaller firms looking to grow. But if the client is not right for the practice and doesn't share the firm's values and the work isn't consistent with where the firm wants to go, there is a risk of allocating precious resources that could be better used elsewhere—and ending up with both the firm and the client dissatisfied.

The empowerment of Yes: The firm's vision, values, and goals should guide decisions about the clients and projects that best suit the practice and provide the right challenges and learning experiences for growth. This is especially important for smaller firms with limited resources, but it is true for all firms, regardless of size. Nothing is more empowering, fuels creativity more, or provides more long-term satisfaction than staying true to the firm's vision and saying "yes" to clients and projects aligned with the firm's values.

HANGAR 41

We have three principals and eight associates. By design, we created an office environment that could thrive on collaboration. One key ingredient of collaboration is equality. If one person makes all the final decisions, you close off the creative process and the ability to brainstorm fades away. That's one reason for the two-tiered hierarchy. Another is staff motivation and personal accountability. In the typical firm model, it takes years of dedication to earn responsibility at an associate level. It's a coveted position, and people sometimes do what they can to jump up the corporate ladder at any cost. In our model, there are only three principals, and no plans to add more without substantial growth or expansion. There is no motivation to gain a more prestigious title. So what happens to the motivation? Money is typically one motivator.

If you bring work into the Hangar, you earn a substantial bonus based on the revenues generated by that project. Our philosophy from a management perspective is that 11 rainmakers are better than one. We also run weekly meetings using parliamentary procedure to keep order. Everyone at Hangar has a stake in the business, not as a direct owner of the LLC, but in profit sharing and voting power. This is where recruiting becomes very important. It's critical that your staff shares the same values in design and practice, is entrepreneurial in spirit, and has an incredible passion for architecture. How the team works together is more important than any one individual. Parliamentary procedure works amazingly well when you find a group of people with the same passion and focus on what they are trying to accomplish together. Ninety-nine percent of all our votes pass unanimously. Believe me, if you put 11 talented and passionate people in the same room together day-in and day-out building a company, and give them all a voice and the power to influence decisions, you had better be prepared for some fireworks. It keeps us on our toes, and pushes us further outside our comfort zone. We believe in developing well-rounded architects. Each person is actively involved in marketing, financial decision making, business development, design, and production. Giving everyone the full picture helps us make the best decisions together.

Buddy Poppitt, Principal, Hangar 41, LLC

Project Execution

Every firm must establish expectations and maintain methods for excellence in the quality of delivery for the services it will provide, from understanding building science to knowing how to assemble a solid set of construction documents and specifications.

The distribution of design, technical, and production work in a smaller firm is usually integrated, often with the same people doing all tasks from the beginning to the end of the project. Ideally, a similar level of integration should also be the goal for a growing firm, though the way this is organized will need to evolve. In a small firm, one or two leaders can typically oversee every aspect of project execution and can continually guide other staff members to meet their expectations.

▶ Professional Development and Mentoring (8.4) addresses training, mentoring, and appraisal programs that support a firm's strategic plan.

Growing firms, on the other hand, need more structure in order for quality expectations to be widely understood by the staff. This will require that mentoring and training practices are put into place to allow staff to succeed. It also means that structured methods of reviewing work for completeness and quality must be developed.

Firm and project leaders also need more formalized ways of remaining integrated into the execution of the work. This is critical to assure quality because demands on the time of the firm's leaders increase as a firm grows. Depending on the nature of the practice, the level of complexity of the work, and the client type, this integration can be achieved in several ways:

- Maintaining small teams, where experienced staff can provide direct feedback and oversight to other staff
- Group review or discussions, critiques, and pin-ups to engage all firm members in dialogue and learning from others' experiences
- Peer review by individuals within or outside of a firm to solicit input and analysis from people with fresh perspectives
- Creating shared resources, including written and Web-based guides, to document lessons learned and best practices
- Formalized oversight processes where more experienced people are assigned to provide quality assurance horizontally across the body of a firm's work

Unless a firm is very large and has had time to develop a sophisticated network of specialists and production strategies, it is best to assume that getting the most experienced and diversified types of input and frequent review (i.e., eyes on the work) will increase its quality.

▶ Origins and Development of Quality Management (12.1) provides an overview of quality management as a system that improves a firm's performance.

As a firm grows, it becomes increasingly important to identify individuals who are leaders in the areas of technical execution and project delivery, and to recognize their achievements and reward their efforts. Success in project acquisition and design is sometimes easier to see and more often rewarded in the industry. However, the firm's technical expertise must be highly regarded, and experienced people retained and nurtured, or the results can be very detrimental for the long-term survival of the practice.

Firm and Project Management

Management is the system of processes and tools—the circulatory system for the practice—that keeps the office and the projects running smoothly together. While small practices can often navigate their way through the day-to-day operations using common sense and good judgment, larger firms require more intentional behaviors. Management systems, from the tracking of project budgets and schedules to the overall strategic direction and governance of a firm, must be put in place. At every stage in its growth, it is critical that a firm's management practices align with its larger values.

Successful management should be integrated into every aspect of the practice. It need not be seen as opposing or inhibiting the delivery of excellence, but, rather, as making excellence more likely. As with technical or project delivery, few firms succeed without an appropriate understanding and recognition of the value of management systems to the overall practice.

Both firm management and project management can be approached as centralized or collectively held responsibilities. Management-savvy design professionals can perform all these functions. But as a firm grows, certain aspects of management should be delegated to people with training in business management or finance, who are also attuned to the nuances of design practice.

To foster excellence and success as a firm grows, management skills should be taught to young practitioners with the same level of rigor and quality expectation as are matters of design and building science. Understanding and appreciation for management issues improves team dynamics, communication, and collaboration with clients and consultants. At some level, everyone in the practice is responsible for managing some aspect of the firm or its projects, if simply their own tasks.

Financial, Legal, and Administrative Tasks

All firm owners face the need to oversee the financial, legal, and administrative aspects of their practice. Small-firm owners usually choose to undertake these tasks themselves, supported by outside attorneys, accountants, and other specialists as needed. As the size of a firm increases, many firms find it advantageous to build an internal team to provide these services, and use outside consultants for advice and strategy.

As a firm continues to grow, administrative staff may evolve from generalists to more specific roles, requiring more specialized training. Like any business, defining communication systems and clarifying the flow of work between administrative and project activities protects against wasted time and frustration.

▶ Office Administration (5.10) discusses personnel, procedures, and processes that improve the efficiency and quality of services of the entire firm.

Managing Work Flow

Assuring a manageable flow of work, not too much or too little, is one of the most challenging aspects of growing a firm. Poor planning or an unstable work flow can lead to wild swings in workload that could necessitate rapid cycles of hiring and firing. This creates job insecurity and can make it difficult to retain valued staff and build on institutional knowledge. There are a number of software tools and systems designed to assist a firm in tracking and studying work flow, such as Newforma for project management or Deltek Vision for accounting and business development tracking. As a firm grows, such tools will become increasingly important.

Even when a firm has an abundance of work and growth prospects look promising, it is generally advisable to employ the smallest workforce a firm can confidently support. Look for ways to maximize productivity before making new hires, such as staggering project start-up schedules or subcontracting production. This way, growth can be approached in an intentional and strategic way. Rapid growth without careful planning can strain a firm's systems and compromise quality. In addition, over-hiring can lead to poor business decisions such as indiscriminately taking on the wrong projects for the sake of "feeding the beast." This is seldom a recipe for excellence.

Similarly, it is important to plan for temporary decreases in workload. If a firm has planned well, and is financially healthy and optimistic about future work, it can use slow times very strategically. "Found time" as a result of fewer projects can be used to focus on internal projects, getting organized, and tending to long-term initiatives like education or research and development. For firms with less financial cushion, it is often possible to work with staff to negotiate some level of short-term cash flow relief through reduced work schedules, furloughs, or job-sharing situations.

However, if a decrease in workload appears to be a long-term situation, it is in the best interests of a firm to downsize staff, sometimes at every skill level in the firm. This should be done with sensitivity to individual situations but also with an eye to the overall health, needs, and skill diversity of the remaining staff in the practice. Frank and open communication with staff as these situations arise is the best policy. Best practice is to remember that staff members are highly trained professionals who deserve to hear information that impacts their futures as soon as decisions have been made.

▶ Navigating Economic Cycles (7.1) discusses the construction industry's ups, downs, and impact on architects.

FIRM ORGANIZATIONAL STRUCTURE

Assuming a firm has the basic skill sets of design, management, and technical execution, a shared system of values, and a vision for what it wants to be, there are still many things to consider as a firm grows and develops. As with any gathering of people, firm leaders will need to agree on a way to organize as the practice grows, all the while being mindful of the intellectual and creative community they hope to establish.

The relationship between organization and creativity is nuanced and complex. Creating organizational structure for an evolving firm is more an art than a science. Some organizations can have a very rigid, ordered system and produce high-quality, creative work. Others can be very egalitarian in their organization, yet do uninspired work. More often than not, for most firms, there is a healthy balance somewhere in the middle that works. A growing firm is advised to walk a fine and well-scrutinized line between creating the collective order needed to be effective and maintaining the high level of individual freedom generally sought in creative occupations.

Ownership Structure

From sole proprietorships and partnerships to corporations, ownership structure is one of the first decisions to be made in new firms and one of the most important, as it will shape the nature of a firm's design community. Many firms begin as sole proprietorships, with all decisions remaining in the hands of the owner. And while many firms often remain sole proprietorships, there can be benefits to expanding the ownership structure to a partnership or corporation as the firm grows, including:

- Increased flexibility in ability to serve clients
- Ability to develop specialties or areas of expertise
- Financial stability for the firm
- Greater capital resources available to the firm
- Shared responsibility, risk, and reward
- Greater growth opportunity for key staff

Owners can be staff that have been identified and promoted from within. This can create a healthy culture where key staff members have incentive to stay and lead the practice when they have achieved professional maturity. However, keep in mind that the criteria for partnership are likely different than that for an excellent project lead. As well, the generational needs of the firm should be taken into account, and partnership decisions made with a view to the ongoing success of the firm. It's important to develop a clear understanding of both the firm's short- and long-term needs when making this important decision.

Owners can also be individuals with strategic skills that are solicited or brought from outside the firm. As firms grow, it can become increasingly advantageous to broaden the skills and services of the firm by partnering with individuals that have other skills, or can expand the firm's client base.

Sometimes the merger or acquisition of firms with complementary skills can provide stimulus to the practice. This sort of change can be challenging to any established practice, and care should be given to the careful planning and communication of the process to employees and clients.

In all cases, when dealing with partnerships, corporations, mergers, acquisitions, or other forms of structure that involve more than one owner, to succeed, partners must be able to:

- Identify and articulate a mutually agreed-upon vision for the firm and agreed-upon roles for each of the partners or owners.
- Establish a partnership agreement including guidelines for governance, methods of conflict resolution, agreed upon code of conduct, confidentiality requirements, and terms of separation.
- Identify an ongoing process for leadership cultivation and a structure for leadership transition.

Beginnings of Structure

Many small and newer firms tend to resemble traditional master and apprentice arrangements. There is the founder or boss, the apprentice, and perhaps a few staff members in between. While the group may enjoy the simplicity of this structure for some time, as the work becomes more demanding, the hours longer, and the levels of proficiency more equal, the midlevel staff may be the first to request more clarity in roles. It is likely they will be seeking more responsibility and craving the recognition that might come with a title or perhaps a larger paycheck.

In dealing with firm structure, it is difficult, and unwise, to ignore these basic needs. Few businesses succeed without establishing a correlation between risk and reward, experience and pay, accountability and opportunity. This is especially true when the

HOW FLAT ARE WE?

THINK OF THREE HYPOTHETICAL WORKPLACES AND THEIR TYPICAL ORGANIZATIONAL STRUCTURES.

- **An urban hospital:** Each worker has highly specialized training and correlating authorization to do a particular set of tasks, with everything from pay to social status dictated by their qualifications, training, and authorized decision-making latitude. Carefully prescribed methods of client care and engagement, and routinized procedures, punctuated with highly regulated oversight from superiors and administrators, are expected. Lives and livelihoods are at stake.
- **A high-tech gaming start-up:** Such companies often embrace a "flat" workplace structure (no titles, no offices, minimal administration) to enable and encourage people to work with relative independence and egalitarianism towards a marketable goal (the creation of a gaming product) set forth by the leadership. In this structure, there is a lucrative reward system for the highest-achieving, those that crack the code to success; and a guarantee of rapid replacement awaiting the underperformer.
- **A college within a university system:** In this situation, there are a few individuals who act as administrators, working toward established university and industry guidelines. There are professors who set forth the expectations for performance and develop a curriculum for the students, assisting them through their instruction and guidance to achieve these expectations. There are also teaching assistants and senior students who serve as mentors. In the end, the quality of the student work is a tribute to their own talents as well as the supportive structure set up by the administration, professors, and teaching assistants.

While none of these examples are entirely adaptable to most architectural practices, consider the outcomes that would result from each if it were considered as a model for practice in a firm.

The highly structured hospital model would likely result in an efficient, productive workplace capable of generating a high quantity of carefully executed work in a known arena. But there are likely fewer creative opportunities for the individual expression or personal investment that can set a firm apart from its competition. Also, it is likely that entrepreneurial personalities would tend to avoid such a structure, and that retaining talented and committed staff would be a challenge.

The entirely flat structure would conceivably offer the inverse of the pros and cons of the structured hospital model. It is likely that some significant strides could be met in areas of innovation, and the most entrepreneurial and confident of the staff would likely feel stimulated by the professional freedoms and opportunities experienced. However, it is difficult to imagine that the firm would be successful in keeping long-term senior staff, which would inevitably be strained to find, train, and manage a potentially undisciplined, highly competitive, and loosely trained workforce.

The college, perhaps, is the hybrid of these systems. In the best schools, as in the best workplaces, individual enthusiasm and passion are encouraged in a collegial atmosphere, and helpful guidelines and curriculum are put into place, along with an administration that brings governance and a faculty that brings specific occupational or subject matter knowledge to the group.

fees for professional services that are established in the market link directly to experience levels and titles set forth as industry standards.

However, depending upon the nature of the work and the goals of the practice, there can be detrimental effects that come from the push to create a tiered organizational structure. Problem-solving ability, creativity, and enthusiasm are often the strongest assets of junior staffers, for whom the right balance of encouragement and oversight must be provided to keep them motivated to stay with the practice. This is especially true in an environment where technology and social media enable less dependence on businesses for employment. Even as firms struggle to adjust to an unpredictable economy, they must provide the stable and supportive environment needed to build loyalty in a young and potentially entrepreneurial workforce.

Teams and Departments

There are a number of different general organizational attitudes that any business or practice can take, ranging in the degree to which hierarchy and definition of roles within the overall workplace are identified, maintained, or valued. Specific to growing architectural practices, there are a number of organizational models that prevail in the industry, and countless variations that occur within these models. As with all other business decisions, it is wise to consider the impact that any structure will have on the culture and business. Think about what sort of culture a firm wants and how it needs to support this in everything from workspace design to business organization.

Shared Studio/Team-Based Organization

In this model, the principal or principals may work individually or collaboratively to bring projects into the office and oversee them. They share the resources of a range of professionals who are assembled as skills and availability allow. The staff might work freely among the principals, and across the range of projects in the office. This is a common structure for small and midsize firms that do projects of a specific type (everyone knowing the work) or projects that are similar enough in type and scale that people can conceivably succeed regardless of their assignment. It is also common in this sort of environment for a project team to work from beginning to end on a particular project and to do a wide range of tasks related to design, management, and execution.

The benefits of this model include flexibility to move staff freely to the work as it comes into the office and cross training of staff by working on the widest range of projects and with the widest range of people. This can impart a general sense of opportunity and professional freedom to staff. Also, working with various firm leaders creates a stronger sense of common purpose, and shared mentorship. This shared, generalist studio model may have a number of people who work horizontally across the office to provide continuity or specialist support, and this is somewhat required at a certain scale. Larger firms that maintain an open studio model may find it helpful to adopt cultural practices to make sure people feel like they have a network within the larger group. Many high design firms are organized this way.

Once a firm grows too large to maintain a shared studio format, or begins to do projects that require a high level of specialized knowledge, it is natural to look for ways to create distinct studios within the larger practice. These studios serve the purpose of creating smaller intellectual communities within the office that act somewhat independently of the others, but share administrative resources. Depending on the particular characteristics of the workload and office, there are several typical ways for studios to be organized.

Studios Organized by Discipline

In a multidisciplinary practice it is common to see separate studios emerge around a discipline, such as urban design or interior design. This allows for variations in organization and business methodologies to emerge around best practices in each area. Typically each discipline-based studio has its own leadership and staff structure, and a somewhat individual vision for their department. Many firms in this vein rely on their complementary strengths and pursue and execute work together, as well as independently of each other.

Studios Organized by Project Type

Similarly, firms that engage deeply in a number of specific project types may find it useful to create studios focused on one or more similar building types: education, high rise, and hospitality, for example. The boundaries of these studios can be very fixed, or more permeable to allow people to move between studios if they possess the right type of experience. Typically this format is desirable for firms trying to attain deep expertise in specialized areas of design, and for those staff people who have a profound interest in a particular aspect of the field. The downside of this arrangement is the possibility that staff will become too specialized or "pigeonholed" in a particular subset of the work of the office. Sudden changes in the economic market might affect studios to different degrees and lead to an uneven distribution of work in the office, which can strain relationships and morale at all levels.

Studios Organized by Principal

Some firms organize themselves by creating studios around one or more principals, with a number of staff dedicated to working closely with a particular individual or subset of a firm's leadership. In this method, the size of a firm often correlates directly to the number of its principals, who often work rather independently in the direction of their particular subset of the practice. This can stimulate robust mentor and mentee relationships and further a firm to the goal of creating well-aligned teams. Conversely, the overall office itself may struggle to develop and maintain office-wide standards that work for everyone, and can even become competitive if performance expectations seem unevenly met. The degree to which an office will work harmoniously in this organizational pattern is linked directly to the synchronicity of the principals and the strength and clarity of their shared vision.

THE MAKING OF A CREATIVE CULTURE AND A LEARNING COMMUNITY

Regardless of the organizational structure of a firm's practice, its size, or the types of projects that are the foundation for its growth, the strength of the collective intellectual and professional community a firm is able to create is perhaps the most significant contributor to the firm's overall growth, development, and long-term success. Firm growth that is inspired by a creative culture and fueled by a learning community provides opportunities for the creation of a thriving practice that are far greater than the sum of any of its parts.

The People

▶ Recruiting and Hiring: Strategies and Methodology (8.3) discusses the research and strategic approaches that can help a firm attract and retain top talent.

▶ See Intern Development (3.2) for further discussion of the IDP as an important component of the licensure process.

The most important aspect of creating sustainable growth for a firm lies in hiring, cultivating, and promoting the most capable individuals a firm can find. It is critical to secure people who are both talented and share the values of a firm, to give them a reason to want to work with a firm, and to value their contributions. Interns, with their energy, boundless enthusiasm, creativity, and highly developed technical skills, are one of the most important sources of talented staff for firms, whether they are newly formed or more established practices.

Intern Development. Every firm benefits individually and industry-wide by paying serious attention to their role in the stewardship of people joining the architectural workforce. The step from academia to practice can be a high one. It is in everyone's best interest to create a supportive work environment where entering professionals can continue to learn the aspects of practice, while bringing their new ideas and skills to a firm. While many learn from being "thrown into the deep end," it is helpful to pay attention to the special needs of the intern and to stay abreast of current NCARB's Intern Development Program (IDP) requirements and guidelines. Firm leaders have a profound obligation to make the best attempt to align interns with situations where they are likely to receive mentorship and guidance. Interns increasingly bring highly valued technical and graphic skills that are immediately useful to a firm, but it is equally important to consider the wider range of skills they will need as their careers progress over a number of years. Make sure they are gaining a broad range of skills that will allow them to move successfully into increasing levels of responsibility.

Interns looking for their first experience should look for a firm where emerging professionals have successfully matured and progressed within the firm based on knowledge they have acquired there. Employers should consider how to create opportunities for interns to present their ideas or continue research initiated in school. Make young professionals part of the intellectual and social fabric of the office and extend to them the same level of professional courtesy that would be extended to other colleagues. Too often, the intern experience is poorly considered, and interns may find themselves in frustrating dead end positions or junctures in their careers. If this time is well managed and guided, an intern could mature to be a loyal employee and a future leader of the firm.

Practitioners should also avoid exploitive employment practices and be aware of the guidelines set by the AIA, state and federal governments with relation to paid vs. unpaid internships, and correct procedures for hourly and overtime pay.

The Learning Community

The importance of community and education is relevant beyond the intern phase and extends throughout an architect's career. A firm that seeks long-term success is wise to think of its workplace as a creative learning community. This means frequently assessing the overall collective dynamic of the office, its systems, and its culture, as well as continually renewing the commitment to the ongoing professional development of each individual in the practice. A firm should act as a framework for the continued growth of each of its members.

The Collective

The best firms are those where people are buzzing with excitement about the work they are doing work in a collaborative setting to deliver the best projects. The office, as a whole, can be an enthusiastic environment where people are encouraged to engage in open, constructive communication and knowledge sharing. While leadership is an important part of this equation, as a firm grows, it can be helpful to build opportunities for collaboration into the rituals and culture of a firm.

Cultural practices that stimulate enthusiasm, growth, and community:

- Create a shared dialogue about lectures, classes, tours, etc., in the community; consider an event calendar or e-message board to share this information.
- Encourage staff to share lessons learned from their academic studies and travels.
- Create a forum for lectures and discussion groups to share best practices internally.
- Invite other local colleagues to speak to the firm about their work and ideas.
- Support participation in learning forums provided by the local AIA and other groups that exist in the area.
- When possible, allow staff the flexibility to pursue teaching, research, or volunteer community outreach.
- Celebrate success collectively, acknowledge special events in the lives of the staff, and have parties.
- Ask the pros: Seek support from those trained in areas of organizational development (management consultants) and human resource management (facilitators, coaches) to work with a firm to assist with leadership training, team building, and change management.

The Resources

In addition to the general attitude and tenor of a practice, it is also important to recognize the importance of supportive resources, both human and physical, as a firm grows. Antiquated methods and procedures, coupled with inadequate systems, equipment, and facilities, and a lack of support staff, strains and inhibits the potential of a firm to do its best work.

- Review financial and legal procedures every year or two, with the assistance of outside consultants as needed, to make sure a firm is aware of changing industry standards and the latest business tools.
- Look at how a firm supports administrative needs in the office. Is the billable professional staff burdened by tasks that could be better performed by others? As a firm grows, be mindful of milestones where it might be wise to introduce administrative support staff.

- Assess the physical plant, and make sure the firm is maintaining its own standards for design, comfort, and usability. Make the space as flexible as possible to accommodate fluctuations in the size and needs of the staff, but avoid making commitments to too much space, especially with the possibilities today of teleworking and virtual teams.
- Don't ignore the costs of doing business in the digital age. Establish a calendar of renewal and replacement of communication infrastructure, computers, software upgrades or licenses, and personal devices, and plan for these expenses.

The Individual

People who are attracted to and succeed in acquiring the training needed to enter the fields of architecture and related professions are generally intelligent, ambitious, talented, and hard-working. They are also frequently motivated by the belief that they can make a difference in the world, and look forward to working in a creative, communicative environment with like-minded individuals, where their contributions will make a difference. With the realities of any business, including deadlines, budgets, and complex tasks, requiring painstaking and reiterative work, it is all too easy for most busy and successful offices to take the softer issues of firm culture and personnel development for granted. As a firm grows, it becomes increasingly important to be vigilant in establishing and maintaining a cycle of thoughtful review of each staff person and to give them timely performance feedback. A firm should also do what it can to align employees with educational and project opportunities that allow them to grow with the firm.

While professional continuing education is equally the responsibility of the individual, a growing firm benefits from supporting this process. Maintain an open dialogue with staff about what activities will be paid for or hosted by the office, and which are considered to be extracurricular or volunteer. The goal is to create a culture where there is mutual investment between people and the practice.

Examples of practices that cultivate the individual:

- Create a system of formal reviews to gauge progress against understood goals, and encourage immediate feedback, including both constructive criticism and praise. Don't let perceived weaknesses in performance fester, but provide interim feedback in a timely manner.
- Look for ways to let people shine, and to develop their own voice in the practice. Create opportunities for individuals to discuss or present work to the office and to clients.
- Be prepared to talk about long-term personal and career goals. Be open about planning for the future.
- Allow people to have input about issues related to the firm as a practice and include staff in planning for the future.
- Allow people to fail in an atmosphere of safety. Celebrate lessons learned by discussing mistakes and solutions openly.
- Acknowledge the contributions of people with specialty or technical knowledge.
- Allow for healthy competition: Host in-house design competitions, provide special opportunities and rewards for people doing exemplary work, and make this visible to others.

CREATING A LEGACY

The most successful practices, whether they are small or large, eventually become organizations that are greater perhaps than the talents of any particular individual. They can shape the industry and practice by their leadership in design, research, and service to the community. As the practice grows to a stable, mature entity, its leaders must become articulate in communicating the institutional values to others, and to maintain, refine, and reinvent them as necessary through transitions in its leadership and business focus. These values must become the norm for decision making if a firm seeks to maintain a culture of creativity, of rigor, of investment in community and profession, and—in short—of excellence.

Actions that will create a firm legacy for the practice and profession:

- Industry leadership, including giving back to the profession through participation in education, professional organizations, research, and development
- Community outreach and membership in cultural and educational organizations
- Personal and political engagement in local, regional, national, and global mechanisms
- Leadership in political and environmental stewardship
- Leadership in dialogues that shape the environment

For More Information

Newforma project management software: http://www.newforma.com/.

Deltek Vision performance, accounting and lead tracking software: http://www.deltek.com/.

AIA Intern Development Program (IDP) guidelines: http://www.aia.org/professionals/idp/index.htm.

5.5 Leader Effectiveness

Peter A. DeLisle, Ph.D.

In the current design environment, the need for architect-leaders has become paramount. This article presents a comprehensive model of leadership development for members of architecture firms. It is a multidimensioned approach to professional development.

THE ARCHITECT AS LEADER

All architects have the potential to be leaders. The most common expectation is that they will be technical leaders. Yet, a world driven by increasing complexity and frequent uncertainty demands the skills and abilities of people who are trained to solve problems and who can lead others in the search for effective solutions.

Architects are not trained academically or in their early careers to lead groups of people and organizations. They seldom undergo formal leadership training, so many are ill-prepared to lead projects or organizations. Too often, they are kicked off the dock and expected to know how to swim. A less harsh image, but one equally dysfunctional, is that good architects will apply some native talent to leadership problems and, through hard work and effort, will prevail.

Many architects have been ruined by this assumption about leadership rather than by their own missteps, and the unfortunate result is a significant loss: They become unhappy and marginally effective managers, sub-optimize the work of their group, and often lose their confidence as individual contributors. The worst-case scenario is that

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they fail as managers and feel a need to leave the company, since they cannot regress by returning to the designer or project manager role without an apparent loss of status and dignity.

So the next question becomes, should architects strive to become effective leaders? The answer is an unqualified *yes*.

RECIPROCITY AND THE CITIZEN ARCHITECT

▶ See Public Service and Community Involvement (4.4) for more on commitment to the public interest by being a "citizen architect."

Few professions combine the rigor of technical design with the aesthetic eye. Fewer professions prepare new members with a sense of responsibility to ensure that the outcomes of their work are both pleasing and congruent in a context. None speak to the commitment of design to improve the built environment or the community to the degree that architecture does. The idea that the practicing professional should commit to a sense of duty, that the work done is respectful and sensitive to the community at large, is a significant differentiator for architects. The need for women and men with this predisposition is critical. It suits the architect to embrace this challenge. The next question becomes, *will they?*

THE PROPENSITY FOR ENGAGEMENT

Three overarching factors dictate an architect's likelihood to embrace leadership:

- Are they personally inclined to do so?
- Are they prepared to meet the challenges?
- Are they willing to step up when the opportunity is presented or emerges?

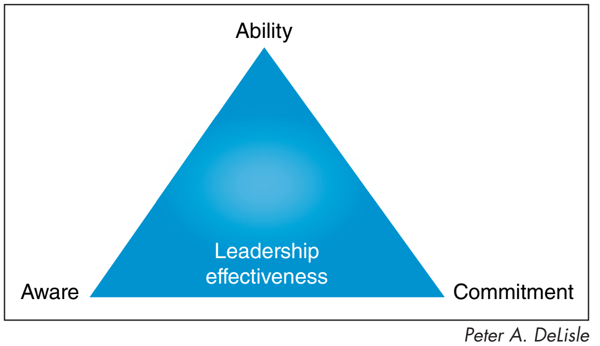
The argument can be made that the opportunities exist; however, the preparedness and inclination are a function of personal development usually not adequately addressed in an architect's professional training.

LEADER EFFECTIVENESS

Leadership effectiveness is a direct function of three interdependent elements:

- People's awareness of themselves, of other people, and of the impact of their behavior on others and on situations
- Their ability to influence others' ideas and behaviors with or without authority and then to make decisions, problem-solve, motivate others, and balance the tasks and relationships in an organization
- Their commitment to make hard decisions and face the risks of "doing the right thing"

As the Leadership Effectiveness Triangle in Figure 5.6 shows, the relationship among these elements is connected and symbiotic.



Peter A. DeLisle

FIGURE 5.6 Leadership Effectiveness Triangle

The geometry of the model suggests that all the rays of the triangle must be present to determine effectiveness. The point of each characteristic lengthens with new skill development, and the area of the triangle grows with new capabilities and awareness. Absence of one element prevents leadership effectiveness from having a perceptible influence. More simply put, a person can be *aware and able*, *but not committed*, causing problems to go unresolved or plans to fail for lack of support; they can be *able and committed and not aware*, yielding good intentions but very poor decision making; and *aware and committed but not able*, which is problematic on many levels. Ideally, leaders should master and practice all three elements.

Awareness

Awareness is a state of consciousness—the ability to recognize the state of one's personal awareness, one's sense of others' events, situations, and needs in real time. Awareness also entails the ability to assess the impact of actions on situations or people, and the ability to be critically self-reflective. Awareness is a growth and development process and a function of direct experience, communication, self-discovery, and feedback. Awareness depends on trust, from and of others, to sustain its growth.

Ability

Ability to lead is a function of influence. Architects rely on their ability to influence others to get work done, since nearly every design project requires collaboration of many disciplines and stakeholders, and accepting new or better ideas to solve problems.

Architects already possess some fundamental problem-solving skills. They are adept at not only recognizing and describing problems but also at offering acceptable solutions to the problematic environment. Architects also subject their ideas to a variety of tests before adopting them. Design review and feedbacks are normal activities for project teams. Architects must also assume responsibility for the quality of their work, and more important, recognize that their work has a direct impact on the lives of other people in a tangible and material way. When coupled with consciousness, this professional competence advances the capability of architect leaders to influence very complex situations and wade into uncertain territory—with an expectation for a positive outcome.

Recognizing complexity is at the core of design leadership, since it speaks to the ethos of architects and articulates one of the most important values of the profession. Only a few other professions share this commitment to self-examination, assessment, and regard for impact on others, such as medicine, engineering, law enforcement, and the military. These endeavors depict how the influence of leadership is very clear and material.

Commitment

Effective leaders must make the commitment to assume risk and responsibility for the outcomes of their decisions. This requires the ability to recognize and make *hard decisions*.

A *hard* decision is different from a *tough* decision—one made when ambiguity or uncertainty, competing priorities or scarcities are prominent. A hard decision is one in which the leader must act to ensure that the ethical, legal, and moral decision is made, even if the consequences are personally unacceptable. This judgment skill is one of the key behaviors that separate leaders from managers. It also lays the foundation for architects to assume more responsibility as the leaders of organizations.

A hard decision might need to be made, for example, when a leader determines that a loyal and honorable staff member's contribution is marginal or even unacceptable. Imagine further that this person was one of the original staff members and helped build the firm.

What does the leader do? Continuing employment communicates an acceptance of substandard performance; involuntary separation seems callous and risks losing valuable institutional knowledge and firm reputation as a good employer. Failure to act suggests that substandard performance is acceptable, while asking the person to leave may result in the leader seeming mean-spirited.

Assuming that creative third-way alternatives have been explored and found unavailable, the leader must make the hard decision about whether to ask the person to leave the firm.

Interdependencies: Technical, Interpersonal, and Resource Utilization Skills

Architects attend professional school and continue their training through licensure and continuing education throughout their careers. Technical training embraces design and visualization from studio to charrette. Resource utilization, the functions of planning, organizing, and controlling processes and activities, is most often referred to as management. Proposals, bids, financial models, and use of capital and human resources fall into this domain.

However, leadership is an interpersonal skill.

For architects, much leadership pertains to influencing people and events, often without the explicit authority to do so. This presents extreme challenges and requires a much higher level of sophistication than the command and control models inherent in other industries. In many instances, the architect leader must convince people of the merits of the design, the plan, and the expected outcome, with nothing other than the ability to persuade as the motivating force. This skill assumes even greater importance when the increasing complexities of design, technical coordination, building performance, agency approvals, and funding are added.

Architects must actively seek feedback and information about their interpersonal effectiveness. They must develop a sophisticated understanding of how people are motivated and how they grow and develop in the organization. Architects must develop and sustain conceptual flexibility, and be comfortable with change and ambiguity. They must hone their technical problem-solving skills, but develop an equally competent set of interpersonal skills, principally those related to communication skills.

Architect/leaders must be self-reflective and self-auditing, listening carefully and acquainting themselves with the best practices of others. Leaders must examine their personal values and recognize that leadership is an act of personal and professional integrity. The consequence for compromising integrity is a *zero* or negative multiplier—like the value of trust: You can be trustworthy a thousand times in a row and untrustworthy once, and the product of the equation is zero or less. The same algorithm holds true for leadership and integrity. Once lost by carelessness, circumstance, or unwillingness to make *hard* decisions, the leader is compromised, and the mantle of leadership can be lost.

COGNITIVE PROBLEM-SOLVING

One of the most important skill that an architect must develop is the ability to solve problems. While problem-solving is a critical capability, it is often considered simple and commonplace. We attribute mathematics and science skill as the fundamentals of problem-solving, and often use the scientific method as our approach. This results in a quantifiable and material set of solutions. Problem-solving, however, is actually much more difficult and complex. When we look at how a person formulates a problem in their mind, we begin to see the complexity of cognitive problem-solving.

To understand cognitive problem-solving, it is important to look at the various ways of interpreting approaches to problem resolution, and important to note that people have a preferred problem-solving style. The problem-solving style characterizes how a person addresses situations that need thought and an approach to resolution. A problem-solving style is an approach that an individual has generally relied on for many years, and is not only the preferred style but often the unconscious choice. There are three common problem-solving styles:

- Adaptive
- Innovative
- As a Continuum—Bridging

Adaptive Problem-Solving

The first style is called adaptive problem-solving. Adaptive problem-solvers are people who look for a few well-reasoned, well-thought-out solutions to problems, working within the system. The solutions must have a high probability of being successful. Adaptive problem-solvers are very comfortable working within the constraints and boundaries of a system or context. They also seek harmony and positive relationships among people. Adapters are very efficient, and bring discipline, order, precision, and elegance to the work they do. Adapters are the people who get things done in a timely and effective manner.

Although it is not possible to be certain, some illustrations from history might be useful. Thomas Edison is known for a very famous quotation, "*invention is one percent inspiration, and ninety-nine percent perspiration.*" Edison was renowned for his persistence and willingness to conduct experiments until a reasonable solution came to pass. If it took a thousand times to get the right answer, he considered the first 999 to be simply failed experiments. Edison gave us the phonograph, movies, and the incandescent light bulb. Unfortunately, Edison did not often see relationships between his inventions. Otherwise, he might have invented MTV at the turn of the century. Yet Thomas Edison was amazingly creative, and very prolific within a certain domain.

Another example of an adaptive problem-solver might be Michelangelo. This is an important example because we see Michelangelo as one of the most of remarkable artists, architects, and sculptors who ever lived, with great works such as *St. Peter's Basilica*, the *Sistine Chapel*, and the statue *David*. If the Sistine Chapel is looked at from structural point of view, it is immediately recognizable that Michelangelo had to work in a finite space. The ceiling had definite boundaries. Also, the medium that Michelangelo used to paint the ceiling was fresco, which is wet plaster, necessitating quick and expert work. Michelangelo, while lying in a semi-prone position, painted from the perspective of a person standing on the floor of the chapel and looking up. He was able to visualize and conceive what the picture should look like from the eyes of the viewer, not the artist. When Michelangelo was asked how he was able to carve the statue *David* from a flawed piece of marble, his simple statement was, *I simply took away the parts of the statue that didn't belong*. Was Michelangelo creative? Most assuredly. Was Michelangelo adaptive in his problem-solving style? It appears so. It is reasonable to state that adaptive problem-solvers are both creative and efficient, striving for elegance in design and execution.

Innovative Problem-Solving

The opposite cognitive problem-solving style is called innovative. Innovation normally is a synonym for creativity in our language, but Edison and Michelangelo established that adaptive problem-solvers can be creative. Innovative problem-solving means that the person looks for as many solutions to the problem as they can possibly conceive. In general, the "more the merrier," more is better than less. The solutions do not have to reflect the system and oftentimes are outside the system. The innovative problem-solver breaks out of the frame of conventional wisdom very easily, often disregarding or breaking rules. Innovators often fail to finish tasks, or are distracted easily if they see something of greater interest. Unlike adaptive problem-solvers, innovators often create a disharmony, show little concern for the welfare of others, and often are seen as renegade and outside of the system. Nevertheless, they operate extremely effectively in situations that are highly uncertain or ambiguous.

By way of comparison, living at the same time as Edison was an entrepreneur named Nicola Tesla. He was an amazingly prolific inventor. Not very many people recognize Tesla's contributions to electrical engineering, or many of the conveniences we use today. Tesla invented alternating current polyphase generators, wireless radio transmission (think cell phones), and tinkered with batteries large enough to store lightning bolts. Why is he not recognized? The answer is simple. When Tesla was asked why he never wrote anything down, he tapped his temple and said something akin to, *why bother, it's all right here*.

Tesla gave us the ability to electrify a household many miles away from the power station with his alternating current dynamo. In addition to wireless radio communication, he described television and microprocessors in the 1880s. He was eccentric, aloof, and very difficult to work with in a collaborative fashion. Frankly, it is said that he and Edison hated each other. Some evidence suggests that Edison blew up Tesla's lab.

Another example of an innovator is another Italian living at the same time as Michelangelo. We know him as the artist who painted the Last Supper and the Mona Lisa: Leonardo da Vinci. Leonardo was extraordinary, often serving as the prototype of the Renaissance man. When asked what he is known for, most recognize his paintings, but da Vinci was prolific in the range his interests. He was a military and aeronautical engineer, a mechanic, an architect, an anatomist, and a scientist. He also painted and sculpted.

It is reported that Leonardo started some 400 paintings or other works of art in his lifetime, but finished about 40. It is interesting to speculate on what his legacy would have been like had he been able to stay on task. Leonardo was extraordinarily creative, as was Tesla. They represent interesting examples of innovators who saw their work outside the bounds of conventional wisdom or tradition. These contrasts help us understand where difficulties in teamwork can exist due to different cognitive styles.

Problem-Solving as a Continuum: Bridgers

Place innovators on one end of a continuum and adapters on the other; those who contribute to solutions between these two disparate problem-solving styles might be called Bridgers. These are people that see the importance of new and different ways of approaching things, and yet recognize and understand the need for order and discipline. They can create more positive relationships between the two different problem-solving styles. They can help innovators understand the need to select few ideas, and show adapters the importance of flexibility and willingness to embrace change. A good example of a bridger is George Westinghouse. Living at the same time as Tesla and Edison, he saw the merits of both of their inventions and the need for them to collaborate. He attempted to convince them to do so, with no success. He proceeded nonetheless with Tesla's solution. His ability to see the interdependence of their inventions resulted in the World's Columbian Exposition of 1893 in Chicago having the distinction of being the first large-scale electrically lit activity in the United States (Wrigley Field was a latecomer).

Another example of a Bridger is General George Marshall. He had the uncanny ability to balance diverse interests and was committed to the employment of people from wide-ranging problem-solving styles to complete his mission. He was successful in the military and as a statesman. He is largely responsible for the economic recovery of Europe after World War II, and the relative degree of harmony in worldwide affairs that was maintained in the late twentieth century. Had Marshall not looked for compromise, and insisted on collaboration, the world would have not enjoyed the postwar stability that rebuilt Europe. Marshall also brokered the talents and abilities of leaders like Eisenhower, Patton, and Bradley, who also represent variations on problem-solving styles. Marshall was exceptionally creative in his understanding and management of interpersonal relationships.

Interdependence

All three problem-solving styles have elements of creativity, and have strengths and weaknesses. When people understand the differences in their approach to problem-solving, they can use the differences to augment and positively influence their solutions. When innovators are given the freedom to build wide-ranging solutions, bridgers articulate those solutions, judging those most applicable to the situation, and adapters execute a plan precisely, excellent solutions can be derived. In a critically reflective environment, in which people recognize and understand their skills and celebrate the differences, the best solutions can be generated.

In an environment that doesn't think about these relationships (a nonreflective environment), great interpersonal conflict can occur. There is a real difference in the way people approach problem-solving, and often people reject another person's approach because it's so radically different from their own. In the worst-case scenario, the Innovator thinks the Adapter *never* has original ideas and treats them accordingly; and the Adapter believes that Innovators are out of control, and should *never* be given any real responsibility. This can create disharmony, a tremendous difficulty since it causes people to be unwilling to work with each other in good faith.

One of most important things to recognize is that excellent solutions cannot develop unless all three of these elements—innovation, bridging, and adaption—are present. The absence of one of these problem-solving styles can create serious dysfunction in an organization. And the consequences of having only one problem-solving style in an organization can be equally as damaging. For example, a design group that is free to think divergently and try new and different approaches to the ideas is extremely desirable. But if the group never articulates or brings any of these ideas to closure, it is simply good at thinking, with no positive material consequence. Conversely if a group only works on a few ideas and never thinks expansively or examines the changing landscape around them, they might miss significant opportunities.

Problem-Solving Environments and Leadership

What is known about cognitive problem-solving suggests the following: If the environment is willing to sustain many new ideas, has a reliable way to articulate them, and can efficiently execute to plan, it will produce successful solutions. In reflective environments, where leaders are self-aware and also aware of what is happening around them, this is the kind of organization that is most desirable, and one in which everyone recognizes the importance of their contribution.

In nonreflective environments, where there is little awareness or thought about what is occurring in a process and interpersonal sense, innovators can become oblivious, bridgers are highly challenged to preserve harmony, and adapters feel like they're cleaning up after an elephant parade all the time. These conditions often exist when the dominant value of the nonreflective environment is what would be called "innovative." Fortunately, the opposite is not necessarily true. If the dominant value system is "adaptive" and reflective, lots of ideas and new and different ways of doing things (innovation) are tolerated and recognized as important, but not proliferated.

A think tank is the best example of innovation in an adaptive and reflective environment. The people inside generate ideas, but there's a containment area around them so that the proliferation of ideas does an impact the environment at large. The strategy is to extract a few good ideas and execute to plan, expecting that the ideas have a high probability of being successful.

A worse situation occurs when environment is adaptive and not reflective. This is a closed system. Any new ideas are seen to be intrusive or inconvenient, or, worse yet, insubordinate. "*We've always done it this way*" characterizes this situation. Two things can happen to innovators in this situation: They become increasingly adaptive and try to fit in, or they go elsewhere to find an environment more hospitable to their approach to problem-solving. Many start-up companies are spawned by big companies who have rejected new and different ways of approaching problem-solving.

The example of Galileo illustrates this point. In Galileo's time, lens grinding was a high art, and the observation of the heavens was the cutting edge of science. Galileo had great skill and was able to cut lenses that would allow magnification that exceeded any current capability of technology at that time. His interest in observing the nighttime sky was greatly enhanced by his ability to magnify stars and planets and make them much more visible to the human eye.

About 80 years prior to Galileo's observations of the heavens, Copernicus had postulated—in opposition to the conventional wisdom of the time that the earth was the center of the universe and the heavens rotated around it—that actually the sun was the center of the universe. He advanced his heliocentric theory, which was met with some interest but no disdain. It was considered an interesting premise, but, since it could not be proved, it was an idea without substance.

Galileo, however, developed the instrumentation that allowed observations to be made with greater precision. The physical certainty of the motions of celestial bodies, as determined by Galileo's observations, made Copernicus's theory a reality. Stepping back, it might be argued that Copernicus was an innovator, and Galileo was the bridger. However, the environment around Galileo was adaptive, not open to innovation, and the profession of science was bounded by the orthodoxy of the Roman Church. Put in another way, if scientific observation contradicted scripture, it was considered heresy.

THE LEADERSHIP CHALLENGE OF PERFORMANCE DEVELOPMENT: THE GUILD HALL

How leaders grow and develop follows a deliberate pathway and design. The move to effectiveness is a function of the person's consciousness—their awareness of the impact of their behavior in real-time—and their competence, their ability to perform at a level of mastery. This is the most desired state, but can only be derived through a deliberate process of engagement and development. Crafts were sustained after the Black Death wiped out half the population of Europe in the fourteenth century through a program of instruction within guild halls. Novices were recruited who agreed to commit to a program of work and service. They arrived with no knowledge and were given direct and immediate direction but minimal feedback until they showed appropriate responsiveness. An apprentice's level of engagement increased with increasing responsibility, and constant feedback was provided to ensure that learning was accelerated and embraced a steep learning curve. Journeymen were expected to work unsupervised for short periods of time but still to seek guidance and feedback frequently. Masters were self-organizing and self-managing.

This process did not come about by accident, and is not unlike the development of leaders and professionals in the modern context. It requires the full engagement of a leader in the demonstration of guidance and direction (the task) and feedback and encouragement (the relationship). It is also tied directly to the developmental needs of the individual or group. The leader must play the role of the taskmaster, the teacher, the encourager, and the colleague, depending on the point of growth of the individual. There are positive outcomes if the leader is adept at helping a person grow to a level of mastery. The capacity and intellectual capital of the group is enhanced.

Regrettably, the absence of this commitment from a leader to respond to the developmental needs of the individual or group can result in frustration, stagnation, malicious compliance, and, in the extreme, abandonment of the task. The leader must become adept at understanding the stage of development of a person, and respond with the right amount of task direction and constructive feedback. This requires a significant amount of critical self-reflection and other-centeredness on the part of the leader. It suggests that leaders must understand the needs of their staff and work cooperatively to meet those needs and encourage growth. The failure to do this, or the inclination to treat others "the way I was treated," is problematic.

Treating everyone the same (consistently) is also a flawed approach. One should not expect a novice to function at a level of competence, nor should one give detailed and specific instructions to a master. The rule of thumb is to understand their needs and match the combination of task and relationship behaviors to their growth.

Architecture embraces this process of novice to master. The rigor of school and the licensing process certainly speaks to the early stages of professional development (student to intern to associate), but much of the growth is self-directed. A more deliberate and positively structured approach would greatly accelerate competence. This is where the emerging leader can make an immediate and significant contribution. An architect's ability to perform is directly linked to the leader's effectiveness in this area.

THE LEADER'S ROLE IN CONFLICT MANAGEMENT

Leadership effectiveness is centered around the issue of conflict. Conflict management is our ability to influence other people in a positive fashion, and successfully complete the task at hand in a finite period of time. This means that essentially all work is a conflict. Trying to get great work done while sustaining excellent relationships in a finite time frame is an art. Many organizations are unable to achieve this.

Simply stated, conflict can't be managed the way finance is managed. It takes interpersonal effectiveness to manage conflict. Many organizations are completely committed to tasks with little or no regard for people. These organizations will get work done effectively in the short term, but have difficulty in sustaining a long-term level of effectiveness. They tend to chew up the people, or see them as interchangeable or expendable resources. Individuals sometimes also approach work with high task expectations but with little regard for relationships. They tend to be combative, self-centered, and unappreciative of the work that others do for them. Some people with this inclination are simply oblivious to the impact of their behavior on others.

Some organizations and individuals have a low-task, high-relationship orientation. These are people who tend to place conflict avoidance and positive feelings above successful completion of the task. This can disable an organization, because it fails to get the work done. Another approach to low-task, high-relationship orientation is seen in organizations that demand compliance and conformance. This is not necessarily a positive relationship, but it is one that demands a person put individual needs second to the needs of the organization, or be concerned with "fitting in" or "not rocking the boat." This mindset often stifles creativity and positive feelings as much as an organization that is committed to task only.

Relationships are often critical to the functioning of an organization because the performance of individuals is largely based upon the resolution of personal problems and motivations. Failure to consider and recognize that these things are important will cause an organization to collapse, perhaps due to key people leaving the organization, often at critical times. Similarly, organizations that are too relationship-oriented, with low commitment to task, often make for harmonious workplaces but may not be able to produce the work effectively.

Ideally, people working in organizations need a balance between task and relationship. The best workplace is one where there is a high commitment to this balance. People like to work hard, but also like to feel their work is valued and that they will be well-regarded for the contributions they make. The best organizations recognize and understand this, and build their values system and culture around the practice of a high-task, high-relationship work environment.

TEAMS: WHEN AND HOW

Teams are best employed when there is too much to be done by individuals working independently to hope for effective synthesis in a finite period of time. Teams should only be used either when time is the key factor or the complexity of the project requires multiple subject-matter experts, as is often the case in architecture.

There are some misunderstood aspects to working in teams that must be addressed by leaders. First, people should only be placed on teams when their level of competence is high and their ability to work cooperatively with others is unquestioned. High-performance teams are not a place for untested or self-interested people, mostly because they can waste time with backfill learning or by advancing personal agendas. The effective team leader must see that all members are fully informed of the expectations of their contribution, the relatedness of their work to other team members, the desired methodology of the team process, and the plan of action. Teams cannot solve all problems, although sometimes they are expected to do so. Above all, members of a team must be dedicated to the task and to other team members. Trust and acceptance is expected, not negative conflict or strife. For example, imagine the mission control team of *Apollo 13* arguing about resources or taking a break.

► See Project Teams (10.2) and Firm Growth and Development: How to Build a Creative Culture (5.4) regarding the importance of firm culture and best practices in selecting and organizing teams for project delivery.

DEVELOPING LEADERS: THE IMPERATIVE

Time will always be the factor that dictates how architects are trained and developed. The challenge is to identify processes and concepts that will bring utility and pragmatism to the process of leadership development. It will also be necessary to determine the points at which architects should be introduced to these practices. The other, more complex question is: who is responsible for the growth and development of effective leaders in the profession, regardless of their stage of professional status (partner, associate, intern, student)?

► Professional Development and Mentoring (8.4) further discusses training, mentoring, and appraisal programs that help to build firm strength and continuity.

Conventional wisdom is that one will learn from experience—hard knocks, so to speak. Some firms, with resources available due to the scale of their operation, can afford internal leadership development programs. All architects and emerging practitioners, if so inclined, can seek seminars or self-directed online programs to augment their skills.

The AIA has promoted much professional development, as have state associations, to address continuing professional education needs; and a few have embraced leader development with commitment and continuity. For example, the AIA–Dallas Emerging Leaders Program was started in 2008 and is supported by a significant number of firms in the region.

The AIA, at the national, state, and local levels, as a provider of continuing education has a significant opportunity to include leadership development in the offerings. A comprehensive approach would be to include a model of professional development that includes leader effectiveness beginning in architecture school (learning about effective teams and interpersonal communication) and continuing in the early stage professional certification. The process could be carried out through self-directed learning, augmented by online learning and component or knowledge community-sponsored programs. The ideal process would be a cooperative effort between the academy and the profession. If treated with the degree of interest, support, and respect that the role of architect as

> The most influential lesson I took away from the Emerging Leaders (EL) program is an understanding of the leadership qualities and skills I had within and finding my voice. Being a young professional, you don't always recognize when you have transitioned to a mentor and leader within your firm. The EL program helped me recognize that I had evolved into a different role. I became more aware of my influence on others and the responsibility I have to respect, improve, and value that quality.
>
> Being someone with typically a soft demeanor who never questioned or defied my superiors, the Emerging Leaders program also helped me develop my voice and learn how to engage and address my superiors appropriately in situations where my role, processes, or ideas needed to be understood and/or implemented. Surprisingly, achieving this hurdle was something senior leadership in our firm was hoping would occur in my situation, as they mentioned it was time for me to "come out of my shell."
>
> *—Dallas AIA, Emerging Leader 2010*

leader deserves, this effort could become a natural part of professional growth and development.

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For More Information

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5.6 Ownership Transitions

Michael Strogoff, FAIA

Architects are trained to design buildings and environments that nurture people and provide value to clients. An architect can apply the same skills and intense focus to create and nurture an architecture firm, to provide opportunities for future generations of owners, and to support the owners as they transition toward retirement.

AN OVERVIEW OF OWNERSHIP TRANSITIONS

Owning an architecture firm can be tremendously rewarding. Ownership allows professionals to shape a firm around an owner's specific interests, to pursue projects and clients to their liking, to define how to interact with clients, and to surround themselves with like-minded colleagues and employees.

Owning a firm is also full of challenges, and one of the largest revolves around how to successfully transfer ownership of a firm from its current owners to others. When owners start the process of transitioning the ownership of a firm, they must consider many issues:

- Whether to transition a firm internally or sell to an outside entity
- How the changing economic and societal landscape affects timing and options
- Why ownership transitions are increasingly difficult to accomplish
- How to create incentives for future owners while rewarding outgoing owners for efforts and investments
- How to develop a valuation methodology that reflects a firm's history, intellectual capital, and future outlook
- How to ensure that a firm's values and culture endure as a transition is completed

Despite the many issues, crafting and implementing an ownership transition plan is not beyond most owners' abilities. What is needed is a successful firm to sell, adequate time, a willing buyer(s), and a good set of guidelines.

After managing a 40-person architecture firm, Michael Strogoff started advising other architecture firms in strategic planning, leadership development, and ownership transitions. Strogoff is a frequent speaker and author on succession planning and mergers and acquisitions, and is a former chair of AIA's Practice Management Knowledge Community's advisory group.

The Need for "Ownership Transition"

Architecture firms can be viewed as living, adaptable entities, responding to internal and external forces: owners wanting to retire, key employees examining alternative opportunities, shifting demographics, generational differences, economic and market forces, technological changes, evolving project delivery methods, and rapidly changing client expectations. Firms that successfully adapt to these forces can prosper through many generations of ownership and leadership transitions.

There are many reasons to proactively plan for an orderly ownership transition:

- Leveraging and perpetuating the reputation, contacts, and portfolio that a firm and/or an owner spent decades to build
- Retaining and rewarding key employees that contribute to a firm's success
- Broadening a firm's skill base and service offerings by expanding its ownership team
- Providing outgoing owners income to help fund their retirements in exchange for years of hard work and risks assumed
- Continuing to service loyal clients that depend on a firm's ongoing operations
- Ensuring a firm's access to professional liability insurance after an owner retires

Firms need to plan for ownership transitions throughout the economic cycles that invariably occur. During periods of growth and profitability, firms should be setting aside funds to at least partially fund the transition process and should be hiring with an eye toward future owners. During economic downturns, firms should be making swift, strategic decisions to ensure their survival, retain key staff, and position themselves to rebound as the economy improves. For some firms, prolonged economic downturns will diminish their staying power and create an urgency to attract new owners, to merge practices, or to sell to a larger, more stable firm.

The Changing Landscape

For many decades it was not unusual for ownership transitions to occur with little more than a few discussions, a handshake, and a short written agreement. The transition choices that an owner of an architectural firm had were relatively straightforward, and the factors influencing how a transition was structured didn't change much. As architectural practice has gotten more complicated, new forces and factors have emerged, which require firms to consider transition planning as an essential strategic initiative.

Shifting Demographics

On October 15th, 2007, the first baby boomers (those born between 1946 and 1964) filed for Social Security retirement benefits, representing a milestone in the workforce. Many firms in existence today were founded in the 1970s and early 1980s by baby boomers. Those founders are now at or approaching retirement age. With 20 percent fewer people in Generation X (those born from about 1965 through the early 1980s), there is significant pressure on firm owners to think about ownership transition in new ways. These might include partially funding internal transitions through larger bonuses and deferred compensation plans, providing greater flexibility to accommodate more work-life balance, and encouraging prospective owners to start setting aside funds to invest in the firm.

Generally speaking, Generation X and the generation behind them, Generation Y, are more cautious and want a more diverse portfolio of investments—the days of having all one's retirement funded by the value of one's home and one's business are dwindling. These generations also tend to be more focused on living a balanced life, of which work is but one element—and have fewer financial resources to invest in a firm. Lack of financial resources is a problem especially during and immediately after economic downturns, when salaries and bonuses have been frozen or possibly reduced.

Adding to the shortage of future owners, fewer professionals entered the profession after each of the recessions of 1980 and early 1990s. Others left during the 2000 to 2001 dot-com bubble and bust, and again during the recession in 2008 to 2010. According to many firm owners, fewer of those licensed architects remaining are interested in assuming ownership. During boom times, when employees were in high demand, many thought, "Why would I want to buy into a practice when I am making such a good living and so many firms want to employ me?" During times of great economic uncertainty, the prevailing attitude was, "Why would I want to buy into a firm in this economy?"

Increasing Complexities of an Architecture Practice

The business and practice of architecture continues to increase in complexity as clients become more sophisticated and demanding, new technologies emerge, and buildings become more complex to design, document, and deliver. The knowledge and skills required to lead a practice, even a relatively small practice, requires an ownership and leadership team with a wider set of skills than previously needed.

Economic Cycles

Architecture and construction are among the most cyclic of industries, prone to large swings as national and global economies shift. When the economy declines, valuation prices decrease, risk factors increase, expected payback periods increase, and ownership becomes less desirable.

► Navigating Economic Cycles (7.1) further discusses the construction industry's ups, downs, and impact on architecture firms.

Consolidation Trends

Although economic downturns generally spur consolidation, the wave of consolidation within the architecture industry from 2009 to 2012 is unprecedented. Large and midsize firms looked at mergers and acquisitions as a strategy to expand geographically, acquire new expertise, expand their pool of future leaders, realize greater economies of scale, and/or simply eliminate competitors. Additionally, many larger firms are persuading their large institutional and corporate clients to centralize their relationships, adding still more pressure to smaller and midsize firms.

On the other side, more firms are finding it harder to compete with larger or more highly specialized firms, and difficult to fund the technology and software required to compete effectively. In response, some firm owners are actively looking to sell their practice or merge their practice into a larger operation. Baby boomers who did not develop an effective internal transition plan, plan adequately for their retirement, and/or don't have the next generation of leaders in place are left with two alternatives: work longer or sell their firm to an outside entity.

Transition Options

Regardless of the reasons an owner wants to sell a firm, there are two options available to those who plan ahead—internal transitions and external mergers or sales. For owners without an adequate transition plan, a less desirable third option, closing shop, may be the only choice available. However, closing the doors represents a unique set of challenges:

- It is difficult and often expensive to wind down projects on different schedules.
- It is difficult to maintain employees to complete projects when it becomes known that the firm is closing.
- Maintaining insurance to protect owners against claims of negligence is both expensive and seldom available to provide adequate protection throughout the entire period until statutes of limitation expire.
- Depending only on savings and investments to fund retirement.

Internal Ownership Transitions

Internal transitions can take different forms: selling portions of the firm to other firm members; recruiting senior people from outside the firm to join the firm as key employees and eventually assume ownership; or creating an employee stock ownership plan (ESOP). As ESOPs are typically appropriate for larger firms and only under special circumstances, firm owners should engage outside accountants and attorneys for guidance.

Benefits of selling a firm internally include maintaining control of the firm longer; handpicking the successors; structuring the transition gradually; the opportunity to attract, retain, and reward future leaders; a higher likelihood of maintaining a culture within the firm; and greater client acceptance of the transition.

Challenges with internal transitions include making internal transitions affordable and attractive to new owners; hiring and mentoring enough candidates who have the resources, interests, and skill sets required to assume ownership; gaining the acceptance by employees of new leaders whom they have previously viewed as peers; and allocating the time and providing the training needed to mentor new owners. And, once an internal transition is implemented, if a firm's profitability suffers and its value declines, morale decreases, the ability of new owners to make payments to outgoing owners declines, and some new owners search for an exit strategy.

External Ownership Transitions

Selling a firm to an outside entity can likewise come in two forms: a merger or a sale. Benefits of selling a firm to an outside entity include higher sale prices; more liquidity; lesser risk, as transitions typically occur over a shorter time frame and payments are not

UNSUCCESSFUL TRANSITION

After gaining experience at a few other firms throughout his early career, Karl Stevens decided that he would start his own firm. He was attracted to the opportunity of creating a firm modeled around his strong design beliefs, and was tired of working excessive hours for other people's benefit.

Over the years, Stevens Architects grew to 12 people, enjoyed a steady flow of repeat clients, and produced several award-winning projects. Stevens earned a reputation among his clients as an architect that provided exceptional client service and produced highly responsive designs. As the sole owner, Karl enjoyed his autonomy and received tremendous satisfaction from winning new commissions.

By all appearances, Karl ran a successful firm. Through tightly controlling the firm's finances, he consistently earned profits hovering around 20 percent, and, due to the quality of his work, had an easy time attracting staff. However, Karl did not delegate well, and even his senior-level staff tended not to stay with the firm for more than a few years.

At the age of 67, Karl was starting to think about traveling and spending more time with his extended family. Sitting down with three of his senior staff, Karl informed them that he would like to start transitioning to a less hectic schedule and would like to offer each of them an opportunity to become owners. Because the firm had been so profitable, Karl told his underlings that he would offer the firm at a price of $1.4 million, which equated to slightly more than four times the firm's average annual profit.

The three staff members voiced initial enthusiasm and said that they would consider Karl's offer. They held several meetings among themselves. The three staff respected each other and believed that they could run the firm successfully. But they kept coming back to the same conclusions: Karl had done 100 percent of the marketing and, when he retired, a large part of the firm's business development success would also be gone. They were also concerned about Karl's ability to relinquish control. He had always controlled every aspect of the firm, so why, they thought, would the future be any different? Finally, Karl seemed set on his asking price, which was beyond the financial means of any of the three staff.

A few weeks later, Karl sat down with his three senior staff. As everyone took their places around the conference table, the mood was sullen. They thanked Karl for the opportunity but politely told him that they decided not to purchase the firm. Karl abruptly left the meeting, knowing that he had waited too long to start the transition process and had few, if any, alternatives. He also felt betrayed.

Two weeks later, the three senior staff gave notice and set out to start their own firm, vowing not to make the firm dependent on any one of them.

Although Karl did replace his senior staff and started involving each of the replacements in more day-to-day decisions, he ended up working for another three years before he felt comfortable taking more time off to spend with his family. Finally, at age 70, Karl started winding down his firm. He slowly reduced his staff count to align with the staggered completion dates of the firm's projects, and awarded pay increases and distributed occasional bonuses to those that remained. Although it was relatively expensive, Karl decided to purchase a tail-end insurance policy that covered his professional liabilities for three years following the official closing of Stevens Architects. In the end, the earnings from working for an additional five years slightly outweighed the purchase price Karl would have received had the three staff to whom he offered ownership actually purchased the firm. The trade-off for Karl, however, was less flexibility in the timing of his retirement and greater personal risk after the tail-end insurance coverage expired in three years.

as linked to ongoing profitability; and opportunities to redefine the day-to-day responsibilities of the owners of the selling firm. In addition, the owners of the selling firm (for as long as they remain), as well as its key employees, often benefit from a buyer's broader portfolio, market diversity, and access to larger clients, and therefore the opportunity to work on more challenging projects. For owners, a major attraction of selling a firm is the ability to get away from spending time running a business. And for many employees of a selling firm, working for a larger firm often provides new project and leadership opportunities.

Challenges for external transitions include the difficult and often time-consuming process of finding a buyer with whom a selling firm shares common values, and maintaining confidentiality while searching for and conducting exploratory discussions. During negotiations, stalemates often occur as buyers and sellers place different values on the seller's firm. External transitions are also more prone to employee and client defections. Finally, for many owners, giving up control of a company they once owned is emotionally stressful.

Making the Choice

Owners should carefully evaluate their options every few years. Some owners choose to focus on an internal ownership transition because of a desire to see the lasting value of the firm continue to prosper in the hands of people they mentored, and want to reward the loyalty of key employees. Others focus on an external transition because it might result in a higher price or because it creates opportunities to work on more exciting projects. (See Table 5.8.)

From a financial perspective, if a firm is generating above-average profits and possesses a strong backlog, an owner is probably better off implementing an internal transition plan and continuing to receive profit distributions as shares are sold. Many think that internal ownership transitions are preferable, and probably better for the profession; this is only true if owners plan properly and are able to attract and retain younger colleagues who have the talent, the personality, the skills, and the entrepreneurial drive to successfully take over the helm.

TABLE 5.8 Internal vs. External Transitions

Internal Transition—Benefits	External Transition (Merger or Sale)—Benefits
Current principals retain control longer	Higher price, more liquidity, generally less risk
Continuity of culture and values	Access to more capital
Retains and rewards key employees	Shorter time frame, faster transition
More gradual transition over longer time frame	Marketing opportunities
Clients more accepting of internal transitions	Adds skills and capacity
	Ability for a seller to focus on a more fulfilling professional role
Internal Transition—Challenges	**External Transition (Merger or Sale)—Challenges**
Unproven leaders and/or lack of candidates	Difficult to find the right buyer
Candidates more risk-averse	Confidentiality
Less liquidity, more risk, longer time frame	Cultures difficult to match
Dependent on future growth and profits	Current owners giving up control
Morale of new owners suffer if value declines	More prone to employee and client defections
Need to make more affordable (incoming owners have less money and less liquidity)	Some contracts difficult to transfer or assign, although this is often solved through a stock sale vs. an asset sale

On the other hand, if a firm is highly desirable (e.g., it opens new markets, brings expertise in new building types, has a large backlog, and/or strengthens a buyer's leadership team) and can therefore command a price based on a high multiple of earnings, an owner can realize considerably higher financial returns with much less risk by selling his firm externally.

The important thing is for firm owners to always look ahead, so that they have options to pursue and a plan in place when they do decide to transition out of the architectural profession.

DEVELOPING AN EFFECTIVE INTERNAL TRANSITION

Offering ownership internally allows an existing owner to retire or transition to another chapter in their life in an orderly and predictable way, to recognize and retain key people, and to pass on a legacy that they were instrumental in creating. Strategically identifying and offering ownership to hand-selected successors who possess strong skills and special expertise also allows a firm to broaden the services it offers to clients.

Keys to Successful Internal Ownership Transitions

- Allow ample time to implement, preferably seven to ten years before the first owner retires.
- Consistently build value.
- Start early and communicate often.
- Ensure a common set of values and vision of the firm's future.
- Identify, motivate, and foster the development of future generations of leaders.
- Develop an ample pool of qualified prospective owners.
- Communicate openly and objectively with prospective owners.
- Provide necessary training and mentoring.
- Give incoming owners increasing amounts of responsibility and gradually relinquish authority.
- Enable leaders to gracefully decline invitations to become owners and remain strong firm leaders.
- Encourage ongoing communication about the firm's value and future direction.
- Include a realistic valuation that is easily measurable, understandable by all owners, and accounts for changes in the firm's profitability and future outlook.
- Align incentives that reinforce the firm's ongoing profitability, growth, culture, and design values.
- Develop a purchase plan that is affordable to incoming owners, many of whom lack cash and liquidity.
- Balance financial rewards to outgoing owners with maintaining financial stability of the firm.
- Structure buyout payments to departing owners over a period of years so the firm and its remaining owners are not overly burdened with debt.
- Establish expectations for each incoming owner, constructively evaluate each other, and hold each other accountable.
- Encourage outgoing owners to transition out of a firm over time while remaining available as a resource.

Before offering ownership, be prepared to address a basic set of questions, starting with "Why should I become an owner, and what exactly does it mean?" Explain that ownership presents an opportunity to shape the firm's future and to have a seat at the decision-making table, to gain access to and offer input on key financial and operational aspects, to have a greater voice in choosing which projects to pursue and a more effective platform from which to market, and to have the potential for higher income in the form of higher salary, larger bonuses, profit sharing, and more job security.

CASE STUDY OF AN INTERNAL TRANSITION

The four owners of Integrated Design Associates valued collaboration above all else. This was reflected in how they involved clients in design decisions, how they governed the firm, and how they obtained new business. The owners could recall only once when a shareholder vote was actually taken, as the four owners and their five associates talked through every important issue until a strong consensus was reached. When hiring, it was not uncommon for prospects to be interviewed by half a dozen members of the firm, including the technical and support staff. Each of the principals was expected to allocate at least 20 percent of their time marketing the firm.

The firm had previously redeemed the shares of two prior owners and were nearing completion of the five-year buyout payments. In both cases, as specified in their shareholder agreement, 20 percent of the first two years of payments were withheld and paid after the former owners fulfilled their obligations to remain available in an advisory capacity.

Integrated Design Associates' ownership transition plan was developed 15 years before the oldest principal was due to retire. At the time, the ages of the owners were purposely staggered, with two in their late fifties, one in her mid-forties, and one in his late thirties. Their shareholders agreement valued the firm at book value plus a premium equal to 25 percent of the average net income for the preceding 3 years. This made the buy-in price affordable to incoming owners while still rewarding current owners for growing the firm and generating profits.

The principals sat down with each of the firm's associates, openly discussed the pros and cons of ownership, and developed a roadmap for each associate should he or she want to be offered a future ownership position. The firm also implemented a leadership training program to help identify other prospective owners and to train the next generation of leaders. They know that it will take at least five years of planning to allow the two owners in their late fifties to start phasing out of the firm.

Key Terms to Be Addressed in an Internal Transition Plan

Developing an effective internal transition plan is not overly complicated. There are, however, some key issues that need to be addressed in a transition plan:

- How will the firm be governed? Specifically, which decisions require unanimous approval by the owners, and which ones might require a supermajority or a simple majority? Over which decisions will the current owners want to maintain veto power?
- What are the expectations of the current and incoming owners? What are their roles and responsibilities, and what type of leadership skills are needed?
- How many shares, if any, should initially be granted to incoming owners?
- How is the share price calculated, and how will it be adjusted each year? What happens if the future owners cannot agree on a value?
- Should the incoming owners have an option and/or an obligation to purchase additional shares?
- What are the buy-in options? For example, in lieu of cash, shares can be acquired by foregoing salary increases and bonuses, from promissory notes (secured or unsecured), from guaranteed bank loans, from deferred compensation, or by guaranteeing outgoing owners a percentages of future profits.
- What are the buyback provisions? If somebody voluntarily resigns, are the value and terms different from involuntary resignations or from death or disability?
- What is the time frame for selling shares? Is it going to be done over one year, five years, ten years?
- How are profits distributed? What is the working definition of profits? With multiple shareholders, a formula or fallback option is needed for how the firm will categorize profits and cash reserves, along with a distribution schedule for those profits.
- What types of personal guarantees will an incoming owner assume?
- What liabilities will each incoming owner assume?
- What are the terms for noncompetition if an owner leaves? If an owner resigns, would they be entitled to compete against the firm or restricted from competing

against the firm, in designated markets, in specific regions, with identified clients, and for how long?

- What are the terms for nonsolicitation if an owner leaves? If an owner resigns, would they be entitled to solicit employees of the firm or restricted from soliciting, and for how long?

Potential Concerns of Prospective Firm Owners

- What does firm ownership really mean?
- What will be my role and responsibilities, and how do they differ from my current role?
- Are my visions of the firm's future compatible with those of the current owner(s)?
- Can I have a significant role in shaping the firm?
- What is the long-term succession plan and how do I fit into it?
- Will the current owners remain active long enough to mentor me?
- Who else is being offered an ownership position, either now or in the immediate future?
- Will being a minority shareholder limit my influence?
- Does firm ownership fit into my life and other interests at this point?
- What about my own financial security? Will I make more money?
- How much is the firm worth, and how do I know that the offering price is fair?
- Can I afford to buy in?
- What are the various options for purchasing my share of the firm?
- What is the firm's financial outlook?
- How do I know that the firm has really been profitable?
- What liabilities would I incur?
- What if I invest into buying into the firm and the firm has a bad year or a stretch of bad years?
- If it doesn't work, how do I get out?
- What if I decline?

Owners need to be candid about the risks, stress, and long hours that accompany ownership. It is an owner's responsibility to enable a prospect to make an informed choice. Make it clear that declining an offer for ownership is an acceptable alternative and that there will be no repercussions. Gracefully accepting a response of "No thank you, that is not for me" is better than having a valued employee leave the firm because their priorities and desires for ownership differ.

Criteria for Becoming a Principal/Owner

Every firm should develop a list of traits and criteria to consider for identifying and evaluating new owners. Here is a list to start the process:

- Shared values and belief in the firm's vision
- Ability to think strategically about the future
- Client-centric focus and ability to nurture client relationships
- Industry thought leader
- Design, technical, and/or management capabilities
- Passion for delivering high-quality services
- Commitment to assume broad firm-wide initiatives and leadership responsibilities
- Leadership, delegation, and team-building skills
- Interpersonal skills (ability to listen, participate in intellectually honest conversations, and act on constructive feedback)
- Decisiveness and confidence (taking ownership and reinforcing acceptance of decisions)
- Tolerance for and willingness to assume significant risks
- Trust and integrity
- Discretion and sound judgment

- Personal financial stability
- Ability to market services and close sales
- Contributions toward profitability and firm sustainability
- Willingness to dedicate the time needed to address the responsibilities of an owner

SELLING A FIRM

Selling a firm to an outside entity can require soul-searching, time, and strategic planning. While joining a thriving firm, gaining opportunities to work on different or more stimulating projects, and being relieved of the day-to-day financial responsibilities appeals to some, giving up a controlling interest in the firm and working for someone else can be a difficult choice for others.

The best mergers or acquisitions bring tangible gains to both parties and provide greater value to the marketplace than both firms provide as separate entities. If prospective clients cannot see the value of a merger and embrace it for the added depth, expertise, and/or stability it brings, then the merger will likely not achieve the goals set forth by both parties. In short, approach a merger or acquisition first and foremost from a strategic marketing perspective.

As a seller, the likelihood of attracting a desirable buyer is based on many factors. If a firm has a unique position in the marketplace or possesses special expertise, is sought out by clients in highly desirable market sectors, is in a region with a foreseeable market uptick, has outstanding leadership capabilities, and possesses a solid backlog of work, then the firm has a good chance of attracting a qualified buyer. On the other hand, if a firm is focused on a dwindling market sector, has only a small backlog, has no clear expertise that differentiates it from other firms in a particular market, is poorly led, and has a recent history of poor financial performance, attracting a buyer willing to pay anything more than a fire-sale price is unlikely. In either case, buyers will evaluate a seller based primarily on whether an acquisition will result in greater market share and higher profits, after amortizing the purchase price, than would purchasing a different firm or growing organically.

CASE STUDY OF EXTERNAL PURCHASE

GBTH Architects garnered a national reputation for planning and designing science and technology buildings, often teaming up with large firms across the country for highly sought-after commissions. The three owners were comfortable for years operating as a niche firm. They regularly spoke at conferences and symposiums that their clients attended, and authored articles in numerous trade publications. Although most of their teaming relationships were successful, the owners wanted to undertake much larger projects on their own. Even though they knew that even large projects would not require allocating more than five or six architects, they could not persuade clients to entrust a 25-person firm with projects that exceeded $15 to $20 million in construction costs.

The firm had been approached over the years by firms interested in acquiring them in order to gain a foothold into the growing science and technology building sector. GBTH Architects always politely declined, not wanting to give up their autonomy. As the years passed and GBTH Architects added to their portfolio, the principals' desires to work on larger, more complex projects increased. When they were approached by a well-respected firm with whom they had completed several projects as joint venture partners, they decided to explore a sale.

With the help of an outside adviser, they entered into a Letter of Intent that described the financial terms of the sale, the principals' respective roles and responsibilities in the acquiring firm, and, of most interest, how the combined firms could leverage GBTH Architects' expertise in over a dozen new locations. Two years later, the former principals of GBTH Architects were working on projects of a size and magnitude of complexity that they had only dreamed of doing as a smaller firm. Although they occasionally missed some of the aspects of being in charge of a 25-person firm—they were now part of a 450-person firm and had to contend with some of the bureaucracies inherent in larger organizations—they also felt that they were finally achieving their professional goals. And whenever any of the principals reflected about how their work lives changed, they were reminded of the day-to-day distractions they had had to attend to when running their own firm.

Strategic Rationale for Mergers and Acquisitions

There are multiple strategic reasons to investigate mergers and acquisitions; below are the most prevalent.

- Provide added value to clients.
- Acquire new areas of expertise and knowledge.
- Diversify into new markets.
- Service clients across broader geographic regions.
- Facilitate geographical expansion.
- Compete more effectively against firms with larger market penetration.
- Expand marketing networks (e.g., engineers, specialty consultants, contractors) and opportunities.
- Become viable for larger and more complex projects by increased bench strength.
- Leverage current leadership team, infrastructure, and intellectual capital.
- Expand leadership team and create more stability/redundancy in key positions.
- Enable key people to redefine their professional focus.
- Share project resources, knowledge base, intellectual capital, and best practices.
- Gain access to and/or strengthen marketing, management, design, and/or production capabilities.
- Share workload ("in-sourcing") and reduce staffing fluctuations.
- Obtain skilled staff and/or enlarge base for recruiting staff.
- Offer staff a wider variety of project choices (building types, sizes/complexity, location, expanded services).
- Provide greater economies of scale and reduce duplication of efforts.
- Eliminate each other as competition.
- Facilitate succession planning.
- Avoid the difficulties inherent in closing down a firm.

Identifying an Appropriate Buyer

The first and most important step in an acquisition or merger process is to develop a strategic profile of the type of firm that should be targeted. Start by creating a one- to two-page profile describing the types of firms that will most benefit from the merger or acquisition. Analyze this from several perspectives. Determine what type of firm will benefit from what the selling firm offers in terms of:

- Geographic reach
- Client types
- Services
- Building types
- Design capabilities
- Specialized expertise
- Leadership skills
- Staff skills
- Portfolio
- Reputation
- Project delivery
- Marketing skills and resources
- Technology

As a buyer or a seller, a firm owner might contact directly other firms that meet the profile, explain strategic goals, and why the specific contact is being made to determine if there is any interest in exploring a long-term relationship. After a nondisclosure agreement, which obligates each firm to maintain confidentiality and limit discussions to specific people on a need-to-know basis, is signed by both parties and outside advisers are engaged as appropriate, a series of meetings are conducted to discuss respective visions, potential synergies, leadership structure, governance, and, most important, firm cultures. The key to a successful integration after an acquisition or merger is cultural compatibility. The only way of determining whether this exists is to get the leadership teams together. Discretion is vital at this stage. The last thing wanted is for clients and employees to find out that a transaction is being contemplated before both parties are ready to disclose the decision.

Another approach for both buyers and sellers is to engage a consultant who specializes in mergers and acquisitions to serve as an adviser, advocate, and guide through the process. Consultants can conduct market studies, help develop profiles of target firms, create lists of candidates, contact identified firms, introduce the interested firms, facilitate discussions and decisions, recommend attorneys and tax advisors, and assist during due diligence and integration. Outside consultants often have the ability to reach a broader range of potential buyers, to provide unbiased assessment of specific buyers, and to offer advice about the current fair market value of similar transactions. In addition, hiring the proper consultant allows current owners to remain focused on running their business.

Regardless of whether a mergers and acquisitions consultant is engaged in the process, it is important to seek advice from an accountant fluent in tax ramifications and an attorney experienced in the legal intricacies of a merger or acquisition at appropriate stages of the process.

MERGER/ACQUISITION STEPS

- Develop a firm profile.
- Identify potential buying firms.
- Contact interested firms.
- Explore synergies and cultural compatibility.
- Discuss framework and initial terms.
- Undertake preliminary due diligence.
- Draft a Letter of Intent or Memorandum of Understanding.
- Develop drafts of Definitive Documents (purchase agreement, representations and warranties, employment agreements)
- Perform final due diligence.
- Finalize Definitive Documents.
- Execute pre-closing integration of firms.
- Close.
- Continue to integrate firms post-closing.

Due Diligence

Whether buying or selling a firm, conducting thorough due diligence of the other party is essential. While some due diligence items can be evaluated by a firm's principal or chief financial officer, don't hesitate to obtain outside help from a lawyer, accountant, and/or acquisition adviser to evaluate other items. The following is a list of typical due diligence items that should be reviewed by the firm's attorney:

1. Corporate documents:
    - Articles of incorporation and any amendments thereto
    - Bylaws and any amendments thereto
    - A list of the directors and officers
    - All fictitious business name statements filed and used
    - A certified copy of good standing from the state
    - A list of all licenses and permits held
    - Board of director minutes for the past two years
2. Shareholder information:
    - A list of all shareholders, including names, ages, number of shares held, and stock options held
    - Stock option plans in place
    - A list of all stock options that have been granted to any employee that have not been exercised
    - Shareholder agreements and buy-sell agreements currently in place
    - All stock redemption agreements entered into and which are still in place
3. Benefits
    - A summary list of all benefit plans, including pension, 401K, medical, dental, and life
    - A copy of all benefit plans and insurance policies offered to employees
4. Financial information:
    - Outstanding loans or lines of credit taken
    - Recent financial statements (audited, reviewed, or compiled)

- Current accounts receivable aging schedule
- Current accounts payable aging schedule
- Promissory notes given and/or held
- Security agreements for payment obligations that are still in force
- Recent federal tax filings and returns

5. Insurance and liability information:
   - Certificates of insurance for all general liability and errors and omissions policies held
   - All liens recorded against firm, including any Uniform Commercial Code (UCC) financing statements and tax liens
   - List of all insurance claims, lawsuits, mediation, arbitration, and settlement agreements in the past five years, including the date, summary, and resolution of the event

Integration Planning

When firms are acquired by an external group or merged with another firm, firm leaders should craft an integration plan during the due diligence process and start implementing the integration plan as soon as a letter of intent is signed. This integration plan should be reviewed at key milestones after the closing date to ensure that new information is incorporated and needed adjustments are made. An integration plan generally covers those areas that require attention and a commitment of resources during the first year following the merger or acquisition: strategic issues, including developing a mission statement and strategic summary about what the entities aim to accomplish by merging; organizational structure and governance;

SALE OPTIONS FOR THE SOLE PROPRIETOR

Sale options for a sole proprietor can be especially challenging. Frequently, these firms do not have an apparent internal buyer, the market for external buyers is limited, and traditional business sale transaction costs are high relative to the size of the business. A streamlined transaction is often more appropriate, as illustrated in this example:

- The seller sells the firm's intangible assets, including the firm's name, rights to the firm's portfolio, and client list to the buyer, but retains most of its hard assets, including its cash and accounts receivable. Sellers also keep their life insurance policy, which had built up a sizable cash surrender value, and their company-owned vehicle.
- The seller enters into a three-year employment agreement with the buyer that allows the hours allocated to the current business to ramp down while steadily increasing the hours with the new employer over the course of a year. This allows the seller to complete the work under contract and collect the outstanding fees. To motivate the seller to successfully transition their clients to the buyer, the employment agreement gives the seller a percentage of the net fees earned from the seller's existing client list for a period of three years.
- The buyer agrees to amend its professional liability coverage to retroactively cover the seller's prior acts. In exchange, the seller agrees to assume responsibility for any insurance deductibles related to the seller's prior acts.

This simplified framework brings advantages to both sides.

Sellers are able to:

1. Retain the cash and accounts receivable earned prior to the sale.
2. Finish outstanding work and collect fees for the work under contract.
3. Secure professional liability insurance coverage for the firm's projects after selling the firm.
4. Realize some value for the goodwill and transitioned client relationships.

Buyers have:

1. Reduced due diligence costs and risks associated with the seller's accounts receivable and unknowns associated with completing the seller's current projects.
2. Leveraged the seller's portfolio as the seller transitioned into full-time employment.
3. Created incentives for sellers to continue marketing to their network of clients on behalf of the buyer.

marketing and business development; financials, including cash flow and reinvestment planning; operations, including design methodology, project delivery, and technology; human resources, including leadership development and mentoring programs; risk management, including quality assurance and quality control; and facility integration. Special attention should be paid to areas where the firms most differed in approaches before the merger or acquisition.

WHY MERGER AND ACQUISITION DEALS FAIL

- Incompatible cultures
- No strategic marketing or operational synergies
- Inadequate time by key people to focus on crafting a mutually beneficial framework
- Inadequate participation by key stakeholders
- Seller's current owners not ready to relinquish control
- Different goals among seller's shareholders
- Weak incentives for key people to remain
- Unrealistic expectations by buyer and/or seller
- Seller's financials poorly organized or not credible
- Looming or undisclosed liabilities
- One or both parties inflexible on key terms
- Poor or inadequate advice
- Unanticipated issues by either party

VALUING A FIRM

The value of an architecture firm reflects a combination of (1) its current net worth, and (2) its ability to generate future profits. However, the valuation of a privately held architecture firm is not an exact science, even when using appropriate metrics. Unlike public companies with widely traded stock, there are few market mechanisms at work to define the value of architecture firms. In fact, many of the factors used to value an architecture firm—history of net fees and profitability, backlog, ability to obtain new business—differ substantially from those used to value asset-driven companies. By necessity, value judgments must be made when valuing an architecture firm, such as the quality and depth of staff, sophistication of management skills, marketing abilities, reputation, and industry outlook.

Valuation amounts also differ widely based on actual circumstances. For example, ownership transitions executed over several years with the current owners remaining are typically valued higher than transitions based on the current owners retiring or phasing out of the day-to-day operations, and highly strategic external acquisitions are typically valued higher than internal acquisitions. Stock purchases that include cash and accounts receivable assets are valued higher than asset purchases that do not include current assets or current liabilities. And acquisitions in which a majority of the acquisition price is allocated as other than goodwill for tax purposes, and thereby the buyer can expense it, are valued higher than acquisitions largely allocated as goodwill and which must be depreciated over many years.

Common Valuation Metrics for an Internal Sale

While calculating a firm's current net worth is relatively straightforward, adjustments need to be made for work in progress, assets that have been amortized or expensed for tax reasons but still have a remaining useful life, discretionary bonuses other than those considered part of employees' expected compensation packages, unusual or one-time expenditures, potential bad debts, and unusual liabilities that might not show up on the firm's balance sheet such as pending claims.

Calculating a firm's ability to generate future profits is not as straightforward. While some valuation consultants use the "discounted cash flow" method—a methodology that entails estimating future cash flow and discounting it to yield a present value—this tends to place undue weight on future revenue, much of which is speculative at the time the valuation is performed. Other consultants look at a firm's three- to five-year financial history to project future performance, usually giving more weight to recent years than prior years. Basing a valuation primarily on financial history is a sound practice during times of economic stability but somewhat inaccurate during times of rapid economic change.

An appropriate method relies on a combination of *quantitative* metrics to arrive at a valuation range and then looks at a firm's *qualitative* aspects to determine whether to recommend a value at the higher or the lower end of the range.

Appropriate metrics to arrive at a quantitative range include:

- *Net worth* (book value), adjusted to account for the fair market value of fixed assets, assets expensed for tax purposes, accrued assets and liabilities, and other assets or liabilities not reflected on a firm's balance sheet.
- *Net income*, adjusted to account for owner's market-rate salaries, discretionary bonuses, and unusual or one-time expenditures. Placing more weight on recent year's earnings tends to result in a better prediction of future results.
- *Net fees*, defined as gross revenue minus reimbursable expenses and revenue attributable to outside project consultants. Again, placing more weight on recent year's net fees tends to result in a better prediction of future fees.
- *Current backlog*, defined as the amount of unearned net fees remaining on projects under contract, with possible adjustments made for projects not yet funded or for fees based on additional approvals.

The relative priorities and multipliers applied to each of these metrics often differ, but they generally fall within a certain range. For example, some consultants value a firm between 1 and 1.5 times adjusted net worth for an internal transition. Other consultants value a firm between 3 and 5 times net income or apply a percentage—25 to 50 percent of their average earnings—to a firm's backlog.

Each of these metrics has limitations:

- *Adjusted net worth* measures the value of assets with adjustments for depreciation but makes no provision for the worth of the firm as a going concern.
- *Net fees and net income* measures the firm's ability to generate future fees and profits based on recent history but does not take into account significant changes that might occur.
- *Backlog* does not guarantee future profits.

However, together they provide a credible range for the value of the firm.

The art of valuing a firm is in narrowing these ranges to gain a more precise indication of a firm's value. To pinpoint a firm's precise value entails highly subjective judgments, an in-depth understanding of that firm's strengths and weaknesses, knowledge about how that firm compares to its competitors, and an ability to forecast how that firm will likely fare in the future.

To narrow a valuation range, rank a firm against a list of items that add or detract from a firm's value.

Items That Add Value:

- Ability to obtain business from new clients
- History of repeat clients
- Strong portfolio and marketing resources
- Market diversity
- Market penetration
- Intellectual capital
- Skills and experience of key staff
- Appropriate lengths of time that current owners can, and will, stay during a transition
- Quality and depth of future leaders
- Consistent profitability and growth
- Design and management skills
- Amount and quality of existing resources and assets
- Amount of backlog
- Lack of litigation history and/or current claims
- Strong programs and processes for quality assurance/quality control, staff development, orientation, recruiting, etc.

Items that Subtract from Value:

- Limited market focus, depth, or skills
- Preponderance of work coming from a single client/contract

- Lack of diversification
- Lack of strong repeat client base
- Little or no leadership to carry the firm forward
- Current owners want fast exit strategy
- Most if not all decisions centrally controlled, with no mentorship program in place to groom future leaders
- Little regard for staff development
- High turnover rate
- Undercapitalized and/or poor cash flow
- Financials not well organized or compliant with generally accepted accounting principles (GAAP)
- High marketing expenses and poor win rate, especially as it relates to design-build or design competitions
- High debt
- Work appears overbilled or over-accrued
- Little or no backlog, lack of growth history, poor profits
- History of claims
- Reliance on political contributions for client access
- Lack of strong strategic advantages

For many firms, an agreed-upon internal transition valuation methodology is described within a shareholder agreement. The methodology adopted often becomes baked into a firm's culture over time and should be reviewed every few years to ensure that it remains relevant and fair to all parties involved.

Common Valuation Metrics for an External Sale

Valuing a firm for an external sale is usually based on one or a combination of the following: (1) adjusted net worth with the same adjustments as made for an internal valuation; (2) a multiple of a firm's EBIDTA—Earnings Before Interest, Depreciation, Taxes, and Amortization—which has been a reliable metric in other industries and is now becoming common within the design industries; or (3) a discounted cash flow, which again entails a certain level of inaccuracy about future performance.

Valuation opinions predictably differ between a buyer and a seller and can best be resolved through candid discussions involving those who place importance on the strategic reasons for the acquisition and those who place importance on the seller's financial history. Although some rules of thumb can establish the proper range of valuation, the precise values can differ based on the motivations of buyers and sellers, their respective views about the market, and the terms negotiated between the parties.

For example, some buyers place higher values on opportunities to enter new markets, acquire specialized knowledge, or gain access to specific clients. Other buyers place greater importance on a seller's history of cash flow and profitability. Likewise, sellers often modify their asking price based on a variety of issues, such as the ability to retain their identity and day-to-day control, the amount of guaranteed payments versus earn-out payments, and the terms of their employment or consulting agreements after the sale is completed.

SUMMARY

Regardless of whether firm owners decide to pursue an internal transition or an external sale, they should start early and allow ample time. Anticipate that not everyone approached will be interested in assuming ownership or place the same financial value on the firm as the current owners. Think about professional goals—ownership transitions represent a unique opportunity for architects to redefine their professional life. Establish a realistic valuation that is easily measurable, understandable by all parties, and accounts for changes in the firm's profitability and future outlook. Above all, pay close attention to how the transition will promote or change the firm's current culture.

For More Information

Architect's Essentials of Starting, Assessing, and Transitioning a Design Firm (Wiley, 2008) by Peter Piven, FAIA, and Bradford Perkins, FAIA.

"Ownership and Leadership Transitions—Demystified" (Continuing Education course at aecKnowledge, 2011): www.aecKnowledge.com.

PART 2: FIRM MANAGEMENT

5.7 Small-Firm Collaboration

Linda Reeder, AIA, LEED AP

By collaborating with other architects, small firms can compete for and win a broader range of projects without expanding their offices or staffs. This article discusses the benefits and challenges of small-firm collaborations, different collaborative models, and the keys to successful collaboration among small architecture firms and other architects.

Architecture is by nature a collaborative enterprise; the skills and knowledge of different design disciplines, construction trades, and material suppliers are required to complete a building. While architects routinely collaborate with owners, engineers, and others, down economies make collaboration among architecture firms more attractive. Bringing specialized expertise onto a proposed project team can tip the balance in a competitive environment, and by working together architecture firms can meet fluctuating workloads while minimizing employee layoffs or unnecessary hiring in an unstable economic environment. In a profession that lost 28 percent of its positions from 2007 to 2011 (*The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics*, p. 5), competitive differentiation and staffing efficiency are key concerns.

▶ Navigating Economic Cycles (7.1) further discusses the construction industry's ups, downs, and impact on architects.

Small firms (fewer than 10 employees) made up more than 80 percent of all architecture firms in 2012, with about one-fourth of firms having only one employee (*The Business of Architecture* [AIA, 2012], p. 7). In spite of—or perhaps as a result of—the job losses in the profession, the number of single-person firms grew slightly from 2009 to 2012. These realities present both challenges and opportunities for small firms.

POTENTIAL BENEFITS OF COLLABORATION

Project Acquisition

▶ See Chapter 6, Marketing and Business Development, for more information on project acquisition.

In a slow economy with more firms pursuing fewer projects, building strong project teams is essential. Small firms may be able to improve their chances, or become eligible for work they wouldn't pursue alone, by teaming with other architects. While larger firms often have studios or departments focused on different project types, small firms by definition have fewer people and thus fewer areas of specialization. By teaming with carefully selected firms or individual architects, small firms can offer specific expertise targeted to a client's need. There are also opportunities to be the local associate for another firm. On publicly funded projects, small firms certified as a small, minority,

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disadvantaged, veteran-owned, or woman-owned business may be attractive collaborators for firms lacking such designation.

Small firms can serve in different roles; the same firm may be a consultant on one project and the lead firm on another. For example, owing to its historic preservation and interior design expertise, Flesher + Foster (F+F) of Pacific Grove, California, served on teams as consultants and associated architects, but also capitalized on its local knowledge to be the prime architect in an affordable senior housing project. Former Principal Gretchen Flesher, AIA, says, “Flesher + Foster teamed up with Robert Herman, FAIA, of Herman & Coliver: Architecture (now Herman Coliver Locus Architecture, or HCLA), for the RFQ. HCLA is nationally recognized for numerous affordable and senior housing projects. We got the job due to our strong local reputation and the added expertise the project required.” Neither firm would have pursued the project alone; HCLA’s experience was with larger, urban developments, and while F+F had experience with the California Coastal Commission and local regulatory boards, they were short on specific project type experience.

In Middleburg, Virginia, two small local firms were among four firms invited to compete for a privately funded library project. Clites Architects, PC, and Turnure Architecture decided to join forces instead of competing against one another. Principals Tim Clites, AIA, and Bill Turnure, AIA, knew each other—and were known in their small community—through their volunteer work on the Middleburg historic commission. The other two invited firms had a local presence which was not based in Middleburg. Tim Clites says, “We won the project over more experienced firms with a history of library work. The committee was very focused on making the library expansion a ‘community effort’—from their fundraising efforts to their selection of professionals and contractors. By teaming up we made it especially positive to select us: they were getting two local firms for the same one firm fee. It was a good lesson to learn early in my new firm: Make it easy for the owner to get to YES.”

For publicly funded projects, Requests for Proposals (RFPs) may include incentives for including certified minority- or women-owned business enterprises (MBE and WBEs, respectively), firms owned by disabled veterans, or other disadvantaged business enterprises (DBEs) on the project team. Firms certified in the state or municipality may be invited to join a project team based on the advantage their certification brings.

► See the backgrounder, WBE/MBE/DBE/SBE Certification, that accompanies Regulation of Professional Practice (3.1) for a more detailed discussion of certified minority- or woman-owned enterprises, disadvantaged business enterprises, and small business enterprises.

Teaming agreements, or memorandums of understanding, define the roles, responsibilities, shared costs, exclusivity, confidentiality, and other terms as firms pursue work together. In addition to defining aspects of the project acquisition phase, teaming agreements identify the contractual relationship among parties if the project is awarded. Formally defining these details of collaboration can define expectations and prevent misunderstandings. “We have an open-door policy on how we bring work in. If another architect wants to collaborate with us on a proposal, or a specific project, we create a project specific agreement and work together until the project is complete,” says Buddy Poppitt, Principal of Hangar 41, LLC, in Denver. “We don’t have to lead the project, but the collaborative must be a good fit. That’s the most important thing about collaboration. You have to be on the same page when you start, have similar values, and the same expectations on the project.”

► Project Team Agreements (17.2) addresses agreements with consultants and establishment of joint ventures between firms.

Flexible Staffing

Teaming with other architects can help small firms take on projects that are larger than their current staff can produce, yet provide the flexibility to avoid a damaging cycle of hiring and laying off employees while waiting for the workload to stabilize. There is a range of possible structures for collaboration, from formal prime-consultant or joint venture agreements down to an independent contractor agreement for a single freelance architect.

Hiring one employee in a small firm increases the office size by a significant percentage, and depending on the firm's projected workload may not be a sustainable option. Firms can reduce their exposure by hiring an independent contractor to work as needed. There are positives and negatives for both parties in such an arrangement.

Potential Advantages Include:

- The firm has extra help with no strings attached should the workload decrease, and no overhead costs such as employee benefits or training.
- The firm may gain specialized expertise, depending on the individual contracted.
- The contract employee generates a fairly predictable revenue stream while pursuing other opportunities (which may include permanent full-time employment, building their own practice, or other contract work).
- The contract employee has more autonomy than a traditional employee in terms of setting their schedule and pay rate, choosing what projects to accept, etc.
- The parties may learn from each other.

EMPLOYEE OR INDEPENDENT CONTRACTOR?

Facts that provide evidence of the degree of control and independence fall into three categories:

- *Behavioral:* Does the company control or have the right to control what the worker does and how the worker does his or her job?
- *Financial:* Are the business aspects of the worker's job controlled by the payer? (These include things like how worker is paid, whether expenses are reimbursed, who provides tools/supplies, etc.)
- *Type of Relationship:* Are there written contracts or employee-type benefits (e.g., pension plan, insurance, vacation pay, etc.)? Will the relationship continue, and is the work performed a key aspect of the business?

Businesses must weigh all these factors when determining whether a worker is an employee or independent contractor. Some factors may indicate that the worker is an employee, while other factors indicate that the worker is an independent contractor. There is no "magic" or set number of factors that makes the worker an employee or an independent contractor, and no single factor stands alone in making this determination. Also, factors that are relevant in one situation may not be relevant in another.

The keys are to look at the entire relationship, consider the degree or extent of the right to direct and control, and finally, to document each of the factors used in coming up with the determination.

If, after reviewing the three categories of evidence, it is still unclear whether a worker is an employee or an independent contractor, *Form SS-8, Determination of Worker Status for Purposes of Federal Employment Taxes and Income Tax Withholding* (PDF) can be filed with the IRS. The form may be filed by either the business or the worker. The IRS will review the facts and circumstances and officially determine the worker's status.

Internal Revenue Service, reprinted from www.irs.gov

Disadvantages May Include:

- Because the firm has to make less of a commitment to an independent contractor than to an employee, the contractor may be less committed to the firm. This could result in contractors moving on to another opportunity before the firm wants their services to end. Contractor turnover can be disruptive, just as employee turnover is.

  If feasible, paying contractors a fee for the project rather than an hourly rate provides more security for both parties and a corresponding obligation to stay on until the project is completed. This arrangement will require more work up front in the agreement to define a scope of services. If a freelance architect is brought on to help with production rather than complete defined tasks, creating such an agreement might not be feasible.
- If a contractor is committed to the firm, they may miss out on other professional opportunities.
- The contractor may have professional obligations outside the firm, making it difficult for them to work additional hours if needed.
- There are tax implications if IRS rules are not followed correctly. Consult a tax adviser or the IRS to make sure an architect paid as an independent contractor cannot be classified as an employee.
- There is less stability for a contractor than for an employee.
- There may be challenges in developing and institutionalizing internal office standards, best practices, and other elements of a firm culture that require stability and long-term commitment from staff.
- If firms contract with experienced architects instead of training and mentoring interns, employment options for emerging professionals may narrow. This could have long-term implications for the profession.

Another option for managing staffing is to loan out or borrow employees from another firm. The AIA Colorado is one AIA component that facilitates an employee share network to help member firms balance workload and staffing. Informal arrangements also exist. Gerald Martin of Martin & Martin Architecture Inc. in Chesapeake, Virginia, says, "I was a 'lent' employee back in the [economic] correction in the '70s. I continue to use my peers' staffs from time to time. For me in the '70s it was great—I got to keep my check and benefits from my employer with no lapse in either, and I got to see firsthand how the other guys did it. On opening my own practice in '83, I used the same firms to which I had been lent/contracted to undertake much larger projects, and used these firms' employees to my complete satisfaction. I would not hesitate to use another's or to lend our staff."

Instead of lending employees, an entire architecture firm may step in behind the scenes to aid another with their workload. For example, James Hundt of Foresight Architects in Schenectady, New York, says, "At some times, we have provided drafting services for firms that couldn't keep up, and at other times we have subbed out drafting to drafting firms or contract drafters (sometimes former employees). Just like with any client, we negotiate scope, schedule, and fee ahead of time so that there are no unpleasant surprises. It has been a good way to balance the workload and has allowed us to keep valuable employees during slow times."

Learning Opportunities

Collaborating with other architects offers opportunities to learn from them, from design approaches to marketing to business strategies and practices. These opportunities can be particularly welcome to solo practitioners. Tim Clites, AIA, who teamed with another firm soon after starting his own, said that exchanging design critiques was one benefit of the collaboration. Leslie Saul, AIA, IIDA, of Leslie Saul & Associates in Cambridge, Massachusetts, said of her experience working with other architecture firms, "Solving problems for your peers is fun; I like teaching. Getting help in solving problems from your peers is fun; I like learning."

Gustavo Berenblum, AIA, who has worked for firms serving as executive architect, associate architect, and joint venture partner, said, "I've built a big part of my professional career collaborating with world-renowned firms to complete projects here in Miami. I have learned and grown immensely through these collaborations and I find myself thinking about it often. Personally, I find it extremely rewarding—usually architects compete with each other, but when you are on the same team, you learn a lot. Then you have different tools for thinking about things on your own projects. Furthermore, good collaborations make a project stronger, as it benefits from the talent and strengths of both firms and the synergy that is created between them."

In addition to learning through project collaboration, some architects join peer-to-peer groups to confidentially share and learn from the business experiences of similar firms in noncompeting markets. In 2012, the AIA was facilitating the formation of self-moderating peer-to-peer networks. The preliminary guidelines describe "a program developed for the architectural profession and its leaders who recognize the need to sharpen skills, share experiences, offer advice, and learn from their peers better ways to run a successful business. It helps tackle the day-to-day complexities of working in a time when the architecture industry is faced with many difficult challenges." There are also consulting companies that coordinate peer-to-peer roundtables, bringing together firms, organizing conference calls, and facilitating meetings. The representatives of participating firms share financial numbers, insurance information, and other practice data—"Everything you share with your partner," as one participant described it—in a confidential environment.

ELEMENTS OF SUCCESSFUL COLLABORATION

Profitability is an important measure of success. However, intangibles such as reputation, client satisfaction, and laying the groundwork for future project and firm successes are also important. Choosing the right collaborators, establishing effective communication, and clearly defining roles and responsibilities can increase the likelihood of a successful outcome. The following issues should be discussed when considering or establishing a collaborative endeavor:

- People
  - Role expectations
  - Skills/experience
  - Time expectations
  - Fee sharing
- Firms
  - Design and service quality
  - Noncompeting market positions
- Reputation
  - Commitment to the collaborative process

Technology
  - Design and production software capability
  - Preferred communication tools
- Processes
  - Decision making
  - Work coordination
  - Dispute resolution
  - Credit sharing and project promotional efforts

(List adapted from *The Jericho Principle: How Companies Use Strategic Collaboration to Find New Sources of Value* (Wiley, 2003) by Ralph Welborn and Vincent Kasten, p. 158)

Firms and People

Choosing appropriate collaborators is essential. The expertise each party brings to the project should be complementary and necessary. Each firm should have familiarity with the project type, the client, the locality, or another element that is crucial to acquiring and completing the work. Victor Latavish of Victor J. Lativish AIA Architect, a three-person firm in Naples, Florida, warns that firms should also take care in choosing collaborators who will not create unfriendly competition for future projects. His firm had a successful collaboration with Reynolds, Smith, and Hills (RS&H), a national AE firm with eight offices in Florida. Latavish invited RS&H to pursue a $12 million, 58,000 square foot Special Operations Building for the Collier County Sheriff's Office in Naples. Victor J. Lativish AIA Architect was the prime consultant and design architect, responsible for design, project management, and local construction contract administration. Charles Gutekunst, AIA, was the principal for RS&H, the architect of record in charge of construction documents.

Latavish chose RS&H to collaborate because:

- RS&H's expertise in schools demonstrated proficiency and showed capability in executing large projects with complex programs—a good fit for the project he was pursuing.
- RS&H's regional office did not do a lot of civic work, so he did not see them as a competitive threat to his firm, which focuses exclusively on civic and religious architecture.
- The principals had worked together at another firm in the past. This previous relationship made Latavish confident that the collaboration would be easy and successful.

Many small-firm practitioners have found that previously working together with an individual in other capacities—for example, as colleagues at another firm, as described above, or serving on the same community board, in Tim Clites and Bill Turnure's case—gave them the confidence that they could collaborate effectively.

At the same time, integrating new players into established collaborations can result in new perspectives and ideas. Sociologist Brian Uzzi studied Broadway musicals as a model of group creativity. He found that while creative teams who had collaborated before had more success than ones who had not, the most successful teams were a mix of old and new—people comfortable with one another who worked efficiently together, combined with unfamiliar people who brought new ideas or challenged old ways of thinking (Jonah Lehrer, "Groupthink," *The New Yorker*, January 30, 2012).

Treat others as you wish to be treated.

—The Golden Rule

The attitudes of the individuals are also significant. Trust and respect are crucial, which is part of the reason collaborations among familiar team members are more successful ("Eight Ways to Build Collaborative Teams" by Lynda Gratton and Tamara J. Erickson, in *Collaborating Effectively* [Harvard Business Review Press, 2011]). Regardless of the hierarchy of the contractual relationship—consultant or prime, design architect or architect of record—participants want their ideas to be heard, and their contributions acknowledged. Since collaborators are generally chosen because of the value they bring to the team, ill will and discord may result when their contributions are ignored. The design solution, technical aspects, or even project finances may be affected, as the party discounting the value of their collaborators' input is paying for contributions they do not value.

"While we are a woman-owned firm, we have eschewed getting certification," says Sara O'Neil-Manion, AIA, of O'Neil & Manion Architects P.A. in Bethesda, Maryland. "If people want to hire our firm, it is for our competence, not because of gender." The firm has been engaged in many successful collaborations. Numerous firms that have received MBE, WBE, or other certification have also collaborated successfully, particularly when valued for more than their certificate. One firm owner who has collaborated with several architects as a WBE firm describes both good and bad experiences. "Some firms are respectful of expertise, and some need a WBE and want the client to think they have expertise—but then do what they want to do."

EMOTIONAL INTELLIGENCE IN GROUPS

"Three conditions are essential to a group's effectiveness: trust among members, a sense of group identity, and a sense of group efficacy," researchers of group emotional intelligence have found. Norms that can support these behaviors include:

- Be self-aware as a group. Assess strengths and weaknesses; for example, encourage members to speak up if they think a meeting isn't being productive, or gently call out a member whose mood or attitude is negatively affecting the group.
- Create an affirming environment where members are supported and a positive attitude prevails—but allow the occasional break for moaning and complaining.
- Employ proactive problem-solving; instead of despairing at a setback, work together to overcome it.

"Building the Emotional Intelligence of Groups" by Vanessa Urch Druskat and Steven B. Wolff, in *Collaborating Across Silos* (Harvard Business Review Press, 2009), pp. 176–86.

Communication

While the diversity of knowledge and skills that dispersed team members bring is valuable, when collaborators are not co-located there is a potential loss of informal communication and bonding that can intensify conflicts. The Internet and related tools—web-based video conferences, ftp sites, e-mail, etc.—make virtual collaboration easier and affordable, but they do not replace face-to-face meetings. Isaac Kohane, a researcher at Harvard Medical School, reviewed 35,000 peer-reviewed papers and charted the locations of the coauthors. He found that the most cited (and therefore most influential) papers were coauthored by scientists working within 10 meters of each other. By contrast, the least cited papers were written by people more than a kilometer apart. Kohane concluded that frequent physical spontaneous interaction helps people work together effectively ("Groupthink," Lehrer).

Architects routinely and successfully work with engineers and other consultants with whom they do not share an office space, but in-person progress meetings contribute to this success. Researchers have found that "periodic face-to-face meetings of dispersed team members can be particularly effective for initiating and maintaining key social processes that will encourage informal communication, team identification, and cohesion." In their study of software developers, researchers found dispersed teams can outperform co-located ones because of their expertise, but the teams have to be set up and managed well to succeed. One suggestion is to hold extended project kickoff meetings so people share an understanding of the work and start to build some cohesion as a team. A team leader in the study recommended going out socially as a group before starting the collaboration ("How to Manage Virtual Teams" [*MIT Sloan Management Review*, 2009] by Frank Siebdrat, Martin Hoegl, and Holger Ernst).

HOW WELL-PREPARED ARE THE POTENTIAL COLLABORATORS TO COMMUNICATE EFFICIENTLY?

Factors to consider:

- Degree of shared experience
- Similarity of cultures, or understanding of cultural differences, or commitment to collaboration
- Similar measures of success that account for innovation and collaboration
- Business processes that can work together
- Compatible software applications and platforms
- Similar technologies
- Shared communication channels

Adapted from Welborn and Kasten, 2003

While Victor Latavish's team communicated and shared drawings via e-mail and an FTP site during their collaboration with RS&H, Latavish says, "Face to face does matter—we would still have in-person meetings, and we always brought hard copies of prints to look at." Determining the preferred methods of virtual communication and file sharing early is also helpful. In terms of information technology, "simplicity, ease of use, and familiarity are far more important than functional sophistication" ("Harnessing Your Staff's Informal Networks" by Richard McDermott and Douglas Archibald, in *Collaborating Effectively*, 2011).

Clearly Define Responsibilities

Defining roles clearly is important when working with other architecture firms, just as it is working with other disciplines. "Collaboration improves when the roles of the individual team members are clearly defined and well understood—when individuals feel that they can do a significant portion of their work independently," researchers have found (Gratton and Erickson, *Collaborating Across Silos*, 2009). Architects are accustomed to defining roles among different disciplines and can apply the same tools when working with other architects.

For example, of the affordable senior housing development collaboration between F+F and HCLA, Flesher says, "HCLA was involved in the programming, public workshops, early design proposals, approvals, specifications, value engineering, and general overview of the development of the project. F+F managed the project through a lengthy local and state approval process, design development, construction documents, consultant coordination, cost estimating/value engineering, and construction administration, and postoccupancy coordination. The team functioned well together with the bulk of the production work done in the F+F office and the coaching and expertise coming from Bob Herman of HCLA."

▶ Defining Project Services (15.1) and Services and Compensation (15.2) address the centrality of scope definition to effective agreements and the variables involved in determining compensation for architectural services.

BR Architects, Inc. of Richardson, Texas, regularly collaborates with other firms. Director of Architecture/Engineering Bradford Russell, AIA, PE, says that in these collaborations BR Architects is involved in general architectural document preparation and structural engineering, another firm does the interior architecture, and a third firm handles construction administration. "Everyone knows what their task is—we have not had problems with continuity," says Russell.

In addition to delegating tasks clearly among architecture firms, multi-architect teams must also make sure the client understands how the team works—that there is a single point of responsibility and communication for the owner (and who that is), and how they benefit from the skills of all.

Determining how a fee will be shared or how a consulting architect will be compensated will involve the same negotiations and considerations of value, effort, and risk as in any fee arrangement, with many team and project-specific elements affecting the outcome.

CHALLENGES FOR COLLABORATION

Anytime a firm tries new processes, including the intimate process of collaboration, there are unknowns and hence risks. One tool for assessing the pros and cons of a potential collaboration is the risk distribution scorecard in Figure 5.7. This tool assigns weight to each risk, allowing for a comparison of the overall collaborative risk to each party.

To use the scorecard, modify or supplement the risks listed and the number of firms per the specifics of the project. Then, for each risk and opportunity:

- Evaluate the importance to each firm: How significant is each risk or opportunity in terms of the future success of the firm? Rate each from 0 to 5, with 0 equal to no importance and 5 a matter of survival. These ratings are the Risk Importance (RI) or Opportunity Importance (OI).
- Evaluate the perceived likelihood of both risk and opportunity and rate them from 0 to 5, with 0 equal to no chance and 5 equal to a 100 percent certainty. These numbers are the Risk Likelihood (RL) or Opportunity Likelihood (OL).
- The value of the risk or opportunity can be assessed by multiplying the Risk or Opportunity Importance by the Risk or Opportunity Likelihood, respectively. The result is the Risk or Opportunity Value: that is, Value = Importance × Likelihood.

The distribution of risks and opportunities between or among architecture firms is a factor in determining the suitability of collaboration, but by no means the only factor.

	Firm A						Firm B						Balance	
													Risk	Opportunity
Risk element	**Risk** Importance (RI): 0-5 Likelihood (RL): 0-5 Value (RV) = RI x RL			**Opportunity** Importance (OI): 0-5 Likelihood (OL): 0-5 Value (OV) = OI x OL			**Risk** Importance (RI): 0-5 Likelihood (RL): 0-5 Value (RV) = RI x RL			**Opportunity** Importance (OI): 0-5 Likelihood (OL): 0-5 Value (OV) = OI x OL			**Firm A RV minus Firm B RV**	**Firm A OV minus Firm B OV**
	RI	**RL**	**RV**	**OI**	**OL**	**OV**	**RI**	**RL**	**RV**	**OI**	**OL**	**OV**		
Client														
	Loss of client, theft of client			*Client acquisition, client retention*			*Loss of client, theft of client*			*Client acquisition, client retention*				
Reputation														
	Diminished reputation			*Enhanced reputation*			*Diminished reputation*			*Enhanced reputation*				
Governance														
	Differences in decision-making norms prevent cooperation			*Firm decision-making processes enhanced*			*Differences in decision-making norms prevent cooperation*			*Difference in decision-making norms prevent cooperation*				
Quality														
	Perceived reduction in value			*Enhanced quality and client satisfaction*			*Perceived reduction in value*			*Enhanced quality and client satisfaction*				
Financial														
	Opportunity costs, collaboration costs			*Access to necessary resources for project*			*Opportunity costs, collaboration costs*			*Access to necessary resources for project*				
Execution														
	Loss of best practices			*Enhanced processes*			*Loss of best practices*			*Enhanced processes*				

(Based on concepts in Welborn and Kasten, 2003)

Adapted from Welborn and Kasten, 2003

FIGURE 5.7 Risk Distribution Scorecard

Biases of the Marketplace

A challenge to small-firm collaborations is the unease clients may have about hiring a team of architecture firms instead of one large firm. Many owners perceive it as less risky to hire one firm capable of doing all the work. Some architects respond to this concern by emphasizing the unique talents of the assembled team. "I tell clients I am finding the best people for each task—I'm not just using who's there," said Joe DeScipio of DeScipio and Associates Inc. in Elmhurst, Pennsylvania. DeScipio's firm completed a $2.1 million commercial renovation project in 2012 with no in-house staff other than himself. In addition to making the case that multi-architect teams represent the best-suited talent, rather than the talent at the next desk, small-firm alliances can also make the case that they will provide a high level of client service. Instead of working with employees at a large firm, owners will be served by multiple small-firm owners—committed, attentive, experienced small-firm owners. The client must understand and appreciate the value the collaboration brings to their project.

BR Architects Inc. has stopped pursuing public work collaboratively. "Cities are scared of this model—they like larger firms, and fee is not as big a concern," says Bradford Russell, AIA, P.E. However, his firm still competes for work for developers with collaborative teams. Collaborating firms "have to be someone our firm is familiar with, and we have to give a better fee as a team, which collaborating small firms can do and still make money" because of lower overhead, says Russell. Still, this approach became more challenging for his team during the economic downturn when large firms were cutting fees to compete for work they did not previously pursue.

LEADERSHIP FOR COLLABORATION

Senior managers and academics have debated which leadership style is most effective for leading complex teams:

- Task-oriented leadership, focused on clearly defining goals and roles
- Relationship-oriented leadership, focused on building trust and goodwill

A study of 55 teams found that "the most productive, innovative teams were typically led by people who were *both* task- and relationship-oriented." These "ambidextrous" leaders shifted styles over the course of the project, being very task-oriented at the beginning and then transitioning to a relationship-oriented style once goals and responsibilities had been defined and accepted. (Gratton and Erickson, *Collaborating Across Silos,* 2009)

Management Complications

The logistics of working with off-site architects may add to the time and costs of managing a project team. In addition, the firms' cultures and organizations may be quite different. These differences need to be recognized, understood, and accepted in order to fully capitalize on collaboration. For example, a large bureaucratic firm might make decisions formally and explicitly, while a small entrepreneurial firm makes decisions tacitly and informally. If these differences are not understood, the larger firm could view the smaller as reckless independents, while the smaller firm might view its larger partner as slow and inflexible (Doz and Hamel, 1998).

QUALITIES OF FIRMS THAT ARE AND ARE NOT ALLIANCE-READY

Unprepared
- Protective
- Imitative
- Define failure as money lost

Prepared
- Creative
- Innovative
- Define failure as money forgone

Excerpted from *Alliance Advantage: The Art of Creating Value through Partnering* (Harvard Business School Press, 1998) by Yves L. Doz and Gary Hamel.

Collaboration Gone Wrong

Collaborations involve sharing best practices, office processes, BIMs or drawing files, and more. When collaborating, there is some loss of control. While learning from and teaching peers can be useful and gratifying, if those peers become future competitors, the experience will have been a costly one. It is one reason to choose collaborators with care.

One small-firm practitioner tells of losing a market advantage with residential developers when the firm borrowed employees from a competing firm to help with construction documents. When the employees returned to their firm, they took the practitioner's design innovations with them. Competing developers adopted the designs, and their value was diminished.

Another potential risk is losing a client to a collaborator. This could happen with repeat work, or even in the absence of a teaming agreement at the conclusion of the marketing phase. To prevent this, choose collaborators with complementary, not competing, expertise, have a strong teaming agreement, and cultivate trust.

WHEN NOT TO COLLABORATE

Collaboration is not appropriate for every project, client, or firm. It is important to remember that the goal of collaboration is not collaboration—it is to be awarded a project, balance workload, increase profits, or otherwise benefit a firm. After identifying an opportunity for collaboration, account for the potential downsides of collaboration as well as the benefits. Consider the following:

To collaborate well is to know when not to do it.

—Morten T. Hansen, "When Internal Collaboration Is Bad for Your Company," in Collaborating Effectively (2011)

- *Opportunity costs*: Could the time spent pursuing a project collaboratively be better spent pursuing a more profitable (financially or otherwise) opportunity alone?
- *Collaboration costs*: These might include travel time to meet at the collaborator's office, additional time managing the project, or purchasing and learning compatible software. It could also include additional time required to create teaming, nondisclosure, or anti-poaching agreements.
- *Collaboration premium*: "A collaboration premium is the difference between the projected financial return and two often overlooked factors: opportunity cost and collaboration costs" (Hansen, *Collaborating Effectively*, p. 7).
- *Personality*: Not everyone is a good collaborator. Poor collaborators might have an oversized ego, or be unable to keep commitments and meet deadlines. They may simply not play well with others. Honestly assess the skills of the key people in a proposed collaboration before moving ahead. Researchers found that skills crucial to successful collaboration include "appreciating others, being able to engage in purposeful conversations, [and] productively and creatively resolving conflicts" (Gratton and Erickson, *Collaborating Effectively).*

WHEN CONSIDERING COLLABORATION...

...be able to answer the following questions:

- What is the value proposition of the collaboration—the value to be created?
- How will the rewards be shared?
- What are the risks, and how will the collaborators manage them?
- What are the possible disruptive impacts on the collaborative venture that need to be anticipated prior to its establishment?
- How do we build a collaborative mindset?

Adapted from Welborn and Kasten, 2003

CONCLUSION

In spite of the potential advantages, collaboration is not for every firm or every project. Some clients may prefer to hire a single firm instead of a team of two or more architecture firms. The disadvantages of some proposed collaborations may exceed the potential benefits, in terms of the risk of strengthening a future competitor, missing opportunities that could be pursued alone, or challenges in bringing together firms with different cultures or people with non-collaborative personalities.

There must be a compelling reason to collaborate, a reason that creates value for all participants. By collaborating with other architects, small firms can compete for and win a broader range of projects without expanding their offices or staffs. Firms can obtain specialized knowledge, access to clients, local expertise, or additional staffing capability through collaboration. In selecting collaborators, care must be taken to choose firms with complementary, not competing, expertise. Additional effort may be required to manage off-site architects; however, with proper communication tools and processes, including regular face-to-face meetings, a dispersed team can be as or more effective than a co-located team.

For More Information

Alliance Advantage: The Art of Creating Value through Partnering (Harvard Business School Press, 1998) by Yves L. Doz and Gary Hamel.

Collaborating Effectively (Harvard Business Review Press, 2011).

Collaborating Across Silos (Harvard Business Review Press, 2009).

"How to Manage Virtual Teams" (*MIT Sloan Management Review*, Summer 2009) by Frank Siebdrat, Martin Hoegl, and Holger Ernst.

The Jericho Principle: How Companies Use Strategic Collaboration to Find New Sources of Value (Wiley, 2003) by Ralph Welborn and Vincent Kasten.

AIA Small Project Practitioners: www.aia.org/spp.

AIA Small Firms Roundtable: www.aia.org/sfrt.

5.8 Practicing in a Global Market

Ronald Arthur Altoon, FAIA

Since the 1990s, global practice has touched a significant percentage of American architects. The context in which AIA members must navigate when seeking international design opportunities is fraught with challenges. As the rules of engagement change in global practice, the methodologies required to chart a successful course must also adapt.

GLOBAL ECONOMY/GLOBAL PRACTICE

We live in a global economy. American aircraft and automobiles are assembled with parts manufactured and shipped from countries around the world. Building products and assemblies are sourced from suppliers on every continent. More and more U.S.-based architecture firms are contemplating entering the global marketplace, either from a base at home or from an office abroad. Practice in a global market has evolved significantly since the turn of the century. As local architects in developing countries acquire skill sets approaching equivalency with First World architects, serving international clients from a U.S. domestic practice is becoming less practical and less competitive. Concurrently, more offshore clients demand daily interaction as a condition of engagement. The challenges implicit in starting up a domestic practice are similar abroad, but exponentially greater.

THE STRATEGIC DECISION TO ENTER GLOBAL PRACTICE

Determining whether the firm should consider practicing in a global marketplace demands careful self-evaluation. While many firms are well qualified in a particular market sector as leaders in their local, regional, or national practices, it takes special considerations to make the cultural leap required to apply those skills to practice abroad effectively and responsibly.

Ronald Arthur Altoon, as the 74th AIA president, negotiated accords with Russian, Chinese, Australian, and Japanese architectural associations, supporting global practice for AIA members. Founder of Altoon Partners—a Los Angeles, Amsterdam, and Shanghai firm with projects in 43 countries—he served six years as an International Union of Architects (UIA) Council Member, Region III.

Bring Needed Expertise

It is essential to determine whether the firm has the core competencies and capacity to deliver needed expertise in the country being considered. It is important to understand what established design capabilities are present in the locale, the relative openness of clients in the country to accept offshore advice, and whether there is a reasonable certainty that the firm's specific capabilities are coincidental with the country's needs. Generally, any practice will be evaluated against other firms, local and foreign, all vying for the same contracts. Without established core competencies, desire to practice abroad and passion for design are rarely sufficient to produce commissions overseas.

Bring Added Value

Another critical factor is the ability of the firm to demonstrate added value throughout the process of site planning, concept design, and evolving design services. In developing countries, often the U.S.-based architect brings a greater understanding of mature business objectives than local clients have had the time or experience to develop internally. This creates additional responsibilities for the architect. Thinking like an investor brings a fresh perspective to design decisions that can enlighten a client and cement a relationship for longer than one single commission.

Bring Proven Process

Western project management techniques will be useful to the practitioner abroad, up to a point. To appreciate some of the different conditions encountered abroad, refer to the AIA Contract Documents B161–2002 and B162–2002.

▶ AIA Documents Program (17.5) covers the International Family of AIA Contract Documents in greater detail.

However, it is important to understand that architects in every country practice according to their local methodology, and clients are accustomed to those methods. The disciplined, professional, and formal approach that U.S. architects espouse may find resistance from clients who want services delivered in less time, for lower fees, and with many out-of-sequence changes. It is important to remain flexible, but cognizant of the professional obligations that good management techniques require.

Beyond project management, the practice of process management often proves invaluable. Public sector agencies may not have the expertise to evaluate complex projects relative to best practices, particularly related to fire and life safety issues. Being willing to consider local codes and regulations, and to challenge them with strong, internationally accepted norms and practices, offers a valuable role for design firms. Learning about the nuances of the local approval process, and contributing to the discourse about the strategies to gain timely approvals, may resolve misunderstandings and save countless hours of redesign time and effort that offshore clients often consider as part of Basic Services.

Evaluation of the Firm

Understanding why the firm seeks access to offshore projects is perhaps the essential consideration. For some it may be to expand building type capabilities or to win larger-scale projects. For others, it is a question of stability, balancing economic fluctuations, or growing market sector experience that is unattainable domestically. In any case, recognizing that the consequences include managing a 24-hour-a-day global practice, it is critical to determine whether establishing a practice abroad fits within the firm's Strategic Plan.

Understanding the firm's true capabilities requires careful and candid self-examination, often best achieved with the assistance of a professional management facilitator. Even with this added perspective, identifying a firm's strengths—what it has to offer better than most others—is more challenging in the context of international competition. Equally daunting is accepting what the firm may need to overcome internally in order to succeed in the offshore enterprise. Researching the firm's domestic and international competition and assessing their comparative strengths will help to clarify the challenge. Importantly, having an established practice culture with defined and sustained core values provides a moral compass as the firm ventures into a new competitive environment that presents diverse ethical issues and values.

Identifying who in the firm is qualified to lead an overseas enterprise is best done by a comprehensive evaluation process. Beyond the firm's design reputation, the ability to build personal relationships is critical. Clients relate to people. Offshore, they often demand named partners, or very senior professionals at the least. The firm must determine who will be its face, who will be most effective in identifying prospective clients and creating opportunities, and who is most effective in presenting the firm's capabilities and is skilled in closing the deal. These may not be the same individual, and a firm is well advised to make a candid appraisal of the separate skills required. The "closer" is generally the person that the prospective client sees as being their architect, not necessarily the marketing person. Seniority may not make the case; the ability to connect with the client is more important.

Consider who best represents you, speaks with authority, can demonstrate needed expertise, and will be available throughout the entire process of design and construction. Determine who is most effective at communicating, negotiating, managing, designing, and collaborating. Be prepared to identify the individual or team that will ultimately commit to live overseas, and what level of authority will be entrusted to that individual or team, along with the considerable responsibility. Knowing that whoever leads the office needs the ability to secure and sustain client confidence will help to determine the most appropriate fit.

Additionally, the leader must be able to assure that the firm can maintain its practice culture. The ability to juggle time differences and distances, to extend practice values while sustaining good judgment, commitment to craft, and quality, are all important qualities for the person entrusted with representing the firm abroad.

Determining when the time is right to practice abroad is the result of a confluence of both internal and external forces. Internal considerations include the firm's domestic and international reputation, demonstrated leadership of the individual selected to assume responsibility for the venture, financial resources of the firm, and an ownership culture that provides commitment for an extended period of time. External influences may include domestic clients' desire to expand overseas or opportunities resulting from a stronger economy abroad. It may be several years before expectations are achieved. In addition, the firm's reputation should be evaluated in the context of the desired market to ascertain if the practice can secure a competitive advantage.

Knowing where to take the first step, and how to take the second, will be different for each firm. Conventional wisdom suggests selecting the first country based on existing relationships, an established support structure, and the ability to serve the client well. Expanding geographically from a foundation of success to contiguous or targeted countries, and prioritizing by highest probability of further success, provides an efficient platform for growth. Yet, some strategize target markets according to building type expertise, maturity of the country's economic development, or even language. Whatever the firm's approach, accessing clients in foreign cultures will be challenging.

Before deciding, the firm should assess the impact on existing leadership and staff of managing both offshore and existing

GETTING STARTED

Altoon Partners, a 32-person firm, broke into global practice in Asia through the personal relationship of a staff member, and in Europe via the recommendation of a former domestic client living in Hungary. With the opportunity at hand, country-specific research was conducted through:

- The World Bank
- U.S. Department of Commerce
- World Trade Organization
- U.S. Chamber of Commerce
- International Real Estate Organizations
- AIA International Committee
- Cultural sources
- Colleagues and friends
- Clients and consultants

Competing against much larger firms in the same market sector, Altoon Partners leveraged its limited assets to secure market share. Among those assets were its demonstrated expertise; design awards; books and articles written and published; leadership in the AIA at every level, at the International Union of Architects (UIA), and in international real estate organizations; and the firm's significant portfolio of constructed work.

Once a project was secured, recommendations from a practice consultant led to interviews with local firms to establish a long-term practice association. The division of responsibility was agreed upon, terms of engagement were established, and communications mechanisms confirmed. Fundamental to any relationship is an agreement on expectations, quality assurance, respect, and trust. The midsize U.S. firm became a large international firm through these associations, able to compete on equal footing for any size project.

client project workload at home. It is also critical to evaluate domestic client reaction to the firm's shift in focus. The full impact on personal lives and relationships of partners and staff involved needs consideration. Determining who will fill the leadership gap at home so as not to undermine the domestic practice culture will be critical.

BUILDING A STRONG PRACTICE FRAMEWORK: GETTING STARTED

Residency Requirement

It is certainly possible to open an offshore office with a local national citizen as the managing director. However, that decision may make the nurturance of a well-established practice culture more challenging. On the other hand, sending a representative of the firm's culture to promote consistency with design precepts and quality assurance brings special challenges, and some obstacles, that merit consideration at the outset and continued attention. Among these is meeting national residency requirements for the professionals in the local office. Obtaining a residency permit for the architects, their families, and children takes first priority. This confirms the right to live in a country for a defined period of time, often renewable, but also requires leaving the country in question for a period of time before reentering.

Legal Entity/Business License

Each country will have its own designations for professional business entities, and each will require a different process to attain legal standing. The right to establish a business may entail creating only a local office of an existing company, but could necessitate the creation of an entire new business entity in order to establish local banking relationships and to meet tax law requirements of both the country in question and the United States Treasury. Registration with the appropriate government agency may be required and should be thoroughly investigated at the onset. Whether it is a Wholly Owned Foreign Enterprise (WOFE) in China, a Besloten Vennootschap—a limited company—in the Netherlands, or a Russian Representative Company, the process is prescribed and the firm should seek legal counsel and the advice of a knowledgeable tax accountant so the process is handled efficiently and appropriately. In some countries a firm must register with the Chamber of Commerce or government agency in order to establish a business, hire staff, and provide professional services. It is important to ascertain the specific agency in each country.

Professional Licensure

Reciprocity to attain licensure in foreign countries can be a process as simple as submitting documentation of one's professional education, domestic licensure, and career experience, or one of significant challenge. Many countries consider a diploma from an accredited university architecture program evidence of qualification to practice. Others require an examination and/or interview process similar to the Architect Registration Examination (ARE) and several domestic registration boards. Whatever the local situation, it will affect the firm if it intends to provide professional service entirely on its own, without associating with a local Architect of Record. If, on the other hand, the firm determines its objective is to master plan and design projects in collaboration with a licensed individual or firm that will assume responsibility for contract documents and construction contract administration, a license to practice locally may not be required. This should be investigated thoroughly prior to the firm proceeding to identify the kind of services it will provide and how it will represent itself—as an architect or design consultant.

Since the disagreement over reciprocity issues occurred between European architectural licensing organizations and the National Council of Architectural Registration Boards (NCARB), as of 2012 it remains inconvenient to obtain a license to practice architecture in many European Union (EU) countries. The EU allows for cross-border practice for those holding a license in a member country that has signed the professional services portion of their treaty. For those countries that are not signatories to that agreement, reciprocity does not exist.

Title Act vs. Practice Act

In the United States there are both Title Acts and Practice Acts. A Title Act simply limits the right to use the term "architect" to those who have attained and maintained a license to practice architecture from one of the states or territories. A Practice Act limits the right to practice architecture to those who also maintain an active license. Some offshore countries offer only a Title Act, which effectively allows any individual to practice architecture as long as that person does not identify himself or herself as an architect. Using the title "architect" is a violation of the regulation and is punishable by law.

Liability and Errors and Omissions Insurance Issues

While the United States is generally considered the most litigious country in the world, liability for a firm's professional actions abroad remains an issue. Some countries have onerous reprimands, even prison sentences, for construction site calamities, building collapses, and loss of life by fire. Collaborating with a local architect who will assume the role of Architect of Record places the ultimate and final responsibility in the hands of a firm that has experience in local code requirements, means and methods of construction, and local customs and business practices, including local employment protocols and legal protections.

Continuing Education

Sending a member of a U.S. firm abroad to manage a local office does not relieve that person of the responsibility of meeting continuing education requirements of the AIA or any of the individual U.S. state licensing boards. Beyond the basic learning units, each state will have its own Health, Safety, and Welfare, Sustainable Design, and Universal Access provisions in its law that must be met periodically. Locating AIA accredited providers in more remote locations may create a challenge. Utilizing online learning opportunities can serve this purpose well for the overseas American staff.

Local or National Business Tax

Generally, tax treaties between the United States and most countries stipulate that an offshore U.S. national will not pay double tax. But determining where taxes will be paid is critical, as tax rates can be significantly higher or lower abroad, depending on the country in question. It may be necessary to provide additional compensation for U.S. nationals living abroad to bridge this gap.

For tax purposes, it may be more advantageous for the firm to establish a wholly owned local office as a separate business entity from the company in the United States. It may also be better to create a "branch office" of the same company. Taxes vary considerably, with some countries even imposing a value added tax (VAT) on professional services.

Legal Representation

Every country operates under its own system of laws and process of resolution of disputes. It is critical to understand the legal framework under which the practice will operate, and to engage a local attorney who can represent the interests of the firm. Many U.S. firms either have representation in a foreign country or have associated colleagues there who represent them.

Banking

Just as in creating a business entity, banking in each country will be subject to local regulations. For example, in Western Europe, banking is relatively organized and simple, but proof of a legal entity is generally necessary in order to open a bank account. Credit cards are rarely used in Europe, where debit cards prevail. Payments for services rendered are generally made directly by wire transfer to the architect's bank account.

In Russia, fee payments prior to construction can be arranged by wire transfer in U.S. dollars through an offshore bank to a U.S. bank. During construction, the Russian central bank makes payments only upon bodies of work that have signed "Acts of Acceptance," and generally pays to a Russian bank account in rubles.

In China, clients will pay in local currency into a Chinese bank account. It is possible to transfer funds out of the country to Hong Kong or other locations, with a percentage deducted as a service charge. It is possible to be paid in U.S. dollars, but this requires Chinese government approval of both the contract and the right to transfer.

Leasehold

Leasing office space will require the establishment of a legal entity signing the lease agreement. Terms are not inconsistent with those found in the United States, but one would be well advised to review the terms from a local legal and business basis. The rate, common area maintenance charges, taxes, and rate increase schedules should be included. Restrictions as to time of use, access, and any other use limitations should be well established at the onset.

Accounting

Understanding the tax codes of the countries where a firm has located offshore offices can be challenging. Frequently it is not possible to attain the information needed to coordinate the collation of revenue and expenses in order to file taxes in the United States by the filing deadline. U.S. tax filing extensions may become an annual occurrence. It is important to consult a domestic accounting firm for a recommendation for colleagues in the country who can best advise and represent your interests there.

When practicing abroad it is usually best to require that professional services fees be paid exclusive of all national and local taxes, levies, fees, exactions of any kind, and that such taxes are paid directly by the client within the countries where the firm is working. Be sure to stipulate in any agreements that fees are for professional services only, and any and all payments on behalf of the project to public agencies will be made by the client directly.

Human Resource Issues

In order to give full attention to the professional services requirements on projects, human resources issues regarding expatriate staff demand appropriate attention and resolution prior to initiating work. They include:

- Relocation costs for residence, vehicles, shipping, and storage
- Establishing residency
- Meeting qualifications for a work permit
- Tax equalization
- Selection of and admission to local schools for children
- Health care benefits
- Emergency services
- Holidays
- Vacations
- Annual trips home
- Continuing professional education
- Clear path for career advancement
- Meeting IDP/NCARB requirements
- Taking the ARE
- LEED AP, BREEAM, or other rating system examinations
- Communications protocols

Employment Issues for "Permanent" Employees or Contract Employees

American firms generally operate with a policy of "at will" employment, which provides maximum flexibility for the firm to adapt to changing market realities. Different operating principles exist in countries where more active social and employment guarantees exist. It is not uncommon for an employer to be required by the government to pay a separation stipend of up to two years' salary to dismiss an employee of the firm. As a consequence, many architects work on a contract basis. The contract has a job description, stipulated fee, and term of engagement. It can be extended, but only for limited occurrences. After that the individual must either be engaged as a full employee of the firm, subject to customary protections, or never be engaged again as a consultant. Contract employees are responsible for paying into their own pension and health care accounts.

Advancement for Local Nationals in the Overall Organization

A U.S. firm operating an offshore office may find it difficult to bring a foreign national into ownership in the overall firm. Depending on the American entity, partnership, LLP, corporation, or LLC, some U.S. states restrict firms from admitting into ownership any individual not licensed in the state. The internal conundrum of advancing one colleague over another, not by virtue of professional competency but by specific licensure requirements, can limit leadership growth and have a demoralizing impact within the offshore office.

Health Benefits

American health care insurance carriers may not recognize illnesses or emergency issues occurring offshore, necessitating local health insurance for employees, spouses, and children. In some countries, health care is a national right, paid for out of national income taxes. These costs, and who pays them, should be researched well in advance.

Vacations

Vacation time that is afforded to employees in the United States is at the discretion of the employer, and the number of hours accrued is often described in an employee manual. In many countries, however, the number of vacation days is mandated by the government, and often in excess of what is customary in the United States. This may be seen as part of the compensation package, and may have residual impact on domestic staff when they learn what their offshore colleagues are receiving.

Holidays

Beyond the customary American paid holidays, foreign countries generally have a number of additional days for specific events or cultural priorities. When assessing the cost of doing business in a foreign country, it is important to carefully research local holidays, festivals, etc., that will not only cause inefficiency with the local practice, but also create unanticipated days of non-communication between offices.

Maternity and Bereavement Leave

In many foreign countries, women are given significantly more maternity leave than is customary in the United States, with their positions guaranteed upon their return. In addition, the male spouse may claim paid paternity leave for a period of time as well. Marriage and bereavement leave is also afforded in some countries.

Software Licensing

In the United States it would be difficult to imagine having the firm raided by private sector individuals to assure compliance with licensing agreements for computer programs. Yet, in some foreign countries, an unexpected visit by a private company armed with a court-provided search warrant may result in confiscation of computer equipment and/or considerable fines due at the time an infraction is detected, or the practice might be shut down. Given the increasing acceptance of sharing software among staff, including the firm's private and even copyrighted materials, without permission, it is not unimaginable to find a firm incurring considerable unexpected and undeserved costs for such infractions. Policies and safeguards should be put in place, and an internal monitoring procedure should be established to protect the firm from actions of those who do not understand their ramifications.

Firms expend considerable resources to hire and train staff. The more experienced a professional becomes within the firm, the greater the expended investment. Continuing education, licensing and sustainable design exams, conferences, and other professional growth packages intended to make the individual more valuable to the firm mount over time. In many parts of the world a culture of professional migration exists, where an employee will leave one firm for another for a small increase in pay. It is important to ascertain as much as possible the longer-term goals of each member of staff, so as to gauge the extent of the investment in professional growth the firm will undertake.

Practicing Internationally from the United States

While many firms have established offices within regions where they are most active abroad, others continue to manage their international practice from their U.S.-based offices. In the early days, offshore clients accepted this arrangement, as they were pleased to have attracted architects with international reputations to design their projects. It offered them master plans and building designs that created a point of difference with those of their peers. But, with so many U.S. and European firms having established offices abroad, the opportunity for daily contact with their architect has made local presence a very compelling competitive argument for firms with local offices to foreign clients.

It has become increasingly difficult to provide architectural services from a distance, without the daily reconnaissance necessary as projects move through the process from master planning to design and into construction. Beyond the obvious inconvenience, some of the other challenges faced by domestic firms practicing abroad are daily communications across time zones with clients and their associated consultants, remote project management, identification and engagement of local consultants, availability of key staff for travel, costs associated with travel, and identifying local technical resources while in country. Additionally, a firm's ability to provide a comprehensive analysis of the contextual factors affecting project design—including site issues, political, social, and economic—will be limited by the infrequency of their visits.

Competing firms will identify the advantages of having local staff available to serve client needs. And in developing countries, where the architect is often requested to provide normal client-side services that are beyond the expertise of the client, project opportunities are often won by familiarity.

PROTOCOLS FOR A STRONG PRACTICE: OFFICE MANAGEMENT

Creating and Following an Entry Strategy

Before committing to opening a foreign office, it is critical to understand the full financial impact. An entry strategy identifies the goals of the endeavor; the human, financial, intellectual, and marketing resources pledged to achieve success; and a limit of what the firm is committing to invest. Without an absolute limit, the firm may extend an ill-advised overage that can damage the entire enterprise.

Exit Strategy

In addition, an exit strategy should be in place that establishes a time frame to meet practice expectations; defines financial limits that will not be exceeded; and delineates all tax, legal issues, and obligations that must be fulfilled in the event of closing a foreign office. These will include contractual responsibilities to clients and statutory obligations to staff.

Business Protocols

Myriad protocols are required to create the framework for a successful offshore practice. Reality may look very different on the ground than it does in theory.

Travel Protocols

It is customary for clients offshore to require that the architect include reimbursable expenses in the fee proposal. They intend to avoid the unpredictable, and quantify and control costs. It is incumbent upon the firm, then, to impose limits on all out-of-pocket costs it will incur. International air travel costs will be affected by pricing policies of individual carriers, as advance booking, demand, and class of service all are variables. It is advisable to define this in the employee manual and select a single individual who is responsible for making travel arrangements and will be accountable for adhering to the protocol. In-country domestic air travel can most often be purchased less expensively if reservations and payments are made locally. A responsible management individual, rather than the traveler, should be appointed to make all such arrangements for both the U.S. and local office staff, as well as for consultants traveling on behalf of a particular project. The firm should define limits on daily expenses for overnight accommodations, ground transportation, dining, miscellaneous travel expenses, and entertainment for all individuals.

Expatriate Staff Protocols

Given that staff will be working in another culture, it is important to provide guidelines that will clearly spell out project and process management protocols, limit financial expenditures and legal and accounting regulations, and establish a productive and comfortable working environment. These protocols for expatriate staff should be established in advance to limit misunderstandings. In addition, they should cover cultural awareness, education, trips home, and other issues that affect the personal well-being of staff.

Managing an Offshore Office

All the resources that would have been at hand at the home office will be less available in a satellite location. In time, resources will be developed locally. It is important to identify competent local engineering and design consultants that will understand the building type the firm will be designing from the perspective of the firm. Alternatively, encouraging domestic consultants to venture abroad, or working with those who already have international experience, simplifies this transition into global practice.

Collecting fees according to the contract schedule often requires thick skin. There will be a thousand reasons why a payment was withheld. Stopping work until contractually stipulated terms are respected often gets the client's attention. If paid in local currency, repatriation of fees may pose a challenge in some countries. Alternatively, getting paid in U.S. dollars in a neutral location, wired directly into the firm's bank account, allows for repatriation of fees without conflict, and for more efficient management of the practice abroad.

Communication with the home office across time zones can be effectively accomplished through several electronic means. E-mail, Skype, and online meeting software are among the available tools. But a firm can take advantage of time zone differences to increase daily productivity by collaborating between two offices. Jointly sharing projects can remove the sense of isolation and improve the culture of a single firm with multiple offices.

SUSTAINING A STRONG PRACTICE: GETTING BUSINESS

Design Competitions

In many countries within Europe, Asia, and the Middle East, design competitions are an integral part of the architect's process of gaining commissions. Sometimes this is policy dictated by the local government to promote access by the widest pool of design talent. In other instances, a design beauty contest is mandated by the client or by the municipality that will be entitling the property for development. Even in the instance where an architect may be preselected by a client where an existing relationship exists, the client may be required by a public agency to submit multiple schemes by separate architects. Rarely will the architect be adequately compensated for such work, and even if the client is successful in attaining the development rights, another architect may be designated for the ongoing design as a condition of the client attaining development rights. Firms should proceed with caution, and should determine the nature of the selection process with the client prior to assuming this risk.

Contracts

Once the commission is assured, offshore clients, particularly in the developing world, seek absolute certainty in owner-architect agreements that define the scope of work, deliverables, time schedule, compensation, payment schedules, and reimbursable expenses. For many foreign clients, Additional Services suggest that the architect did not fully assess the costs at the outset and are generally viewed negatively. It is important to be quite specific in defining Basic Services, what constitutes Additional Services and how they are different from Basic Services, as well as how Supplemental Services are distinct from both. Be sure that the client understands and can distinguish the differences between them.

It is rare to see an offshore client consider architecture fees calculated as a Percentage of the Construction Cost. They may not want the construction cost identified beyond their organization, or may not want to provide an incentive for the architect to overdesign a project to increase fees. Few will accept a Cost-Plus method of fee calculation because it is an open-ended approach, with no certainty. Flat fees, very often generated on a square meter–rate schedule basis, are understood, accepted, and very difficult to adjust once agreement has been reached. This does not imply that a competitive fee negotiation will not occur, but it does provide a framework within which to begin the discussion. There will almost always be a negotiation.

During fee negotiations the firm should calculate actual labor expenses to provide the deliverables wherever they are being provided, be it in the domestic or foreign location. Each will have different costs, direct and indirect, as influenced by local business conditions. Projecting fees into the future to account for inflation, salary increases, increased costs of business, currency fluctuations, inflation, and the like are important. Everything takes longer than anticipated, and fees should be determined in a manner that estimates the uncertainties.

Offshore fees are generally listed by both phase and stage, such as Phase 1: Schematic Design, Stage 1, Stage 2, and Stage 3. Include the number of meetings, together with the location of those meetings and who from the firm will attend, including consultants under the same contract. Determine the number of overseas or out-of-town trips, and who from the firm will be committed to make those trips.

Reimbursable expenses, or out-of-pocket costs, are somewhat unpredictable, and clients want the architect to bear the risk. Carefully evaluate the costs of airfares, hotels, meals, professional renderings and models, professional photography, printing, and binding of multiple copies of presentation documents as stipulated in the contract.

While the AIA has produced standard documents for use overseas, it is more likely that the client will translate the architect's proposal into a format that can be accepted by internal legal departments or, in some cases, by the government. Dual language agreements produced by the client should be checked carefully by the architect for compliance with the intent of the proposal, and for consistency between the two languages by a professional legal translator knowledgeable of technical terms as the local language usually prevails in the event of disputes. Clients will require a proposal, but there is no guarantee that the terms stipulated in an architect's proposal will be faithfully included in the contract provided by the client. Read everything carefully, and negotiate again until the contract reflects a fair interpretation of the architect's intent. A schedule of payments, including a nonrefundable mobilization payment applied against the last installment under the agreement, should be included.

In many cultures, negotiation only begins when the contract is signed. Articles of Acceptance is a commonly utilized document in many developing countries which concludes one stage or phase of a contract, and is necessary to be issued by the client in order to advance to the next stage or phase. However, a firm should be aware that it is often used as a tool to squeeze more out of the architect and their consultants than was negotiated for in the agreement. Inexperienced clients assume the architect will provide anything they need, despite the number of changes they make, even if out of sequence. Many firms report difficulty in collecting the last 15 percent of the fee. Plan ahead, seek a mobilization payment up front, and never put the firm in a position of risk or financial compromise.

► Negotiating Agreement (15.3) addresses the skill of negotiation in detail.

It is not uncommon to find clients cutting off design services earlier than the architect anticipated, even negotiated in the agreement. This limits the ability for the firm to provide quality assurance during subsequent design and construction phases. It is important to discuss this thoroughly with the client in advance and to address it in the contract. Additionally, local architects often attempt to renegotiate their scope of work during the process of design, as they are often well positioned with local officials, design institutes, and contractors. Creating an "associated architects" relationship, with a clear division of responsibilities that will transcend any particular project, is a useful way to avert this pitfall and to create a more collaborative working protocol.

Terms of Engagement

Defining the firm's terms of engagement before taking the decision to enter the challenging waters of international practice is not only common sense, it's practical. Tested suggestions include the following:

- *Never fall in love*. The architect who is too desirous of a particular commission will be put at a negotiating and collecting disadvantage. There is a reason why a client determines it is in their best interest to cross the world to engage an American architect. Maintain that advantage.
- *Get paid in advance*. In a foreign country there is little political leverage to help a firm recover costs once spent. There is a significantly reduced chance of legal justice for a foreign national in another country, and the legal costs and time are unpredictable. If a firm finds it is overextended, it may be advisable to withhold delivery of documents until all outstanding fees are collected.
- *Deliver on time*. There is rarely sufficient time to complete any phase of an assignment overseas based on U.S. practice standards. The firm that meets challenging time constraints can leverage the success to secure the next commission.
- *Exceed expectations*. If the firm is paid in advance, it is important for the client to appreciate that in return the architect has provided more than what was negotiated for in the contract. They will double-check the work product against the list of deliverables in the contract. Depending on the situation, it may also be beneficial to deliver the work product earlier than the anticipated date.
- *Add value*. Beyond producing a creative design that satisfies the program and fulfills the client's expectations, it is important to think like the investor and add greater than expected value. This may be measured in building cost, building efficiency, or the rental rates that result from a superior design product.

RECOMMENDATIONS

The playing field abroad is occasionally difficult to read. For private sector projects, the development process may be upset by frequently changing planning guidelines and building code adjustments applied retroactively. International code consultants are available to firms to advise on these matters. Means and methods of construction will require re-education for the U.S.-based practice. Keep an open mind.

Practice abroad brings special challenges but also offers opportunities for architects to bring their holistic skill sets to the process. In order to be effective within a foreign culture deploying a process that requires a comprehensive understanding of the place and the special nuances that define its unique difference, it is often the best place to begin.

Recommended Professional Practices

The obvious is not always obvious. When practicing in another country it is important that the firm appreciates that it is a privilege to be invited, rather than a favor that the firm is offering the client. Several practices are important to observe:

- *Respect the host country's history and culture*.
- *Appreciate the visible and invisible context*.
- *Be professional at all times*. Do not compromise your standards of practice.
- *Raise the bar of professional practice locally* by introducing best practices and new technologies, among other opportunities.
- *Be patient*. The common business practices by a client or public agency in the U.S. may still be maturing abroad, causing the architect to be asked to revisit design issues repeatedly to achieve a shared level of comfort.
- *Be flexible*. Practice methodology will most certainly be altered overseas. It is important to maintain focus on the desired outcome over the means of achieving it.
- *Bring value*. The expectation that the U.S. practitioner will bring unexpected and quantifiable value (revenue) to a project should be confirmed through the design process.
- *Bring vision*. Many see this as the creative century. Design is currency. Bold but practical design offers not only vision but also viability. Think globally, but design locally.
- *Build community*. In many developing countries the space between grand master plans and iconic building is ignored. Meeting building program objectives is only one obligation of the architect. But there is an opportunity to build social interaction and community through genuine engagement with local residents and practitioners.

Common Pitfalls

Architects are human, and occasionally bring attitudes that create unnecessary obstacles for themselves. It is difficult enough to practice abroad, so be careful to avoid the pitfalls below, many of which are corollaries to the recommended practices:

- *Do not bring preconceptions or biases*. Keep an open and inquisitive mind.
- *Do not be arrogant or disingenuous*. Clients are sensitive and deserve respect.
- *Do not be seduced by an opportunity*. Maintain balance by evaluating every prospective project on its merits, including business terms.
- *Do not forget the firm's terms of engagement*. They will keep the firm focused.
- *Do not undervalue the firm's contribution*. There is a reason the firm has been invited to submit a proposal.
- *Do not underestimate the competition*. U.S. and foreign firms sometimes apply different ethical standards abroad.
- *Do not limit the process by applying the firm's specific experience*. Apply knowledge and wisdom.
- *Do not compromise the firm's core values*. This is the most important element of a firm's culture.

CONCLUSION

There are certain challenges inherent in practice abroad, and several residual benefits. They should be anticipated, embraced, and mined to the benefit of the domestic practice as well.

Challenges of Practice in the Global Marketplace

When firm leaders are busy growing the practice abroad, the challenge of overcoming inconsistencies with staff at home and staff overseas exists for several reasons. Among these are logistics—time lost in transit, physical impact of multiple time zones, absence from the office, and family and personal needs. In addition, there are issues of design quality assurance and the understanding and acceptance of the quirks and benefits of the foreign venture to the owners and professional staff back home.

Clients Don't Know What They Don't Know

Practice abroad exposes the U.S. architect to three potential client experience climates: first world, developing economies, and third world. In Western and much of Central Europe, Japan, Korea, Hong Kong, Singapore, Australia, New Zealand, Canada, and parts of the Middle East, first world competencies exist. In the third world, most clients seeking U.S. design competencies understand that they need significant leadership from the design firm. But in developing economies, where fortunes have been made in export trade, manufacturing, or exclusive licensing of market activities, clients embarking on significant real estate ventures may not know what they don't know. They will not know whom to ask or trust, which puts the architect in a precarious position, since client direction may change with every new opinion. Caution is advised—securing written approvals at every stage of each phase of services will offer some, but not complete protection.

Benefits and Entrepreneurial Results

Benefits abound from global practice experiences for the firm sufficiently prepared to seize opportunities in a professional and cautious manner. Once the overseas practice is established and its workload is stable, the firm can use geographic distance to compensate for domestic recessions. It can facilitate the concept of a 24-hour office, which may bring production efficiencies to the firm, particularly for projects facing compressed design schedules. It can also create flexibility with staff assignments.

The firm may attract higher-level applicants and retain its strongest staff by offering international travel opportunities as well as offshore living and educational experiences, all of which may broaden and deepen the firm's competencies across the board. Global practice can enhance the firm's communications skills, encourage more strategic thinking, and produce more effective design decision making.

At the same time, the firm may be able achieve growth in its domestic portfolio by securing commissions abroad for which it would never have been considered at home, enabling it to then become competitive in new, more complex domestic markets. With the experience of practice abroad, the firm may be able to serve domestic clients as they seek to expand their operations in foreign markets.

In addition, with an offshore office the firm has an opportunity to associate with a foreign practice that brings the benefit of learning from peers who will see practice in their country from a different perspective. There is also the opportunity to form a long-term relationship that can foster more predictability in project delivery, greater efficiency, and improve the marketing of future projects.

Sustaining the Firm's Core Values in the Global Marketplace

Before venturing abroad, it is critical to commit to the firm's core values. Without confirming or establishing a firm's core values, it becomes more difficult for those entrusted to look after the firm's interests abroad to act in the firm's interests or have their performance measured effectively. Planting and growing the culture of sustaining the firm's core values overseas takes daily vigilance. The firm's reputation is at risk, and must be secured without question, or it will fall to the lowest common denominator. A firm normally takes years to confirm its reputation. Practice abroad, when approached thoughtfully, and when a firm maintains it core values in the effort, offers the opportunity to further enhance the reputation and the capabilities of a firm.

For More Information

International Practice for Architects (Wiley, 2007) by Bradford Perkins, FAIA.

Managing International Operations: A Guide for Engineers, Architects, and Construction Managers (American Society of Civil Engineers, 1997) by Roozbeth Kangari and Chester L. Lucas.

Competing Globally in Architecture Competitions (Architecture in Practice) (Academy Press, 2004) by G. Stanley Collyer.

Union Internationale des Architectes ("Practice Overseas"): www.uia-architectes.org.

5.9 Developing and Managing Multiple-Office Firms

Deborah M. DeBernard, AIA, NCARB, Architect-AIBC, LEED BD+C

Although many architecture firms are single-office enterprises, there are numerous reasons for firm owners to explore the possibility of expanding into more than one office. However, multi-office firms can be a challenge to lead and manage. Savvy owners will thoughtfully craft a business plan, organizational model, and strategic plan that mitigate these challenges.

PART 2: FIRM MANAGEMENT

INTRODUCTION

The decision to expand to multiple offices is one that few firms choose. For some, staying in one office is a decision of conscience based on a belief that a single location brings the greatest benefits to clients and staff while providing the highest quality; others are fearful of the many challenges inherent in multiple locations; and some have never been presented with a convincing business opportunity. Yet there are many examples of thriving firms with multiple locations.

"Although the majority of architecture firms have one office, just over 10 percent have multiple offices. Approximately two-thirds of firms with 10 to 49 employees and one-quarter of firms with 50 or more employees have one office, and 43 percent of the firms with 100 or more employees have 5 or more offices. The majority of firms have offices that are located exclusively in the United States, with just 2 percent reporting that they have offices overseas," according to *The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics*.

▶ See Demographics of Practice: 2012 AIA Firm Survey (2.2) for the percentages of multiple-office firms in relation to firm size.

Although many architecture firms are single-office enterprises, there are numerous reasons for firm owners to explore the possibility of expanding into more than one office. Once that single-office barrier has been broken, architects can open more offices

Over her 28-year career Deborah M. DeBernard has held responsible positions in four multi-office national firms, including her current position as director of acquisitions for Dewberry. In each, she has been central to creating a strategy for success. DeBernard was the subject matter expert for "Leadership" for AIA's Soloso™ Editorial Control Review Board.

to create regional, national, or global practices. Reasons to expand into multiple locations include:

- Creating new opportunities for staff members as new leadership and project positions are created
- Diversifying the practice by including new geographies, markets, clients, staff, cultures, approaches, or ideas
- Taking advantage of the desire of a senior partner or key employee who wants to relocate
- Expanding the reputation of the firm's expertise by creating a broader platform for the firm to perform services
- Better serving a client who has projects in multiple regions
- Improving the potential for winning work by having a local presence in a growing area where projects are often awarded to local architects
- Increasing revenues while controlling overhead costs through the use of centralized human resources (HR), accounting, technology, marketing, legal, and risk management departments (and thereby increasing profits)
- Reducing risks on projects being performed outside the normal geographic "reach" by increasing local knowledge, improving opportunities to build relationships with the client, contractor, and others, or taking a prime role on the project

Steve McConnell, FAIA, LEED AP, Managing Partner at NBBJ (which has six domestic and four international offices) says, "Having multiple offices broadens our overall understanding, providing multiple perspectives of architecture and our client's business. The fresh eyes and experiences that come from opening a new office location infuse our practice with diverse viewpoints. This new way of thinking is often the springboard to an idea that differentiates us from our competition."

While some practitioners use their single-office status to control quality, design, and client relationships, others believe that there are means to prevent degradation while at the same time accommodating expansion. McConnell describes the framework that makes NBBJ's multi-office network a success as "one of high attention to culture and alignment, where all of our offices are fully integrated using one business model. NBBJ staff has a common framework for culture and value, while simultaneously respecting the differences that occur in multiple offices."

Moving into a multi-office business model is not for every firm. However, when single-office firms successfully expand into multi-office firms, they can create a momentum that brings benefits of greater stability, independence, and opportunities.

DISCUSSIONS ABOUT DEVELOPING A MULTI-OFFICE FIRM

Expansion often begins with a market analysis associated with a strategic planning session. This market analysis may indicate that the local market is declining or that other markets are expanding. This information may propel a firm to consider new geographies that are ripe with opportunities that match the existing skill set or market expertise of the firm. With a depth of experienced staff and portfolio in health care, for example, one might look for regions where health care spending is anticipated to grow. Targeting specific cities where industries are relocating, population is expanding beyond the national norm, or emerging business ventures are poised to succeed could serve as likely candidates for a branch office opened to serve a new geography. This type of expansion is aimed at bringing existing expertise to new clients that are located in a new area and generally requires relocating a key staff person.

Alternatively, the strategic hire of an architect already located in the targeted area can be the impetus for a new office location. In this example, the expertise of the strategic hire would not necessarily be limited to the current expertise of the firm. New markets in new geographies can be initiated simultaneously in this fashion.

Existing clients that have projects in multiple locations is another reason architects open new branches. In particular, existing domestic clients with an international reach may be the nexus of a jump from a national to an international practice.

General contractors involved in design-build project delivery, specialty MEP engineers, program managers, landscape architects, or other allied professionals can become strategic partners to a firm's expansion if they are located or regularly work in regions that have been targeted.

Large projects located outside of a firm's normal geography often serve as the starting point of a new office. William Hooper Jr., AIA, Principal at Gensler (which has 40 offices worldwide) explains, "In 2007 Gensler began to work with a client in Asia who was investing in both master-planning development and tall towers in the region, including China. That work became so large in scale and continuous in flow that Gensler and the client started discussions on more permanent collaborations. This resulted in the establishing of a new Gensler office in Southeast Asia, largely dedicated to the client. Similarly, Gensler was selected to provide design support to a major U.S. law firm on the design of its flagship office in the Midwest. From this highly successful relationship came requests for new work across the globe, from the Middle East, through Europe, to South America and Asia. With each of these projects came the parallel opportunity to form a local office with the staying power to remain viable after the initial design work was completed. This model provided a reliable underpinning for six to eight months of work, and the ability to become self-sufficient within 18 months."

Once a region or area is targeted, a detailed market analysis should take place that examines market need/trends, staff/recruiting availability, existing portfolio alignment with market needs, competition, costs, and alignment with a firm's mission and values. This analysis provides the factual foundation for better decision making.

MIAMI OFFICE CASE STUDY

Florida was one of the most affected states in the country from the 2008 housing crisis and mortgage crash. At the time, Florida's economy was not well diversified. Florida's economic structure was built upon the success of tourism and local construction. When the market collapsed and the recession occurred, tourism activity slowed tremendously, property values plummeted, and state revenues dramatically decreased. The construction industry encountered unemployment rates in excess of 14 percent in Florida, with local governments facing large budget deficits.

Ignacio Reyes, AIA, LEED AP, Corporate Director of Development and Vice President at Leo A Daly (which has 30 offices worldwide) explains, "For Leo A Daly, the issue was the decision to maintain an office in the most populated area of Florida, the city of Miami, during the challenging economic events of 2008 to 2011. With the economy damaged, local governments without resources, and the political climate dramatically altered, maintaining an architectural practice in South Florida was a daunting task. The process used in the decision to maintain operations (similar to opening a new office) in South Florida involved many factors, individuals at various levels within the organization, a solid understanding of current economic conditions as well as faith in the future of the area."

LOOKING EXTERNALLY

Reyes continues, "We approached the process starting with an inventory of the existing conditions of the marketplace. We reviewed the current census demographics to understand the existing population and their associated needs. We gathered the proposed or existing area economic trends in terms of active building markets over the last five years and the last twenty years. This process helped to build a solid basis of local area understanding and fundamentals. Demographics consistently pointed to an increasing elderly population whose survival rate continued to increase. The demographics alluded to a greater need for health care services for a longer period of time within this state."

The inventory process continued with the mapping of industry-related regulations for growth, such as the processes to approve new health care projects in South Florida, or how the legislature was appropriating funding for education and other general services. Getting an understanding of the current and likely political and regulatory realities was a crucial part of the analysis.

"Our inventory also outlined the existing local competition for architectural and interior design commissions, listing which firms might leverage themselves within our region or core service markets. This enabled us to look at our own strengths and weaknesses in comparison to potential competition. Then we looked at our ability to recruit highly trained, sought-after professionals from local institutions. We needed to know if the current marketplace would have high-quality graduates that would help support the mission of the office or whether the cost of living concerns would be detrimental

(continued)

to recruiting new talent. Our team had to be prepared with solutions to potential concerns for staff availability," says Reyes.

The next step was to understand the projected needs for the area in terms of planning, architecture, engineering, and interior design. For example, by 2010 the Miami hospitality market had experienced various developer foreclosures and deals that never went forward. By 2011, the market stabilized and an increasing amount of potential project opportunities led Reyes to believe that the market need would match up well with one of their core design services. In addition, financial banking institutions from foreign investors were acquiring wholesale office zones within Miami to position themselves as institutional leaders to Latin American markets. This prompted Reyes to believe that corporate commercial banking intuitions would continue to grow and that this asset class would provide both architectural and interior design opportunities for the Miami office in the future.

"We utilized every database and publically available dataset, searching for projections and forecasts to help confirm, verify, or even question the data and information we were getting from other, more traditional sources. We analyzed everything. And after a review of the conditions and market needs, we could see the greater Miami-Dade region becoming very active in the next 24 months in hospitality, interior corporate commercial projects, and continued long-term governmental service projects. With this information, we evaluated how these market trends and needs, combined with the statistical demographic data, aligned with the market sector specialization within Leo A Daly," says Reyes.

LOOKING INTERNALLY

Whether a firm is looking to maintain an existing branch office or opening a new office, a financial analysis determines the cost of such an endeavor, including

- Office purchase or lease
- Local incorporation or registration
- Equipment purchase or lease
- Overhead costs for start-up, insurance, hardware/software/licenses, maintenance, taxes, indirect travel, marketing materials, updated business cards/stationery, and technology
- Indirect salaries of personnel responsible for introducing the firm to the marketplace and developing new client relationships, including dues for local organizations
- Direct salaries of personnel responsible for executing the services
- Relocation and travel
- Public relations campaigns
- Communications and data transfer between offices
- Demand and consumption of senior management and corporate time for support activities

A cash-flow analysis including the costs and the expected revenue (weighted for likelihood of selection and start-up) from successful commissions provides a resource to determine when, if ever, the new office will become feasible. This projection should be as realistic (neither overly optimistic nor overly conservative) as possible, guarding against the temptation to believe that new commissions will be accurately predicted in terms of quantity, start-up time frame, or extent of services. Building a strong contingency into the plan will increase the probability of success.

Reyes describes a step often overlooked when the decision is made to expand into new geographies: "Our final step is to evaluate the region's trends, needs, and market alignment compared to the vision of the firm. We believe strongly in design excellence and in exceeding our client's expectations, from design solutions to service engagements. We ask ourselves whether being in a specific location would give us the ability to support our vision and whether we are willing to financially support the office until the office is financially viable. This process led us to the conclusion to maintain the Miami office through the difficult economic conditions in South Florida while repositioning our Miami staff to better align with the current and projected market conditions."

The basics of the internal and external analysis have to create a promising future, but the most important aspect remains the dedication and commitment of the leadership of the new enterprise. Dan Pleasant, PE, COO of Dewberry (which has 40 locations) explains, "A dedicated, energetic, positive, highly respected office leader who is responsible for successful operations is the single best indicator for us that a new office will thrive. We feel that this person must have a strong knowledge of our internal processes, existing good relationships with the key leaders including the corporate group, patience, internal advocacy, and the passion needed to make this a success." Firms that are able to capitalize on relocating a principal fitting this description have a very strong advantage.

ORGANIZATIONAL STRATEGY

Once the decision has been made to expand, firm leadership must turn to the question of organization. The chosen organization should support the culture and values of the firm, such as degree of transparency, information sharing, decision making, and ability to offer appropriate solutions to clients. Generally, these organizations will be either market-based, where individuals in multiple offices form a business unit around a market (e.g., higher education or health care) without regard to their physical location; or geography-based, where individuals located in a single office form a business unit and pursue work in any market based on the collective expertise within that single office.

Market-Based Organization

Dennis Petersen, P.E., President of Lockwood, Andrews & Newnam, Inc. (LAN, which has 14 offices) says, "There is but one reason to define an organizational structure—increase the odds of success, while remembering that an organizational structure is just a tool to sell more work and deliver quality products more efficiently. It is not the solution. With five market sectors across fourteen geographies, LAN consciously elected to organize around market-based profit centers. Our goal is to serve our clients with processes and expertise that are directly relevant to them. Simply, each market sector is designed to 'fluently speak the client's own language.' Technology, terminology, methodology, selection, pricing, contracting, project delivery, culture, and even acceptable dress codes can vary greatly by market sector. For example, a municipality, a transit agency, and the Corps of Engineers are all units of government, but very different in the selection and execution of projects. We believe it to be very difficult, if not impossible, to sell generic services into a specialized marketplace. To counteract that, we have built our market sectors as 'Centers of Excellence' amassed over multiple geographies."

Petersen believes the market-based organization provides many advantages:

- Experts can sell precisely what they know best to clients they understand—that equates to more wins.
- Workload balancing across geographic boundaries is simplified because all market sector staff is specialized in the same industry.
- Specialization generally equates to production efficiency.
- Cross-geography communication, innovation, and ideas flow more freely.
- Market sectors can choose to locate in geographies with the best potential for success, not where current offices are located.
- Supervision and mentorship are from leaders that understand the employee's marketplace, providing for more effective training.

Likewise, Moseley Architects (which has six offices), reevaluated its organizational structure in 2011 and felt that it could better serve clients by shifting to a market-sector focused organization rather than a geography-focused organization.

Jim McCalla, AIA, vice president of Moseley, explains, "We currently have six locations, and several of these locations serve the same sector and/or multiple sectors. Having restructured our organization to function by market sector, our leaders are better able to access market-specific knowledge and talent across the firm rather than concentrating on personnel who reside closest to the client/project. This allows us to work together regionally and provide the best, knowledge-based solutions to clients. The result is that every member of our organization is assigned to a specific sector and consequently focuses their professional development on becoming knowledgeable about the issues that affect that particular sector's design solutions/options."

From an operational and financial standpoint, the new approach benefits the firm by allocating resources, promoting camaraderie among like-minded designers, strengthening client relationships with in-house experts, and reducing duplicative efforts. McCalla says, "We have already begun to realize many of these goals and achieve additional benefits, including staff demonstrating increased ownership for projects within their sector. Historically, if a designer in our Charlotte office was working on a Richmond project, there was an 'outsourced' view from both offices. Now, every member of the sector is demonstrating the same level of effort and interest in their sector's projects regardless of their zip code. Additionally, sector leaders are conducting regular meetings with the entire sector, so staff in different locations are benefiting by regular communication with the firm's leaders. Staff feels engaged creatively and professionally, with an increased interest in their production from the firm's leaders—who in some instances are in another state."

Geography-Based Organization

A geographic-based profit center model can be very effective if (1) firms are providing similar services to one client base, (2) the offices are considered coequals, (3) leadership is balanced among the offices, and (4) high accountability is an important goal. Geography-based profit centers provide the strongest model for accountability, where every decision—from which office the firm leases, to client pursuit costs, to strategic hiring, to printing—is tracked against a single budget and plan. Disagreements about costs that are shared between profit centers, such as leases, fringe costs of personnel supporting multiple locations, and underutilized staff are minimized under this model. Communication is generally face-to-face, and a sense of team identity is easier to accomplish when all firm members are physically located together.

However, there are many details to work out in the development of geography-based multiple-office firms. There are no right answers to the following questions, yet each one of them needs appropriate consideration when setting up a geography-based business model. These considerations are:

- *Collaboration vs. competition*. Are offices expected to share information about their successes and failures, and to what level of detail? Can offices compete for the same projects? Are their specific marketing areas defined for each office? How can small offices invest in strategic initiatives that are difficult to fully support?
- *Working relationship*. When geography-based offices work together, what are the rules that determine the working relationship for establishing fees, sharing profits or losses, or determining appetite for risk with design-build or design competitions?
- *Harnessing and maximizing expertise*. Who determines the best use of subject matter experts when they have competing deadlines? How are costs for conference attendance or presentation events shared? How do all offices know and access the strengths and experience of the firm's experts?
- *Overhead costs*. Is the methodology for spreading shared overhead costs for corporate leadership, legal, risk management, human resources (HR), and accounting across each office by gross revenue, net revenue, total salaries, or direct salaries? What is the process for discussing, and who makes the final decision on changes affecting each office?
- *Staff leveling*. How do the offices communicate about staff who are over- or underutilized? What is the process for sharing staff across profit centers? What happens when shared projects performance suffers? Is there a difference between a short-term loan and a long-term loan? How are travel and other costs associated with staff sharing handled?

OPERATIONAL BUSINESS MODELS

Whether a market-based or geography-based organization, determining what services to offer and how to launch a new office will depend on availability of financial resources, comfort with risk-taking, leadership effectiveness, strategy, and vision for the future. New offices are often launched in "phases" where the risk of a full-service office start is mitigated by starting with a smaller effort:

- A phone number, a local address, and a strong communication connection back to the headquarters, where personnel respond to initiatives on demand. Care must be used not to overstate or misrepresent the capabilities of such an office.
- Staging one or more staff in a new office that is responsible for business development and marketing efforts, with all services performed in more established offices. Often this effort begins with staff working from their residence or from executive office space.

- A shared office with a strategic partner, allied professional, or client. These arrangements can be made with partners already established in the new geography or with those sharing the desire to move to a new geography.

Once underway, additional office(s) can function as a

- Project office, where all or nearly all staff is focused on a single client's project
- Satellite office, where most if not all decisions are made at headquarters with the branch office carrying out the plan
- Branch office, where the vision and strategy of the firm guides the decisions of the branch office but the responsibility for performance rests primarily with the individual office

Culture

With a small to medium single-office firm, ideas such as unity of purpose, cultural identity, decision making, authority, shared vision, and autonomy are inherently more consistent than with a multi-office firm. The direct, consistent communication possible when everyone is co-located makes each one of these concepts more manageable. If firms have not given enough consideration and definition to these ideas, tensions can arise as they grow and expand into new offices.

To ensure that the existing culture is understood and embraced by all offices, write a statement defining the goals, values, and vision of the firm that leaders, regardless of location, share and support. This is not a quick step but rather one that requires thought, rumination, reworking, and integration. The words on the paper will carry no value unless they are understood, felt, and embodied consistently by leaders in each of the locations. These leaders should reflect this culture with ease by using the vocabulary captured in the vision statement in everyday conversations and taking actions that demonstrate the described qualities in and out of the office.

Next, create an organization chart that serves as a communication and decision-making tool. It should be understood among the leaders of the firm who has authority to make decisions and at what level.

Then determine which services will be provided centrally and which will be provided in each office. While there is more than one solution, most multi-office firms provide centralized finance/accounting, HR/benefits, and legal support. The provision of centralized or decentralized marketing and information technology (IT) services is less consistent. Other aspects to consider are the offering of training, material and detail libraries, document retention, file management, quality assurance/quality control, and public relations. Once those centralized services are defined, it is important to understand how each of the components will work together. For example, while the basic training of project managers to understand project finances, setting project fees, costs-to-complete, and management of accounts receivables might be handled centrally, who is responsible for regular project management mentoring or corrective action? Likewise, the development of collateral materials that are needed to pursue emerging markets can be handled centrally, but the process of making assignments of a central marketing staff for competing marketing deadlines should be determined in advance.

Employee Handbook

Human resource needs increase when firms have multiple offices. Questions arise about how employees are treated in one location versus another. It may be common for offices in Arizona to have a four-day workweek in the summer as a means to reduce the need to cool the office, or for offices in large metropolitan areas to have very flexible start times as a means to mitigate commuting issues. Employment standards may also vary, such as how overtime is handled in California, where nonexempt employees shall not work more than 8 hours in any workday or more than 40 hours in any workweek unless they receive one and one-half times their regular rate of pay; whereas employers in Virginia need only adhere to the federal mandate to pay overtime for hours worked in excess of 40 hours per week. Consulting with a state's Industrial Relations Board or an attorney who specializes in labor/employee relations can yield these differences. Once known, an employee handbook can institutionalize these practices and become an easily accessible communications tool for all offices.

▶ Human Resources Management Overview (8.1) further addresses employee handbooks and includes a sample template.

Dave Francis, corporate director of HR at Dewberry, says that "an employee handbook is a key element to effective HR management. Employees and management at all levels are constantly seeking information and guidance on how to handle the situations they face in their professional lives. This need is heightened when offices grow and move into new locations with differing social norms. Well-defined company policies provide an opportunity for top management to convey company culture in the day-to-day operations of the business and how employee issues are to be handled. Make no mistake, you can never and should not endeavor to create a handbook that will address each and every situation that arises—it is just not possible. Focus on the issues that are most frequent and/or can cause the most difficulty. An employee handbook should evolve as experience clarifies the day-to-day needs of the organization."

Branding

A firm's brand is one of its most valuable assets. It conveys the firm's "corporate personality," combining business objectives with unique corporate culture in a manner that is appealing to clients. As firms take on new offices, it is important that the brand identity established for the original firm is strong enough to transcend the new geography so that it becomes a sales asset for all offices. Even firms that are long-established can benefit from a brand refresher as they expand their influence in new markets and locations.

In 2010, Dewberry undertook a branding exercise that was intended to help clients understand better the architectural, engineering, and consulting services offered by the firm. Dewberry director of communications Molly Wagner says, "It's tempting to jump into the fun stuff—the 'what'—a new color palette, new logo, new typeface. But it's important to stop and think through the reasons behind the branding effort; because by changing your brand you are changing how you will be perceived by your clients, teaming partners, and your current and future employees. When you sit down with the management of your firm to ask the 'why' questions, start with culture. Does the culture of your firm support the kind of changes you are contemplating? If you manage a dynamic, fluid organization, changing your visual identity may be readily embraced. If your firm is resistant to change, consider how altering your identity will impact your audiences, both internal and external. Taking the time to analyze what your culture will support will have a big impact on how employees embrace the change and share it with their clients and colleagues."

After interviewing clients, Wagner believed that it was important for the firm to know how Dewberry was perceived in the geographies surrounding its offices. In addition, she wanted to test whether all services offered were understood and what about the Dewberry brand was perceived consistently.

Wagner explains, "We found that our clients perceive us as highly committed to their success, high-performance, and knowledgeable. We also discovered that we needed to better promote our visionary solutions. This helped us develop a master branding document that provides the framework for external position statements and tailored messages for all disciplines. We then took a hard look at how the branding outcomes would be managed in the future. Our efforts produced more highly functioning electronic communications tools for our website, social media channels, and multimedia content delivery. We use these tools when we orient new employees, in our internal and external communications, and in our everyday language. The results of our branding exercise enabled us to successfully refine our messaging across our 40 locations."

▶ Public Relations and Communications (6.3) further discusses the importance of branding to growing a firm's business.

Managing brand components (e.g., a website, promotional materials) and driving consistency across multiple offices requires additional staff. "We created a new position within the communications department to develop relevant, up-to-date content for our website and social media channels, so that the new Dewberry story could be effectively and regularly broadcast," notes Wagner.

Standards and Templates

Standards and templates are useful tools in many firms, but they become increasingly important as a firm expands into multiple offices. Standards allow various offices to work together more easily, as each team works from a common platform where projects of all kinds can be worked on independently and then combined at appropriate times. Standards can apply to software platforms, hardware specifications, details, stationery, business cards, office furniture, supplies, presentations, project deliverables, title blocks, banners, jobsite signs, websites, social media, and more. Standards can create flexibility where parts can be assembled and reassembled to suit the need and create efficiency. This allows teams to spend time on their unique approach to solving a client's issues rather than, for example, creating new graphics each time a presentation is made. Producing common deliverables also helps clients intuitively understand that each of the components is being offered by a single firm with a consistent, credible message.

For multi-office firms, there may come a time when the firm outgrows a centralized marketing and graphics department's ability to produce all materials used in business development, marketing, presentations, banners, signs, website, and social media. At this point it becomes increasingly important that a graphic standard is in place to ensure that printed and multimedia materials have a cohesiveness that helps clients connect emotionally to the firm and the promise made through that identity.

Sian Imber, Corporate Director of Public Relations at Leo A Daly explains, "Visual consistency is the key to the success of a brand's graphic identity. Its impact depends on consistent use in many impressions over a long period of time. A successful logo, for example, becomes familiar by repetition and is not interpreted as a word but is read visually by the brain, evoking a complex set of associations more powerful than words. A brand's graphic identity is, however, rarely comprised of just a logo but an entire visual language whose usage is guided by a graphic identity manual and templates."

The graphic templates are carefully planned frameworks used to organize information in two or three dimensions. When used correctly, the template assures consistent good design while maintaining a cohesive visual language. Imber explains, "Templates guide the user on the appropriate options and placement for the corporate title, logo, approved typefaces including point size and style, and approved color palette, while also guiding additional content, including quantity and placement of copy, required ratio of white (or negative) space, headline style and hierarchy, image size, resolution requirements, and placement."

Imber recommends developing templates that are highly flexible, extremely efficient, and that allow for growth as new design elements are added. "Templates should serve as a guide for all users with varying degrees of graphics proficiency and provide a recipe for correct use. They also allow the user to focus on the content rather than the graphic representation of the message. An effective template saves time, guarantees visual consistency, ensures a professional end result, and prevents the proliferation of different logos, colors, typefaces, and layouts that bedevil architecture practices with multiple users, applications, and offices in several locations," says Imber.

MANAGING A MULTI-OFFICE FIRM

Strategic Planning

When offices in different locations are striving to work together effectively, strategic planning becomes even more important than it would be for a single-office firm. Strategic planning offers an opportunity for dialogue and consensus about the mission and vision for the firm, what preparations are needed for the future, how a firm will anticipate and manage change, how to align all stakeholders on strategy and tactics, and the means to streamline decision making.

► Strategic Planning for the Design Firm (5.3) discusses how a firm's leaders can envision the firm's future and implement strategies and action plans for positive results.

Multi-office firms require special treatment for inclusion of all stakeholders. "At Gensler, information and longer-term plans are developed from the multiple perspectives of the local office as well as from the region that encompasses the local office; and from the regional practice area (the area of design expertise that is unique and which provides support to a specific client base), which rolls up into a firm-wide practice area perspective. These two groups—'offices' and 'practice areas'—provide complementary perspectives on the market, clients' needs, and projections on the economic growth of the firm, serving to back check each other," says Bill Hooper.

Hooper continues, "Strategic planning within Gensler occurs continuously, but is examined in detail twice yearly, at the start of the fiscal year and the midpoint. It is at these points that the deep-dive into our sense of the market is conducted. The result serves to inform decisions on where to expend resources, where we need to reallocate staff, how our financial projections are tracking, and where new markets are evolving. Gensler recognizes that each office has a different profile of work and emphasis on particular aspects of design and architecture. Thus, the individual office is responsible for setting its own strategic path, while achieving the overarching goals that the firm has agreed upon. An office may be heavily dependent upon a local industry—such as financial services in New York, entertainment in Los Angeles, or automotive in Detroit—but is expected to achieve growth in these markets consistent with the firm-wide vision."

A firm-wide strategic vision should remain independent of the office's implementation strategy. In the case of Gensler, the firm identifies broad goals such as new markets ("non-U.S.-centric growth"), or expansion in staff ("grow to 6,000 employees in seven new geographic markets"), or new practice areas ("acquire or grow capacity for dominance in educational sports facilities"). The office's pursuit of these goals is supportive of the firm-wide strategic vision.

Knitting these two efforts requires regular communication. "Strategy is discussed on a weekly firm-wide phone call, starting every Monday at the same time, with a constant agenda (marketing, trends, and major announcements) and attended by representatives from every office, with participation ranging from late night in China to early morning in California. This is the single most vital moment of the firm and is indispensable for strategic sharing," says Hooper.

Inter-Office Tools

Even with a strong strategic planning process, many firms develop a territorial or silo-based attitude where the primary view is focused on the individual business unit—often at the expense of their colleagues' business unit and the overall performance of the firm.

Leo A Daly has developed two tools to enhance communication among business units and a "one company" attitude. Jay Brader, CPA, controller and vice president at Leo A Daly, explains, "When profit centers share the responsibility to pursue and potentially share work, the leader of the managing business unit prepares a Memorandum of Understanding (MOU) that states the expected split of work, scope of services, and responsibility for both the pursuit and when the project is awarded. The understanding can be amended as needed should the project be modified during the pursuit. This MOU determines the allocation of costs during the pursuit and forms the basis of the 'Fee Split Agreement' once the project is awarded. The MOU is agreed to and signed by all parties before consent is given to pursue a project. This avoids misunderstandings between profit centers and allows each profit center to accumulate their own costs and recognize revenue to match those costs during the course of the job."

The second tool is a Fee Split Agreement wherein collaborating business units memorialize their understanding of the basic element of the project and the working relationship. The fee split agreement contains guidance for this collaboration:

- Labor and expenses should be absorbed by the profit center that incurs them, avoiding disagreements on who will absorb each expense, especially those expenses which are unanticipated.
- The scope should be split based on the expertise that each profit center brings to the project.

- The profit centers should plan the project as a collaborative effort with the intent that the firm will be successful and all parties share in that success.
- All terms of the agreement should match the contract terms (billing methods, rates, multipliers, reimbursable expense definitions, markups, etc.).
- Billings and payments from the client should be allocated in a fair and equitable manner throughout the project so that no profit center's cash-flow metrics are unfairly compromised.

"With our many offices, we have found that it is important to deal with these issues before the project is pursued or started. These agreements do not need to be complicated. With effective leadership, a commitment to the firm's best interests, and an up-front understanding of each party's obligation, a high-quality project with great financial success can be achieved," says Brader.

Beyond specific project performance, business units within a firm can be further measured on other personal and business unit metrics. Setting the framework to ensure a balance between autonomy and accountability is important. This would include understanding how goals can be established that are simultaneously beneficial for individuals, business units, and the firm. Understanding how incentive compensation plans reward certain performance and behaviors, and matching those expectations against the firm's culture, will help align the efforts needed to run and sustain a business. Likewise, it is important to understand that incentive plans need to be paired with leaders who are intrinsically motivated to make appropriate decisions in light of the firm with a view to success by all.

Accountability

Once strategy, goals, and tactics are defined, accountability to those goals needs to be considered. Corporate leadership should be engaged and knowledgeable about the people, projects, and practices at each of the outlying offices. Beyond this, many firms establish a set of metrics aimed at measuring how business units are performing against budgets and other expectations.

Brad Wilson, a consultant with PSMJ Resources, Inc., states, "The key to getting real benefit from opening branch offices is establishing the expectations of the office (and the people in it) right away and putting measurements in place to assure accountability without creating unproductive competition between the offices. Simplicity pays dividends here, as it does in many other business practices. We believe that a firm needs only three measurements to track the relative success of its branch offices. We use two objective measurements to remove any bias for or against the branch offices by the firms' shareholders who are likely to manage one or more of those offices and one somewhat subjective measurement. The objective measurements are: revenue factor (or net payroll multiplier) and return on overhead. The subjective evaluation is cooperation with the other branch offices."

Wilson continues, "The revenue factor (also called yield on total payroll) measures the amount of fee revenue generated for each dollar or payroll spent. It is the best measurement of productivity available to an architecture firm. It is calculated by multiplying the direct labor multiplier within a firm's achieved hourly rates and the utilization rate based on payroll dollars. For example, if a branch office produces an average multiplier of 2.8 (net revenue divided by direct salaries) and their utilization rate is 65 percent (direct salaries divided by total salaries), the revenue factor is 1.82. The gold standard for this metric is 1.98 (3.0 multiplied by .66). By looking at both the multiplier and utilization within a single measurement, a firm balances the focus between achieving high fees and staying busy. Revenue factor has a more direct correlation to profitability than any other commonly used metric in the A/E industry."

The second objective metric is return on overhead (ROO). "Return on overhead is calculated by dividing the profits contributed by a branch office by the amount of overhead expense incurred at that office. Measuring ROO insures that branch offices stay 'lean' without under-investing in growth. The profit and the office overhead are measured without allocation of any corporate overhead. Even though ROO is much more variable, the highest performing firms typically have an ROO between 15 and 20 percent. Accountants have devised many ways to allocate corporate overhead to branch offices; however, none of them are universally accepted or work well for all types of overhead expenses. This can lead to unnecessary complexity and a lack of understanding by the branch office manager, who might then argue with the methods used in order to support a better financial picture for their office. Our mantra is 'just don't do it.' The use of ROO calculated for each office will give you the information needed to evaluate the office without the frustrations of allocating corporate overhead," says Wilson.

To prevent unhealthy competition between offices, PSMJ Resources, Inc., recommends a subjective cooperation measurement where branch office managers evaluate each other on how easy it is to do business with one another within five simple categories:

- Overall cooperation
- Borrowing or lending staff
- Selling work together
- Referring work to other branch offices
- Contributions to overall corporate priorities

"Those offices that are rated highest by their peers in these five ways are doing the best job of preventing silos from developing around the branch offices," explains Wilson.

Communication

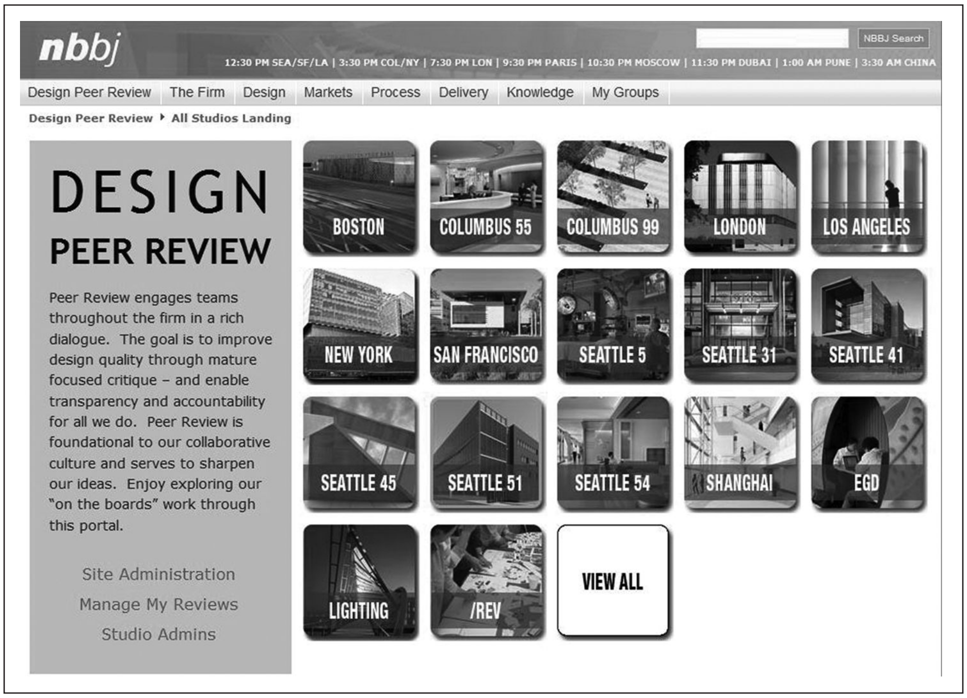
Relationships are more easily developed and sustained when they are based on mutual respect and trust. Building these qualities into the workplace is challenging in any environment, but especially so in firms with multiple offices. Therefore, when distance and time separates business leaders, it is essential to implement communication channels that build a sense of camaraderie. It is important to discuss, among other things: office-wide performance, marketing and business development collaboration, HR issues, technology advancements, training, sustainability initiatives, policies, individual accomplishments, and inspiration.

McConnell says that NBBJ strengthened its communications and decision-making processes by "allocating significant resources to bring leaders together throughout the year. We have created a multi-leader community within and among each office. Our studios, which have significant ownership and responsibility, benefit from having engaged leaders while still enjoying the freedom to be entrepreneurial. In addition, once a year we bring together 70+ designers from around the world to focus on an interdisciplinary, relevant, community-based issue. We find that gathering staff for all-day charrettes builds trust and encourages staff to follow the firm's ideals."

NBBJ also uses its intranet as a platform for inter-office discussions (Figure 5.8) where upward of 200 projects in concept phase or mid-schematic design are posted for peer review by anyone in the firm.

Many multi-office firms find technology helpful to bring staff together who are not co-located, including the use of video conferencing equipment, webinars, web-cams, instant messaging, common databases, common project sites, and virtual servers. Forming committees with representatives from each office who work on behalf of the firm on topics such as culture, BIM, standards, ideation, and sustainability is also a way to enhance a one-firm attitude.

Training programs or the provision of an intercompany blog can bring together staff who share common interests. Adopting volunteer projects with a national footprint (e.g., Red Cross, Girl Scouts, Habitat for Humanity), where offices can pool their resources for a firm-wide effort or hosting an intranet site for sharing of personal accomplishments, hobbies, or family activities all aid in building this intercompany trust. Nothing will serve a firm better than a staff that knows one another, respects one another, and is intrinsically motivated to make decisions based on the organization's goals.



NBBJ

FIGURE 5.8 **NBBJ Intranet Project Peer Review Site**

The culture created by the tone, nature, inclusiveness, and frequency of communication can be a major driver in the success or failure of managing multi-office firms.

Enhancements Through Technology

If the firm has chosen to execute a project using staff in multiple locations, technology can play a substantial role in producing projects successfully. However, it can also be quite challenging, as technology remains one of the most quickly evolving businesses but also one that can be tailored to every firm's requirements.

CIO and Vice President Stephen Held of Leo A Daly explains, "Each scenario warrants differing amounts of infrastructure based on the need being placed on the office location, such as:

- *Small office*: Local file server and network, broadband modem connections, firewall with virtual private network (VPN) tunnel capabilities
- *Small to medium office*: Local storage area network (SAN), T1 or Ethernet wide area network (WAN) connection
- *Medium to large office*: Larger local SAN; multiple T1, T3, or increased Ethernet connection; WAN accelerators

These guidelines should be modified based on the financial, user, and project tolerance experienced. For instance, a small office that is performing heavy production work may require faster connection speeds than a broadband modem can provide. It may be that a WAN accelerator will accomplish enough traffic optimization or that an investment in a T1/Ethernet needs to occur."

Held continues, "Once underway, the product of everyone's work ends up in files and software models that are often stored locally but are needed by team members in other locations. There are several ways to organize this effort:

- *Local/remote access.* Concentrate files in the location where most of the work and staff reside while allowing remote access into this location by others by leveraging remote desktop connections.
- *Split.* Structure the project work in a way that splits the effort and allows each of the locations to keep their work locally. At some point the work may need to be consolidated, but this allows the respective locations to work in an efficient environment.
- *Full collaboration.* As CAD progresses to 3D modeling and BIM coordination becomes critical, the major CAD software providers allow for a model to exist centrally, managing the changes as they occur while detecting any conflicting modification and caching files locally.

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- *Cloud*. While there are different variations, this hosted environment allows all participants to work collectively in one "virtual" space, thereby removing the need to move files. This can be hosted internally as a private cloud, outsourced, or a hybrid. This approach provides the most interactive and up-to-date versions of the model.

Other project files can be paired with a third-party solution (e.g., Newforma, ProjectWise, Bluebeam, Navisworks, Planwell, Double-take, Commvault) to produce similar results with non-model project files."

"Finally, optimizing software licensing can reduce expenses and maximize productivity and accessibility to standard programs. Network-based licensing, while often more per seat, costs less overall since it is measured by concurrent users, can be served everywhere from one location, and is often checked out for extended time away from the office. This approach allows the greatest ability to remain consistent across all office locations," explains Held.

A WORD OF CAUTION

Growing and expanding can be heady experiences. An early success can convince firm leaders that more of the same will bring endless benefits. However, growing into too many locations or too quickly is not recommended. Each new office requires time to be steeped in the cultures, values, and traditions of the original firm. It is easy to underestimate the time and dedication required to inculcate the strategies and practices for quality, decision making, professional development, client management, communications, and work sharing. A second or third office should not be contemplated until the first has matured.

Without this maturation, the new office leadership can become frustrated by the seeming micromanagement and interference of the original firm. Seen as "out of touch with the local environment," decisions intended to enhance the firm's brand or advantage the firm overall can be seen as misdirected or even self-serving. These seeds can be the impetus for disengagement, disenfranchisement, or leadership exodus.

WORKING TOWARD SUCCESS

Multi-office firms can be a challenge to lead and manage. What works for a small to medium office in a single location is generally not robust enough to handle the complexities of a multi-office firm. The inability to have spontaneous conversations, the difficulties of working on a project in more than one location, and the lack of team cohesion all contribute to this challenge. Minute issues, such as knowing whether employees work appropriate business hours, to major issues, such as overcoming an "us versus them" mentality, are challenges that nearly every firm faces during their expansion into the multi-office environment.

The savvy firm will sustain its cultural aspects that foster trust and respect, have engaged leadership, put a strategy in place, expect that all offices develop their business plans and tactics to support that strategy, seek out and hire staff who are intrinsically motivated to make decisions based on the firm's goals; hold each other accountable; communicate frequently; and use processes, standards, and technology appropriately to reinforce a productive, collaborative, and team-like experience.

For Further Information

The 10 Tenets of Running a Firm (Accounting and Business UK, 2011) by Maureen Broderick.

The Art of Managing Professional Services, Insight from Leaders of the World's Top Firms (Wharton School Publishing, 2011) by Maureen Broderick.

How Firms Succeed: A Field Guide to Design Management (Greenway Communications, 2002) by James Cramer and Scott Simpson.

Silos, Politics and Turf Wars: A Leadership Fable About Destroying the Barriers That Turn Colleagues into Competitors (Jossey-Bass, 2006) by Patrick Lencioni.

The Five Dysfunctions of a Team (Jossey-Bass, 2002) by Patrick Lencioni.

PSMJ Resources Inc. publications and newsletter: http://www.psmj.com.

Zweig White publications and newsletter: http://www.zweigwhite.com.

BACKGROUNDER

DEVELOPING AND MANAGING A MIDSIZE MULTI-OFFICE FIRM: VIA ARCHITECTURE

Catherine Calvert, AIA, and Wolf Saar, AIA

VIA Architecture is a 40-person firm established in 1984 in Vancouver, British Columbia. Since 2001, VIA has operated a second office in Seattle, making the firm both a two-office practice and one that bridges an international border.

Catherine Calvert is Director of Community Sustainability at VIA Architecture. She provides leadership on issues of environmental sustainability and the incorporation of these principles in all project work and in the day-to-day practice of the firm. Wolf Saar is the Director of Practice for VIA Architecture. He is recognized for his leadership in the completion of a diverse portfolio of projects for private and public clients. Saar serves on the National AIA Contract Documents Committee and is past Treasurer of AIA Seattle.

ORGANIZATIONAL HISTORY

VIA Architecture's early focus was in two sectors: transit architecture, based on one partner's experience designing the SkyTrain rapid transit system, which opened for the Expo 86 World's Fair in Vancouver, British Columbia; and inner city planning and redevelopment, based on another partner's expertise. These came together as Vancouver's population and residential densities dramatically rose as a consequence of international exposure from Expo. In 1999, the firm was invited to work on the early planning of Seattle's Link Light Rail system owing to its specific expertise in transit design. In 2001, the firm formally opened a Seattle office in order to broaden its geographic base and offer services to a second market.

ORGANIZATIONAL CULTURE

VIA bases its business strategy on diversity:

- *Diversity of practice*, offering a full range of skills from urban and community planning through architectural design. This allows the firm to serve clients from the earliest stages of project evaluation through the detailed oversight of building construction.
- *Diversity of location*, with two primary markets: Vancouver's Lower Mainland and the Puget Sound region of Seattle, Washington. As markets fluctuate between architecture and planning opportunities, so do markets on either side of the border. This provides the practice some resilience to economic downturns in specific markets or areas of practice.
- *Diversity of market sectors*, which have evolved over time to include not only transit architecture and urban planning and design but also sustainable design, multifamily and mixed-use projects, hospitality work, design for seniors, and community architecture.
- *Diversity of client type* spanning the range of public, nonprofit, and private, as well as collaborations with other design professionals.

As a medium-size firm, VIA is able to be extremely nimble in its work flow from one project type to another, and attracts professionals that are skilled at wearing many hats and have expertise in multiple areas of practice. Work is shared frequently between the two offices, using the best available resources and expertise to complete project assignments. VIA's two studios are referred to internally as "one firm, two rooms" in order to reinforce the group's collective sense of identity and mission. An early decision was made to limit the future size of each studio to 30 staff members. This allows the firm to maintain a horizontal management structure, and support the development of deep and collaborative personal relationships between staff members and firm leadership. Overall firm management is provided by a six-person senior "Operations Committee" with representatives from both the Vancouver and Seattle offices. Monthly meetings address topics such as resourcing, business development, finances, and legal issues.

EXPANSION TO MULTIPLE OFFICES

Expansion to a second office was a decision made for several key reasons:

- *Capturing a new market.* As a firm with specific expertise in transit architecture, VIA was concerned that limiting its market to a single city would make the practice vulnerable to the broader political decisions made in the region around transportation projects. VIA was the Chief Architect for Vancouver's Millennium Line rapid transit line (planned, designed, and built from 1998 to 2002), developing in the process an innovative collaborative approach for project delivery. Further work of similar scale was not on the horizon in Vancouver at that time, but Seattle was in the early stages of planning its Link Light Rail system as well as a second rapid transit line, the Seattle Monorail Project. Expansion to the Seattle market appeared to be the best way to leverage VIA's knowledge in a new location.
- *Exportability of expertise.* VIA has specific expertise that has value in the broader geographic marketplace—first, transit design, which involves a depth of technical knowledge relating to corridor planning, systems integration, and functional design common to all types of transit systems. In addition to its U.S.-based work, this expertise has also led to opportunities for project work in Malaysia, Russia, China, and the Philippines. The second type of expertise evolved from Vancouver's increasing recognition as a leader in urban densification, livability, and sustainability. VIA's pioneering role in establishing Vancouver's inner city urbanism for False Creek North, Yaletown, and

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Coal Harbour, led to leadership of the planning for Southeast False Creek (awarded LEED-ND Platinum in 2009). This has positioned the firm well to market to other world cities seeking the same type of positive urban development growth models.

- *Strategic partnering.* VIA has used this strategy for over two decades, partnering specifically with large firms who bring complementary expertise in transit engineering design. VIA is able to bring value to large infrastructure projects by designing the areas of "human interface" or areas where large projects need to sensitively integrate into neighborhoods and communities. VIA initiated its work in the Seattle market on the basis of a strategic partnership with a large national engineering firm and a local architect. This teaming was essential to addressing the local context and meeting the client's specific needs. VIA acted as a strategic addition to both firms, bringing transit and specifically underground station experience to the project. This complemented both the local architect's recent experience with the client, and the engineering consortium's overall project management and coordination role. Our partnership rounded out the portfolio for all three firms and facilitated a mutual learning experience to develop a local approach to underground transit station design.
- *Local presence.* Working as a consultant from another city is an excellent way to test a new market, but to establish further credibility and deeper involvement in projects, the formation of a local office is often a necessary next step. In VIA's situation, expansion to a second office required that one of the two principals commit to relocation in order to provide the new office with the presence and authority of a senior staff member. Having a local presence is a more effective way to keep an "ear to the ground," develop relationships, and contribute directly to communities.

CHALLENGES OF MULTIPLE OFFICES

There are many considerations related to ensuring that a multiple-office firm can run smoothly as a single organization. Some of the challenges that VIA met during this expansion were:

- *Physical separation.* VIA invested in a variety of technologies to overcome the simple distance between collaborating teams. Smart Board technology, instant messaging, and videoconferencing are some of the approaches used to encourage communication between colleagues. To encourage face-to-face familiarity and reinforce relationship building, the entire staff meets at the annual picnic, which is held at a public park on the Canada–United States border.
- *Relocation vs. travel.* VIA has exchanged staff between offices to suit project needs ranging from day trips to months at a time. Each project must be considered separately, as is each staff member's personal situation and willingness to travel or relocate. Many people welcome the opportunity to immerse themselves in another culture, and it helps that both offices are in vital, interesting cities that are very different from one another.
- *Resource management.* VIA's Directors of Practice compare weekly projections about anticipated workload, managing the best fit between available skills and project needs. At times, decisions are made to prioritize in-person teams on fast-track projects in order to maximize efficiency. Matching staff resources with ongoing project needs is a continual balancing act that is made more complex by the addition of a second office.
- *Quality control.* Establishing company-wide standards for production and graphics is essential to reinforcing the firm's expectations of quality. These are developed by teams from both offices in order to create buy-in and keep staff aware of continued improvements and developments in software capability. VIA often uses staff from the other office to offer "fresh eyes" to documents and bring the broadest perspective to the documentation approach.
- *Shared production tools.* VIA is committed to the use of building information modeling, having been an early adopter of BIM software as far back as 1992. Setting up BIM models to have shared work sets can be particularly complex with remote users. VIA has explored a variety of solutions to this issue, including checking out work sets, cross-referencing linked models, and the use of remote workstations located in the other office that emulate a local user.
- *Business development.* Marketing VIA's services is carried out using a consistent approach to branding and firm identity, and the creation of the firm's portfolio featuring projects from both offices. Business development initiatives are discussed with teams from both offices on a weekly basis to provide perspective and brainstorming, including a standard Go/No Go checklist that filters potential projects by VIA's company-wide values and goals. Specific marketing efforts are tailored to suit the individual market as necessary to suit local needs and expertise.
- *Knowledge centers.* Over time, individuals in a firm develop deep knowledge bases in specialized areas of practice. It is essential that the firm actively encourages sharing of this knowledge through mentoring and collaboration within each office and across offices. In addition to a continuing education program led by individuals representing both studios, VIA holds a biweekly videoconference to share information ranging from the latest project work to the development of specific skills.

LOOKING AHEAD

As VIA continues its successful operation in the United States, it will consider how to expand further into the U.S. market, whether by establishing a third office in another state or by serving out-of-state projects from the established home base. The experience of the first expansion will serve the firm well for its continued growth.

5.10 Office Administration

Judy A. Beebe, CDFA; Diane M. Klug, CDFA;
and Gretchen L. Renz, CDFA

The goal of efficient office administration is to increase the amount of time that principals and project managers have available to devote to projects, thereby increasing firm productivity and profitability. Development of the people, procedures, places, and projects that encompass office administration improves the efficiency and quality of services of the entire firm.

ELEMENTS OF OFFICE ADMINISTRATION

Architectural office administration spans a full spectrum of practice areas. Administration has moved far beyond making sure the phones are answered and the bills get paid. As shown in Figure 5.9, design firms have to take into consideration such things as facilities management, marketing, finance, human resources, and project administration.

Support staff, whether it's an intern in a small office or an administrative assistant in any size firm, can add value by handling tasks that would otherwise have to be handled by the architect. Small firms with only front-desk support can find ways to balance the project workload to free up the architect's time for project strategy and design, and the cost benefit can easily be validated. Assume the architect spends 10 hours on administrative tasks at a billing rate of $100/hour. The same 10 hours can be reassigned to the administrative assistant at a billing rate of $50/hour. The amount of the project fee used for billable administrative tasks would be reduced by $500. This will allow more of the fee to be devoted to the project architect's time on project design and technical tasks.

With that in mind, the next section discusses the administrative roles and functions necessary for an architectural firm to thrive, as well as common administrative processes and procedures.

The return on investment of having an administrative assistant perform scheduling tasks, budget updates, invoicing, and RFI tracking at $22/hour rather than a project architect rate of $44/hour is clearly evident the first moment anyone looks at the bottom line of a project budget.

—Deborah A. Gill, CPA, CDFA, President (2012–2013), Society for Design Administration

PART 2: FIRM MANAGEMENT

ADMINISTRATIVE ROLES AND FUNCTIONS

Small, midsize, and large firms need to make sure the administrative functions are executed effectively. The functions can be defined in terms of administrative roles.

- *Receptionist:* Creates a first, positive impression of the firm through interaction with clients, consultants, and vendors. Handles basic office tasks. Reports to Principal or Office Manager.
- *Administrative Assistant:* Provides specific office and project support. Reports to Principal, Project Manager, or Office Manager.
- *Marketing Coordinator/Assistant:* Prepares materials for proposals, brochures, and other public relations documents. Reports to Principal/Marketing Director or Marketing Manager.
- *Bookkeeper/Financial Assistant:* Processes accounts receivable, accounts payable, and payroll activities of the firm. Reports to Principal or Financial Manager.
- *Human Resources Assistant:* Assists with employee recruiting/hiring, benefits, and compensation. Reports to Principal or Human Resources Manager.

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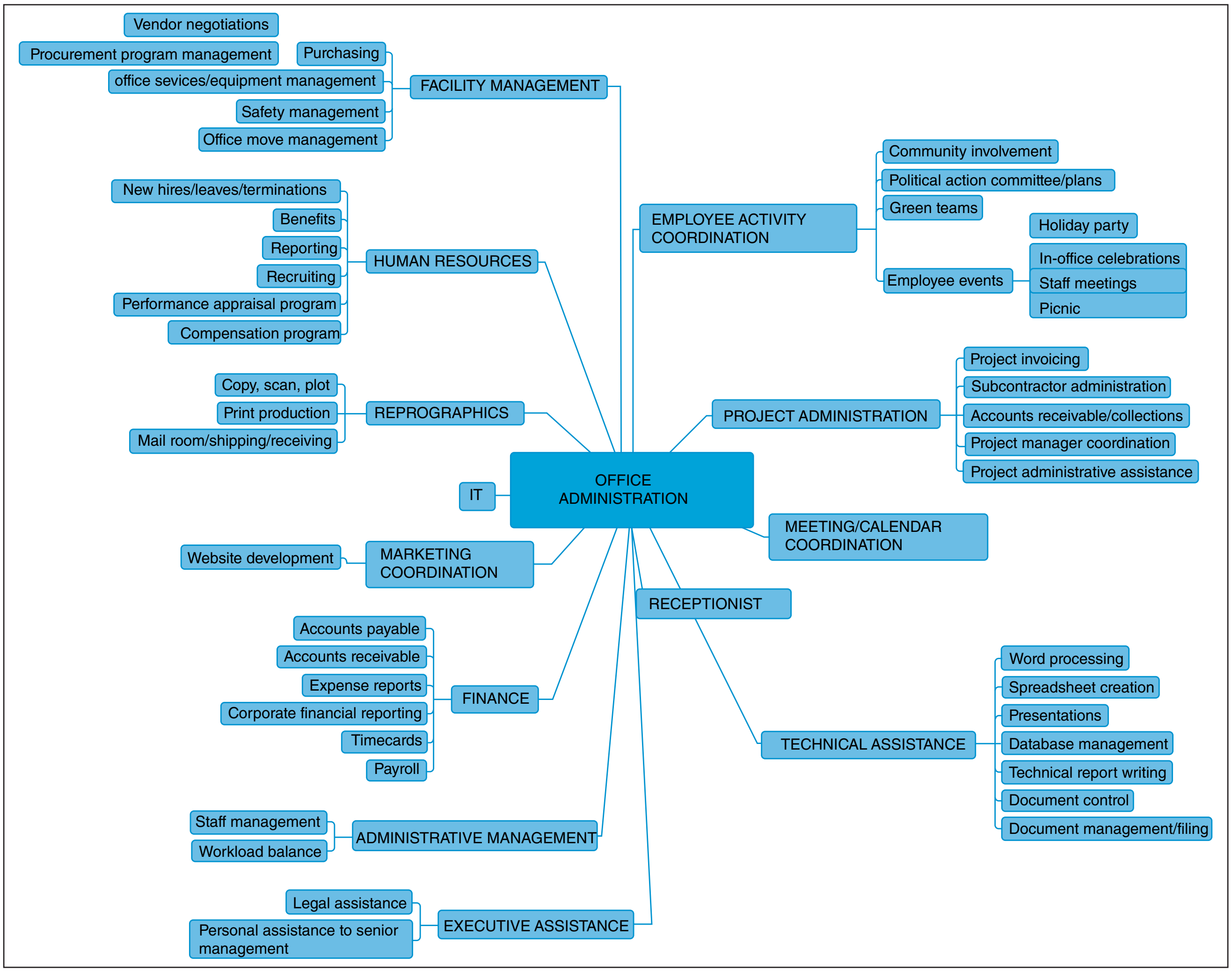


Judy A. Beebe

FIGURE 5.9 Full Spectrum of Office Administration for Design Firms

- *Facility Manager:* Responsible for routine building maintenance and security, negotiating and securing vendor and service contracts, and ensuring the office common and public areas are maintained. Reports to Principal or Office Manager. In a smaller firm, an Office Manager is likely to take on this function.
- *Office Manager:* Oversees office operations and administrative functions; in smaller firms, may serve as any or all of the above positions. Reports to Principal.

Figure 5.10 outlines typical tasks for each administrative position defined above, and offers suggestions for the number and configuration of administrators needed by firm size.

As shown in Figure 5.10, small firms are likely to hire an office manager as the sole administrator—to provide administrative support to principals, who may complete many of the administrative functions themselves. As the firm grows, the office manager will oversee the administrative operations while providing support where needed.

Hiring Administrative Support

When should a firm hire administrative support? The decision will be influenced by factors such as the number of technical staff, forecasted workload balance, and the principal's need to focus on design or other billable tasks. Also consider:

- Is the technical staff's productivity continually halted to answer the phone, receive guests and deliveries, and handle routine office tasks?

Position

OFFICE MANAGER
Oversees administrative tasks and positions. Depending on firm size, may fill any of these positions at some time.

Key Tasks (including, but not limited to)

Receptionist	Administrative (or Project) Assistant	Marketing Coordinator/Assistant	Bookkeeper/Financial Assistant	Human Resources Assistant	Facility Manager
♦ Greet visitor; respond to routine telephone requests	♦ Produce correspondence, notes, specifications, spreadsheets, and reports	♦ Organize/systemize project information and images for marketing purposes	♦ Code and process staff time records	♦ Assist with development and implementation of policies relating to personnel	♦ Assist with vendor and supplier negotiations for goods and services
♦ Proofread/review documents for accuracy and format	♦ Set up and maintain project-specific filing system; archive project close-out files	♦ Participate in the development of brochure materials and presentations	♦ Track PTO, vacation, sick leave	♦ Maintain employee handbook	♦ Assist with research and purchasing of office equipment
♦ Create and send form letters and transmittals	♦ Track process for creating and obtaining executed consultant contracts	♦ Assist with research on current RFQ opportunities and leads	♦ Compute wages and submit payroll information to outside service or prepare paychecks	♦ Assist with enrollment and administration of employee benefit programs	♦ Maintain common and public areas
♦ Order supplies, maintain office equipment	♦ Monitor project time use and invoice status	♦ Maintain files of past SOQ submittals presentation materials	♦ Make payroll tax deposits and prepare quarterly reports	♦ Maintain documentation of employee countinuing education and licensing activities	♦ Coordinate work orders and maintenance requests
♦ Maintain office files	♦ Log RFIs, submittals, and construction job reports	♦ Assist with responses to Letters of Interest, RFQs, RFPs, and awards solicitations	♦ Code and input vendor invoices, issue payments once approved	♦ Assist with advertising or posting job openings, receiving and screening resumes, and arranging employment interviews	♦ Monitor recycling and other green programs
♦ Process incoming/outgoing mail and deliveries	♦ Provide a communication link between team and consultants	♦ Assist with website development and maintenance	♦ Prepare monthly invoices and project management reports	♦ Assist with compliance of federal, state, and local laws	♦ Assist with security and safety procedures; track access key and badge assignments
♦ Coordinate calendars and meeting schedules	♦ Develop QA/QC plan and procedures; monitor and track compliance	♦ Fill in AIA marketing forms	♦ Maintain accounting files	♦ Help develop performance appraisals; assist managers to schedule appraisals	♦ Assist with emergency preparedness and safety training
			♦ Credit card and checkbook reconciliation	♦ Assist with development of employment application and job descriptions	♦ Assist with coordination of office relocation and renovation projects
			♦ Prepare financial reports and records		

Firm Size

<10 Employees: One administrator (typically titled Office Manager) who serves as receptionist and administrative/project assistant, and provides support for marketing, finance, human resources, and facility operations.

11 to 30 Employees: Suggest two administrators—an office manager and receptionist/admin assistant—to provide support in all areas of office operations, including projects. As the firm grows toward the higher end of the staff range, a dedicated marketing coordinator or bookkeeper/financial assistant could be added.

31 to 80 Employees: Suggest four administrators—office manager, receptionist/admin assistant, bookkeeper/financial assistant, and marketing coordinator. As the firm grows toward the higher end of the staff range a dedicated human resources position would be beneficial.

81 to 200 Employees: Suggest six administrators—office manager, receptionist, admin/project assistants, bookkeeper/financial assistant, marketing coordinator, and human resources assistant. As the firm grows toward the higher end of the staff range additional administrators can be added to support expanded operations. A dedicated facility manager will be required for firms at the highest end of the scale.

>200 Employees: Suggest seven administrators—office manager, receptionist, admin/project assistants, bookkeeper/financial assistant, marketing coordinator, human resources assistant, and facility manager. Administrative roles may span across multiple offices; smaller branch offices may function as a small company (see <10 Employees) with support from headquarters.

Judy A. Beebe

FIGURE 5.10 Administrative Positions and Tasks

- Are the technical staff making good impressions for the firm when answering the phone and receiving guests?
- Are the documents generated by the firm lacking consistent format?
- Is the firm generating regular invoices, or do delays occur from lack of time or the burden of time and expense tracking?
- Are the marketing documents boilerplate information because there is no time to tailor the information to each request for qualifications?
- Are the principals spending more than 25 percent of their time researching and purchasing supplies/equipment, renewing business licenses and insurance, coordinating contract details, and other general office matters?
- Is the office no longer an orderly and productive environment?
- Are the firm's projects complex, with multiple agency partners, stakeholders, and subconsultants requiring coordinated support?

When hiring administrative support, it is advisable for firm leaders to look beyond immediate needs. Think about personnel skills and characteristics that will be required as the firm grows and more responsibilities, such as marketing production, benefits management, finances, and contract management, might be transferred to an administrator.

CERTIFIED DESIGN FIRM ADMINISTRATOR (CDFA)

The Certified Design Firm Administrator (CDFA) credential offered by the Society for Design Administration recognizes individuals who have demonstrated proficiency in these key areas:

Office administration: The knowledge and skills necessary to provide for efficient and productive office operations

Finance: Knowledge and skills encompassing all aspects of planning, recording, analyzing, and reporting the financial transactions of the firm

Marketing: Knowledge and skills necessary for business development, proposal generation, and contact management

Human resources: Knowledge and skills required to manage all aspects of human resources within the design firm, including economic, social, and legal considerations

Information technology: Knowledge and skills required to keep current with office technology, budget and plan for technology replacement, and maintain security of digital information

Project administration: Knowledge of all aspects of the planning, administration, and production of a project. Includes the skills administrators need to be a key part of the project management team

Eligibility is determined by a combination of design firm experience and formal education, followed by a written examination. In addition, administrators who have earned the CDFA credential are required to attend at least 18 hours of continuing education each year to maintain the credential.

Key Qualities

Previous design firm experience is an advantage when filling administrative positions. Even if the design firm experience is limited, it will provide a background into the language, process, and intensity specific to the industry. However, by no means should previous experience at a design firm be the sole factor in making a selection. Successful administrators come from varied education and experience backgrounds, but all possess several key qualities. They are organized, intellectually curious, independent, flexible, responsive, patient, trustworthy, discreet, thorough, loyal, helpful, practical, proactive, and respectful of others. These qualities, as much as the technical skills they possess, are critical for administrators to meet the demands of the practice.

Administrators must be technically proficient in software applications for communications, word processing, spreadsheet creation, presentations, and database management. Proficiency means tasks can be accomplished quickly and efficiently, in addition to being able to troubleshoot applications and share knowledge with other staff. Administrators should be quick learners, able to independently acquire skills from online tutorials, manuals, and other references. Microsoft Learning (www.microsoft.com/learning) has inexpensive, self-paced training available. Ideally, one or more administrative staff should be a certified Microsoft Office Specialist demonstrating validated proficiency using Microsoft Office applications.

Small-firm administrators in particular add value if they have an understanding of the practice areas outside of general office administration; specifically finance, human resources, marketing, and project administration. Administrators who join professional organizations and obtain industry certification demonstrate a level of expertise in those practice areas and can contribute to the firm's organizational growth and maturity through best practices of firm administration. The Society for Design Administration (SDA) offers professional credentials as a certified design firm administrator (CDFA) in those key areas. Other certifications such as the International Association of Administrative Professional's *Certified Administrative Professional* would also be appropriate.

Best Practices

Granting authority to administrators enables principals to focus their effort on securing projects and design. When the principal grants authority, administrators can then exercise independent judgment in office matters, without further input from the principal, ensuring that procedures are followed and policies are enforced. For example, the administrator could approve requests for leave of less than one day, approve expenditures or make purchases up to a set dollar amount, sign vendor agreements, and complete routine communications with clients and consultants.

As additional administrators are hired, cross-training should be considered. The tendency to allow administrators to become too specialized in their roles or too territorial of their tasks creates an information vacuum that isn't evident until the administrator takes an extended absence or leaves the firm. If that happens, staff members suddenly realize that no one knows how to process payroll, or how invoices are prepared, or where the letterhead is printed. Cross-training equips all administrators to deal with the unexpected, and allows work to be reassigned and shared during particularly busy times. Administrators can cross-train each other by working together on common tasks, trading tasks, or holding in-house training sessions.

Another method of ensuring that vital office information is available to all is to develop an electronic or hard copy desk-reference for each administrative position. As administrative roles are defined and procedures developed, administrators should document their daily routines and tasks, create shared contact lists for vendors, consultants, and clients, and detail the office standards and practices for reprographics and binding, purchasing, equipment maintenance, and other general office tasks.

Encouraging administrative staff to improve their skills through workshops, online training, and other continuing education, and providing the time and resources to do so, will directly benefit the firm. Administrators who stay up-to-date on new methods and trends in administration, on the latest software applications, and who improve their soft skills such as conflict resolution and interpersonal communication, add value to the firm's standards and practices.

PROCESSES AND PROCEDURES

Well-developed and clearly presented office standards and procedures are vital for effective office administration. Procedures increase productivity, save time and money, and reduce stress.

Best Practice Considerations

Firms develop specific practices based on their structure, values, mission, and culture. Start-up firms need to consider, and established firms need to periodically review, these organizational areas:

- First Impressions
  - Automated phone/messaging system: Will the firm hire a receptionist, have an automated system, or a combination of both? How will the phones be answered—what is the standard greeting?
  - How will guests be greeted? Will refreshments be offered to each guest? Only clients? Will guests be allowed to wander past the receptionist/lobby without escort?
- Basic Procedures
  - How will the administrator track who is in/out of the office? Will principals and technical staff be required to check in and out or otherwise be accounted for?

- Are phone messages, packages, and mail delivered throughout the office or left at a central location for pickup?
- How will office equipment (cameras, phones, measuring devices, laptops) be assigned and tracked? What is the procedure if equipment is lost, stolen, or broken? Who determines when and how to upgrade equipment?

- Document Management/Filing:
  - How will electronic and paper project files be established, organized, and stored? Will there be "official" files and "working" files?
  - How and when will electronic and paper files be purged? What documents are retained, and on what schedule?
  - How will financial, human resources, and company records be secured? Who will have access?
  - Will all filing be accomplished by administrative staff, or will technical staff/project managers be responsible for maintaining their own files?
  - Are e-mails printed and filed, or stored electronically? How are they sorted and searched?
- Mail/Shipping/Receiving:
  - Will ground and express shipping accounts be established or will a shipping service be used?
  - Will a postage meter be leased or stamps purchased?
  - Who will open the mail and how will it be routed? (Principals see all relevant mail first? Mail goes directly to addressee? How are magazines, catalogs, and product literature distributed?)
  - How is outgoing mail collected and processed, and by whom?
  - What are the criteria for overnight shipping?
- Office Supplies:
  - How will supplies be organized and stored? Are there any controls?
  - How much inventory will be maintained?
  - Who is responsible for determining when to order (e.g., person who takes the last pen lets the admin know, admin checks stock on a weekly basis, admin has standing order)?
  - What is standard desk setup? Are special orders allowed?
- Meeting/Calendar Coordination:
  - How will the master office calendar be compiled and distributed—Outlook, web-based scheduling such as Google Calendar, a manual system such as a central whiteboard or wall calendar?
  - What type of information goes on the calendar, and who sees it?
- Travel Arrangements:
  - Will travel be prepaid by firm or reimbursed?
  - May technical staff make their own arrangements, or are all arrangements made by admin staff? Is preapproval from a principal required?
  - What airfare, hotel, and rental car class is adhered to? Are there exceptions?
- Office Life/Staff Meetings, Staff Development, Staff Events:
  - Who organizes/tracks continuing education and staff development opportunities (in-house teaching, vendor lunch and learn sessions, conferences and seminars)?
  - What staff events will be held (all-staff/all-family holiday party, summer party, group outing)? Who organizes the events?
  - How often will all-staff meetings and team meetings be held? Who determines agenda and topics of discussion?
- Morale Building:
  - Will birthdays, milestones, and length of service/anniversaries be celebrated? In what way?
  - Are there bonus programs and recognition? How will these be promoted within the firm? How will the program be monitored?

Resources for developing firm practices and procedures are available from various sources, including the Internet. In particular, AIA and SDA have dedicated pages on practice management and best practices. By searching forums and related sites, principals and administrators can discover how other firms are answering these questions and tailor a procedure to fit their firm. See "For More Information" at the end of this section for additional resources.

Templates and Forms

Standardize routine tasks and frequently used forms and make them available to all staff. Procedures should be developed for:

- Proofreading and finalizing documents
- Ordering prints and copies
- Shipping and mailing
- Requesting office supplies
- Checking out vehicles and office/field equipment
- Scheduling meetings
- Reserving conference rooms
- Office safety/security (bomb threats, building evacuation)
- Assigning project numbers and project setup

Creating standard templates enables consistency in firm branding. Consider:

- Fax cover letters
- E-mail signatures
- Reimbursement requests
- Letters and memorandums
- Transmittal forms
- Fee proposals
- Reports
- Presentations
- Marketing materials

All staff should have easy access to documents and procedural manuals; store them in a directory or folder on the company intranet or server system and discuss them in new-employee orientation and staff meetings. By not having to create or search for the correct form, technical staff will spend less time and energy on routine administrative tasks.

Facilities

When the time has come to move the office, the new facility should be an attractive and well-managed place. The architect's office can be an effective, visible marketing tool, an employee morale booster, and a productivity enhancer.

In all sizes of firms, there are a number of facility areas the administrator can manage, track, and monitor to reduce the principal's time and effort spent on facility management.

Vendor Negotiations and Purchasing

Negotiate the commodities essential to the firm's daily operations. Negotiations should include services to be provided, delivery terms, automatic inventory tracking/restocking, and price. Some contracts are based on time and materials; others offer quantity discounts for frequently purchased items. Establish relationships and contracts with vendors to assure the level of service and product delivery meets the firm's needs.

Procurement of Services

Services are typically negotiated as ongoing contracts to provide inventory tracking/restocking or services on demand. Automatic inventory tracking/restocking services will visit the office at specified intervals to restock supplies and provide equipment maintenance or other services.

Other services are on demand or are maintenance agreements that provide negotiated rates for a service or repairs on equipment. This type of agreement can reduce downtime, critical for business operations when related to information technology (IT) or telecommunications. Most services are best handled through direct personal negotiation with a vendor representative.

Sample services commodities, often referred to as maintenance contracts, include:

- Janitorial
- Building maintenance
- Office supplies
- Catering services
- Coffee/water
- Reprographics (including in-house labor)
- Audiovisual
- IT (maintenance and support)
- Website development
- Off-site records/file storage
- Safety/supplies (automatic external defibrillator, first aid kit, safety training)
- Recycling services
- Telecommunications (phone system, voicemail, teleconferencing, web conferencing)
- Vehicle fleet service (leasing, maintenance, fuel cards)
- Security systems

Procurement of Products

Consider depreciation schedules when purchasing furniture, fixtures, and equipment. Consider whether products should be purchased, leased, or rented based on expected usage and financial considerations. The same products may be purchased directly from manufacturers or vendors that provide multiple-product catalog service. Many product procurements are handled online; however, in some cases, a discount may be obtained through direct personal negotiation with vendor representatives, particularly if the firm can guarantee a specific volume of purchasing.

Sample products commodities, those product purchases that should be negotiated for delivery terms and price, include:

- Office supplies
- Furniture
- Fixtures
- Reprographics equipment
- IT hardware/software
- Audiovisual equipment
- Telecommunication equipment (phone/voicemail system)
- Books/publications
- Postage/courier/express mail
- Printing (stationery, business cards, marketing materials)
- Promotional items, gifts, flowers
- Vehicles
- Signage

Building/Office Maintenance

Office space leases typically include building maintenance services. If the architect is the property owner, contracts are required for building maintenance issues.

- Maintaining Common and Public Areas. Assure employee comfort is maintained as a priority (HVAC, restroom plumbing, prompt light bulb replacements). Landscaping, elevator service, and parking lot upkeep are also important to keep up appearances.

- Work Orders and Maintenance Requests. Some building maintenance contracts include a requirement for work orders or maintenance requests to be completed online for tracking and quality assurance.
- Janitorial services for trash removal, restroom cleaning, and general office maintenance (vacuuming, dusting, window cleaning) are essential for a professional office environment.
- Greening Your Office. Sustainable operating practices should be the norm. Develop a recycling program and encourage staff participation. During purchasing, consider the use of sustainable and recycled content products such as office supplies, cleaning products, and lighting. Many firms are tracking their overall carbon footprint in the areas of office operations (utility usage, sustainable office environment, and product purchases) and practices (alternatives to employee travel utilizing technology, efficiency of fleet vehicles, automatic light sensors, HVAC timers, and rideshare/bike-to-work).

► See the backgrounder accompanying this article, A Case Study of Sustainable Business Practices, for more on operating sustainable offices.

Fleet Management

Whether the firm has one vehicle or a large fleet, management of vehicles is important. Procedures for timely handling of registration/licensing, violations, accidents, maintenance, and repairs should be in place. Establish policies for vehicle purchasing and termination, including employee purchases.

Security

Building/Office Security

Office security systems vary based on need, and office leases may include building security. Building security comes in several forms, from 24/7 on-site staffed security, to security systems/cameras, to the building's information desk that monitors visitors. There are sophisticated scanning systems, access cards/badges with photos, programmed badges, cipher/code locks, and key locks. Parking may also be restricted with these security system types.

At a minimum, firms large or small should establish procedures:

- Overnight/weekend security. Lock/unlock entry doors at specified times. Instruct employees to keep doors locked during non-business hours.
- Daytime security. Consider installation of doorbell, telephone, or intercom at locked entry doors for use when receptionist is not available or whenever considered necessary. In secured buildings, place a bell or telephone at the reception area. Assure appropriate instructional signage is in place for guests/deliveries.
- Employee security. Instruct employees to call 9-1-1 and/or provide appropriate building security contact information in the event of an emergency or any security issues. Instruct employees to verify identification before allowing office entry to non-uniformed or unsolicited service/delivery personnel.

Key and Badge Control

Office security systems can include a software program to assign a card/badge to an employee. In lieu of software programs, a simple spreadsheet will work. Whether it's a badge or key, access should be tracked and monitored to assure that badges/keys are collected and taken out of the system upon employee termination. Establish a policy for lost badges/keys.

Emergency Preparedness

First Aid Training

- The size of the office should determine whether or not automated External Defibrillator (AED) devices should be installed. Some buildings provide AEDs for tenant use; check prior to purchasing.
- AEDs should be placed in a central, accessible location. AED maintenance and annual training are required.

- Locate first aid kits in kitchen, copy room, or other common office space in marked cabinets.
- CPR and first aid training should be considered for an appropriate number of employees (typically 10 percent of total staff).
- The location of safety equipment and evacuation routes should be noted on floor plans and posted in common areas.

Safety Training

All firms should take steps to provide for the safety of their employees.

- Require all employees to participate in office evacuation drills and read/understand policies on accident/incident reporting.
- Require additional safety training for all employees who do field/site visits.
- Establish a rally point for employees to gather after office evacuations, and appoint someone to account for staff.
- Establish policies for handling and reporting specific types of incidents (workers compensation issues, vehicle accidents).
- Conduct annual office safety audits to limit employee accidents and workplace incidents. Check for potential safety hazards, including electrical (equipment, space heaters, power strips plugged into power strips), appropriate tools (hand carts, step ladders), and signage (at AED/first aid kit, exit doors, Material Safety Data Sheets).
- Establish tracking procedures to assure corrective actions from the office safety audits are handled in a timely manner. Online systems are available for recording safety incidents and accidents to allow tracking and reporting by categories.

SAFETY AUDITS

Annual office safety audits should be considered for all facilities. Categories for office safety audits include work environment, emergency precautions/first aid, fire protection, workspace ergonomics, office furniture/equipment, material/office supply handling, and electrical equipment. Develop and utilize a checklist to identify specific potential hazards, record observations, and implement corrective action steps, including person responsible and completion date, for prompt resolution.

Disaster Recovery

Establish a disaster recovery plan that outlines what should be done if the firm is unable to access its office space, and distribute it to key managers. The plan should include:

- An alternate business location, list of key clients, list of key vendors/service restoration contacts, employee contact information, and telephone tree for assigned contact
- An off-site records management/tracking program to archive/store business records and project files
- Backup IT capabilities and program documentation, including procedures for standard file naming conventions, specifics on saving electronic project-related materials and correspondence, and direction on saving copies of electronic files on the highest-level storage media
- The point person, with backup, responsible for initial contact with employees, clients, and vendors, along with media, website update, and press release assignments

▶ The Role of Architects in Disaster Response and Recovery (4.2) further discusses effectiveness in disaster response, recovery, rebuilding, and resilience to help shape truly sustainable communities.

Office Relocations/Renovations

Another key administrative function is in the area of office space. Whether moving employees and equipment internally, expanding space, downsizing, or relocating, coordination is critical. Administrators can assist with scheduling and coordination activities such as space needs assessment, site visits, layout/seating plans, mover procurement, in-house vendors (coffee, water, vending, reprographics), and coordination with and communication to staff and clients.

Real Estate Liaison

Due to the complexity and legal issues related to real estate transactions, a real estate professional and/or attorney should be involved in finalizing all real estate contract negotiations.

Move Team Coordination

All move activities need to be organized, no matter the size of the office. Establish a Move Team (with lead person) to assure successful coordination and to limit the number of staff involved in the move to decrease downtime and confusion.

Develop a Move Communications Plan and share it with staff. Include in the plan the move activity dates and schedule for milestone tasks such as construction deliverables; equipment, furniture, and printing orders; address change notifications for employees, postal service, clients, consultants, and vendors; and the Open House event.

Once the space needs are established, other items need to be addressed:

- Decide the layout for common areas and equipment placement. They may need to be located adjacent to building water/electrical or in central access areas. An architect (or outside architectural/interiors firm) may be assigned to handle this design and coordination, particularly if construction is involved.
- Establish contracts for installation of appropriate power/voice/data cabling, AV, IT, and telecom move/installation.
- Place orders for furniture modification and/or new furniture.
- Secure contractor/installation services for carpet, paint, and other finishes as required.
- Order corporate and name plate signage, as appropriate.
- Consider contracting with professional movers to assure employee safety, even for internal moves.

Technology offers opportunities to reduce overall office space needs and enable better use of collaborative spaces. Consider reducing file cabinet and storage needs by using electronic media storage or online resources. Backing up electronic data and archiving documents off-site should be considered. Consider the impact of telecommuting/remote work opportunities through virtual private network technology (cloud computing, remote access). The evolving technologies present increased opportunities to offer guest/shared spaces for improved collaboration by those not permanently located in an office.

PROJECTS

Support staff can manage the project's flow of information; maximize, streamline, and improve efficiencies; analyze, chart, summarize, and report data; and help improve the methods used to deliver projects.

Consider these project administrative tasks that can be delegated to support staff:

- Tracking subcontractors' task orders and contracts
- Creating/maintaining project implementation and management plans, and project procedures manuals associated with ISO 9000 procedures, safety, and communications
- Creating templates and the procedures for producing deliverables and work products
- Providing project scheduling and follow-up for key milestones
- Providing quality assurance review of reports/correspondence for grammar and formatting
- Creating/updating progress reports
- Taking meeting minutes
- Producing reports, spreadsheets, and presentations
- Taking photos and vehicle counts (field work)
- Creating/managing website

Best Practice Considerations

As soon as possible, put practices in place to standardize routine tasks in order to maximize project efficiencies. Experienced administrators understand the need to have protocols, processes, and tools in place to ensure the project work meets or exceeds the project schedule and client expectations. The assistant can develop control systems for monitoring and reporting deviations quickly so that corrective actions can be taken.

SERA Architects Inc. provides for dedicated administrative assistants based on the size and complexity of the project. The firm always has at least one project-oriented administrative assistant supporting multiple projects, generally covering one or more market sectors. Some of SERA's large projects have required a dedicated administrative assistant due to the number of parties involved, in which the admin is responsible for the complex meeting scheduling of multiple parties, often in multiple locations. Some of SERA's projects have required a lot of travel for meetings at the project site, and the project administrative assistant accompanied the team to provide on-site meeting support. SERA's project budgets have often supported a dedicated administrative assistant, primarily with their civic and institutional clients.

Support for Phase-Based Tasks

Administrative assistants can be brought on the project early in the process to assist with operational tasks. The project initiation phase requires a high level of effort for start-up tasks and procedures. Once established, some tasks, identified by an asterisk, will require monitoring and updating throughout the project.

- Project Initiation
  - Set up project numbers/system.
  - Coordinate Owner-Architect Agreement.
  - Establish invoicing and expense reporting procedures.
  - Establish progress reporting procedures.
  - Establish and set up project filing system,* including archiving procedures.
  - Process insurance requests and other consultant certifications.*
  - Coordinate Consultant Agreements.
  - Create the organization chart and the list of team contacts.*
- Schematic Design
  - Monitor the budget—actual and percent completes—and report concerns to Project Architect.*
  - Monitor the work products—schedule versus actual—and report concerns to Project Architect.*
  - Prepare and submit invoices.*
- Design Development
  - Create the table of contents based on the specification sections written and edited.
- Construction Documents
  - Word-process, reproduce, and assemble the specifications.
- Bidding and Negotiation
  - Publish or distribute bid advertisement.
  - Maintain Register of Bid Documents.
  - Distribute Bid Documents to bidders.
  - Coordinate and distribute Addenda.
  - Coordinate Construction Contracts.
- Construction Contract Administration
  - Coordinate and track Change Orders.
  - Track, log, and process RFIs.
  - Create and maintain the tracking log for Submittals and Shop Drawing Review.
- Project Close-out
  - Assist with preparing the Certificate of Substantial Completion.
  - Prepare and submit the Final Invoice.
  - Prepare the close-out paperwork.
  - Finalize the Agreements, including accounts payable/receivable to and from consultants.
  - Inventory and archive project files, including monitoring the destruction date of project files.

ADMINISTRATIVE SUPPORT FOR CONSTRUCTION PHASE SERVICES

Support staff can prepare Construction Phase Services forms that are not provided by the client or others:

- Proposal requests and change orders
- Daily inspection reports
- Letters of transmittal and incoming/outgoing correspondence log
- Noncompliance notice and log
- Environmental compliance assurance procedure
- Payment documentation log
- Photograph log

Contracts and Agreements

Administrative assistants can initiate and coordinate the contractual obligations of the project:

- Collect contact information from each party.
- Create draft contract for principal and/or project manager's review.
- Distribute draft contract to all parties for review.
- Incorporate all edits and comments; finalize documents.
- Distribute final document for signatures.
- Request proofs of insurance, monitor renewal dates, request updated certificates.
- Monitor and track contract changes.

Project Invoicing and Collections

Administrative assistants can track, monitor, and invoice direct expenses such as office long distance calls, cell phone usage, mileage, computer time, in-house print production, and models and renderings. Even if some of the direct expenses are not reimbursed by the client, tracking those expenses can be used over time for cost-estimating purposes for new projects.

Whether the firm uses its own invoicing format or the client specifies the format, the project assistant and its client counterpart should meet to discuss invoicing procedures (format, frequency, when payment is expected—e.g., 20 days from client receipt—and the steps to be taken if payment is not received within the agreed-upon schedule). Once the procedures are set, the project assistant should create a checklist to ensure compliance and accuracy before submitting invoices.

The same quality control practices that are in place for the architect's invoice should be in place for quality control of the subconsultant's invoice. Develop a checklist of items to review and apply it to the subconsultant's invoice before accepting the invoice for payment.

Monitor receipt and payment from the client. Within two to four days of submission, the project assistant should contact its client counterpart to confirm receipt of the invoice. If payment has not been received in a timely manner, the project assistant should check with its client counterpart whether the invoice has been processed and when payment is expected. If payment isn't received on the final payment date, the effort should be elevated to the project architect to personally contact the client to discuss the reason for delay.

While it is possible to track project resources and profitability manually using Excel spreadsheets, there comes a point where there are either too many active projects or too much information to keep manual reports up to date. Various project management software packages are available, based on the desired degree of interoperability between accounting, project management, and marketing. When selecting a software solution, consider one that will organize projects, contacts, time entries, expenses, and billing. Project management software is a significant investment in both time and money, so strategize what the software needs to accomplish and research the best fit.

▶ See Project Budgets, Work Planning, and Monitoring (10.3) and Financial Management Systems (7.3) for related information about systems to help achieve a firm's long-term financial goals.

Document Control

Organization of project documents is key throughout the project. Knowing where to find the most current version and knowing where the documents are in terms of the project's work flow is essential. Consider hard copies as well as electronic files and e-mails. Support staff can develop standards and protocols for file naming and electronic folder structure, as well as developing the framework for tracking documents. There are numerous software programs available to track documents and work flow. Various administrative forms, such as the simple yet effective RFI tracking spreadsheet shown in Figure 5.11, can be created in-house by a firm and are also available through the Society for Design Administration.

▶ Construction Phase Services (10.9) covers the architect's observation and reporting of the progress and quality of the work, and its conformance to the design intent expressed in the contract documents.

	A	B	C	D	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Enter Firm Name Here																	
2																		
3	Project Name:																	
4	State Project Number:																	
5	Project Number:																	
6	Contractor:																	
7	Last Update:			Enter cur														
8							Referred						COPIES TO					
9	Contractor's RFI Number	DATE REC'D	SPEC SECTION	Drawing Number	Subcontractor/Supplier	Date Required	To	DATE SENT	Response by	Date Ret'd from Reviewer	DATE RET'D	Total Number of Days	Contractor	Owner	Consultant	Code Authority	File	Miscellaneous Comments
10												0						
11												0						
12												0						
13												0						
14												0						

Society for Design Administration

FIGURE 5.11 **RFI Tracking Log**

Quality Assurance/Quality Control

Firms with established quality processes and procedures that determine how its services will be provided, measured, and verified have a greater chance of project success than firms without established plans. The work breakdown structure should include a quality assurance/quality control (QA/QC) plan as a deliverable, as well as associated QA/QC tasks to implement the plan.

The administrative assistant or intern can assist with the quality control process: creating flowcharts depicting the overall process, tracking controlled documents/deliverables, and developing and administering the client feedback form. Ideally, integrated teams will work from the same QA/QC plan. For teams with multiple consultants, an alternative would be to allow the consultant the choice of following the prime consultant's quality procedures, or adhering to its own firm's procedures, with the understanding that the consultant may be audited by the prime, especially with regard to the quality assurance of its technical work products.

▶ Origins and Development of Quality Management (12.1) addresses systems that provide guidelines, support, and metrics to holistically support a firm's performance and advance the profession.

Bid Document Preparation and Control

As construction documents near completion, the administrative assistant will prepare a list of plan holders (bidding contractors, owner, regulatory agencies, and plan centers) to track the distribution of bid sets and addenda. The assistant should work closely with the architect to determine the parameters of the bid and get answers to essential questions such as:

- Who can request and receive plans (only generals, only preapproved generals, all subs, major subs, only designated plan centers)?
- How and when the bids will be opened?
- Deposit required; is it refundable?
- Date and time of any pre-bid walk through; is it mandatory?
- Plans, specs, and addenda distribution—electronic or hard copies, shipped, delivered, or pick-up required?
- What is the bid estimate range for the project?

Once the project has been advertised and bid documents are out, the assistant can field calls from interested generals, subconsultants, and suppliers. The assistant can collect and record all deposits, holding them for refund once the plans are returned.

As addenda are developed, the assistant can help organize the information, package the final addenda, and ensure it is distributed to each plan holder as required by the contract.

After bid opening, the assistant distributes bid results to interested parties, monitors the return of plans, specifications, and bid deposit refunds, and distributes plans to the successful contractor.

Some firms have left it to the project architect to be responsible for the success of their projects. But if the architect's desire is to focus on the firm's business development and the design process, the architect needs someone to focus on the administrative responsibilities. That's where support staff can add value—creating and monitoring the project controls and the procedures and systems it takes to ensure client and firm success.

► Bidding and Negotiation (10.8) provides an overview of construction procurement processes.

CONCLUSION

As the practice of architecture continues to evolve to meet the demands of our rapidly changing world, so will office administration. Administrators are taking on more responsibilities in the areas of marketing, finance, human resources, information technology, and project administration, and in many firms are playing a key role in controlling costs to enhance profitability. The return on investment is a key indicator of the value that administrators bring to the firm, the client, and the project.

Emerging trends in lean architecture and integrated project delivery require updated procedures for getting quality work done rapidly and consistently. As projects become more integrated and complex, methods for effective team collaboration and the sharing and tracking of documents must be developed, assessed, and refined. Administrators, and principals, should always be asking, "Is there a more efficient or effective way?"

For More Information

Society for Design Administration: 2400 Ardmore Blvd., Suite 302, Pittsburgh, PA, www.sdadmin.org, e-mail: admin@sdadmin.org, phone: 1-800-711-8199.

International Association of Administrative Professionals (IAAP): www.iaap-hg.org.

Project Management Institute: www.pmi.org.

American Management Association: www.amanet.org.

International Facility Management Association: www.ifma.org.

Business Disaster Planning: www.ready.gov/business.

A CASE STUDY OF SUSTAINABLE BUSINESS PRACTICES

Tina Keller, Assoc. AIA

For architects, designing green buildings is only one component of a truly sustainable practice. Successful firms are differentiating themselves by applying principles of sustainability to all aspects of business.

Tina Keller is Manager of Contracts and Administration for SERA Architects and is a founding member of the firm's Sustainable Action Committee. She is actively helping SERA fulfill its mission to be the most sustainable firm possible.

SERA Architects, a 114-person multidisciplinary firm based in Portland, Oregon, adopted sustainable business practices in an effort to "walk the talk" on sustainability.

DISCOVERY

SERA's path toward sustainable business practices began in 1996 when the firm hired a new design director, John Echlin, who had the vision to add sustainable design to its urban focus.

In 1999 Echlin attended a workshop on The Natural Step (TNS) presented by its founder, Karl-Henrik Robèrt—an event that is now seen as a seminal and transformative moment in Portland's evolution as a national hub for sustainability thought leadership. TNS is a not-for-profit organization founded in Sweden with the vision of creating a sustainable human society. Its stated mission is to promote understanding, competence, strategic planning, and above all, action towards sustainability. TNS provides a cohesive, scientific framework for progressive change that resonated with the leaders at SERA because of its empirical basis and applicability to all systems (both natural and man-made) at all scales (local, regional, and global).

(continued)

In 2001, all of SERA's principals underwent TNS training to become educated about sustainable business practices, and then invested in changing the firm's culture accordingly. Support from the firm's top leaders was key to undertaking a complete cultural transformation. SERA's reinvention included changing the firm's ownership structure via an Employee Stock Ownership Plan (ESOP). Being employee-owned directly reflects SERA's commitment to The Natural Step's premise that a sustainable society empowers people's capacity to meet their own needs. The ESOP empowers SERA staff in decision making, which has resulted in a greater level of engagement and entrepreneurial involvement, and has helped the firm attract multidisciplinary senior staff with professional expertise and personal passions for sustainability to accelerate the firm's transition.

A cross-section of SERA's staff completed the TNS training, and a phased approach was implemented to train all current and future staff members. The TNS training resulted in a shared firm-wide vision and goal for SERA to become a fully sustainable office.

DEVELOPMENT

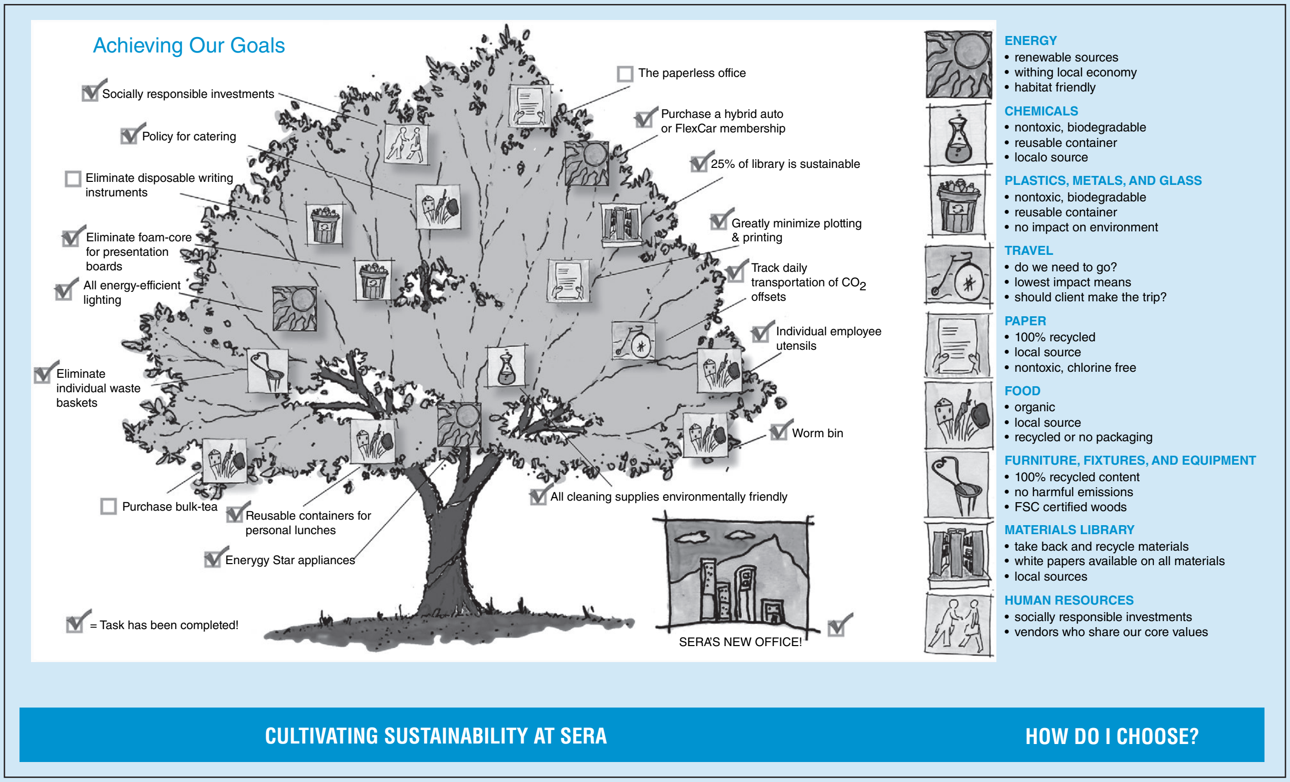
The concept of "backcasting" is central to The Natural Step's strategic approach for a sustainable society, and can be summarized as follows:

1. Imagine ideal and sustainable future conditions—begin with the end in mind.
2. Benchmark the present conditions—create an honest assessment of where you really are today.
3. Develop measurable and achievable steps from the present to the future conditions, adjusting course as needed due to growing understanding and competency, and ever-evolving present conditions.

Firm principal Clark Brockman paraphrases TNS' strategic approach this way: "Backcasting is much more effective than forecasting, which tends to have the effect of presenting a limited range of options, stifling creativity, and most important, projecting (sometimes in perpetuity) the problems of today into the future. Beginning with the end in mind is the only way to truly reimagine the future—otherwise we are simply trying to fix or repair the existing, default conditions."

Over a nine-month period from 2002 to 2003, SERA's backcasting team established a vision for a fully sustainable workplace, benchmarked the firm's existing conditions, and used TNS principles to chart a course toward a fully sustainable office. (See Figure 5.12.) The backcasting process produced some surprising results, such as the realization that SERA's largest environmental impact, by a factor of two, resulted from employees' commutes to and from work rather than more predictable (and visible) factors such as a design office's use of vast quantities of paper.

To manifest SERA's cultural transformation (and to make visible the team's nine months of work), the backcasting



SERA Architects

FIGURE 5.12 SERA's fully sustainable workplace encourages the same values from vendors and suppliers.

group came in over a weekend and initiated the following guerilla tactics:

- Removed all individual trash cans from people's desks (without removing any recycling containers)
- Established an expanded recycling center
- Provided individual utensil sets in handmade holders made from recycled fabric samples from the Interior Design library and reused utensils from Goodwill
- Provided recycled paper notebooks using recycled office paper

In 2003 and 2004, SERA implemented many "low-hanging fruit" changes to office practices guided by the backcasting process, but it was clear that SERA's leased office space of 35 years was proving to be a significant barrier to progress on the firm's path to sustainability. In 2004, SERA moved to newly remodeled office space located prominently on Portland's new downtown light-rail line. The new office piloted LEED's Commercial Interiors (CI) standard and received Gold level certification, incorporating sustainable design elements and business practices throughout the office.

In addition to using renewable and recycled materials in the office's design, SERA purchases 100 percent Clean Wind power from Portland General Electric and 100 percent carbon-offset natural gas from NW Natural Gas. Unlike a traditional tenant, SERA contracts directly for janitorial services focused on green housekeeping practices. SERA's commitment extends to owning its own high-performance mechanical units and installing electrical sub-meters to closely track actual energy usage.

The firm continued to grow, necessitating an expansion in 2006 that doubled the size of SERA's downtown office space. This project achieved LEED-CI Platinum certification, the highest level available from the U.S. Green Building Council.

RESULTS

SERA's decade-long focus on sustainable business practices accomplished a strategic cultural shift that is embedded at all levels in the firm's operations, products, services, and business planning. Reimagining the firm along sustainable principles resulted in large impacts both internally and externally:

- Firm staff and revenue growth
- Firm transition and rebranding
- Higher-profile design projects
- Dramatic shift in staff recruitment and retention
- Dramatic shift in client base to clients with shared values
- Expanded geographic reach, regionally, nationally, and internationally
- Recognized leadership in the field of sustainable design
- Participation in sustainability policy work locally, regionally, and nationally
- Influence of staff at home and in the community

SERA's architectural projects are designed to reflect best practices in sustainability. The firm's in-house Sustainability Resources Group (SuRG) offers clients integrated thinking and sophisticated early design tools. SERA's Urban Design & Planning Studio provides leadership in Civic Ecology and district-scale systems planning. The firm's employee-owners are active in shaping sustainable public policies, such as working with Oregon's political leaders to rewrite the State's Plumbing Code to allow reuse of graywater, and the State's Energy Code to include one of the country's first "Reach Codes," a set of optional standards to increase the energy efficiency of buildings above the mandatory statewide building code.

Members of the firm are routinely called on to talk to others about SERA's path toward sustainability and their evolving design practice. SERA has effectively influenced vendors, consultants, clients, and other businesses toward implementing more sustainable practices in their own workplaces, and on their projects.

From an operations perspective, SERA's attention to purchasing policies and waste reduction has impacted practices on local and national levels ranging from green reprographics to sustainable food catering services. SERA has encouraged its vendors to find new, more sustainable options for frequently used materials including job site signage and presentation boards, resulting in better solutions for the entire industry to adopt.

FUTURE

SERA's solid framework and shared mental model manifest as an ongoing commitment to become more sustainable through continuous learning and adaptation. New SERA sustainable initiatives include tracking energy use intensity at SERA's office, in SERA's projects, and at the homes of SERA's employees. The SERA Carbon-Neutral Initiative (SERACn) is modeled on existing international protocols to align with likely formats of eventual regulation, and the firm is an active participant in the AIA's 2030 Commitment. The firm holds an annual Sustainable Action Celebration attended by employees, clients, and guests to recognize SERA's progress and share successes so others can learn.

The TNS backcasting process and ongoing implementation work has created a cultural shift at SERA—and an understanding that the path to a sustainable office is just that, a path. SERA's shift toward sustainable business practices will never be declared complete; to do so would disregard the complexity of systems, practices, and interrelationships involved with a truly sustainable practice.

For More Information

The Natural Step: http://www.naturalstep.org/.
U.S. Green Building Council: http://www.usgbc.org/.
SERA Architects Inc.: http://www.serapdx.com/.

5.11 Knowledge Management

Doris S. Pulsifer

Knowledge Management provides architecture firms a method to foster, develop, and capitalize on its most valuable assets: creativity and invention.

INTRODUCTION

As a theory, Knowledge Management (KM) helps define a common approach for the business that is aligned with the goals and objectives of the firm. As a methodology, it provides a common set of tools that facilitates and promotes the creation, capturing, and sharing of the firm's intellectual capital. It is the convergence of economic, environmental, technology, and social drivers that support the need for a KM discipline in every architectural practice.

Globalization continues to expand economic opportunities while leveling environmental and social issues. The urgencies for a green infrastructure are a primary focus for federal and local governments. Understanding that the building sector is responsible for over 40 percent of all carbon emissions, advances in a sustainable practice are now core to the architecture industry. Although the core concepts of globalization and green technologies are not foreign to architectural practice, the rate at which these are shaping and directing the practice is.

The possibilities of technology, including the explosion of social networks and open source software/platforms, provide multiple opportunities for organizations to harvest internal and social knowledge. These opportunities can be scaled to meet the economic and strategic needs of any size organization. Technology provides great opportunities to promote and transform social networks into professional/learning environments regardless of location and time. It presents opportunities to capture and disseminate knowledge that was previously confined by space and time as well as the job-assigned responsibilities of the individual. On the other hand, the challenges of an increasingly mobile workforce and its communion with social networks require the creation of new information technology (IT) models.

ABOUT KNOWLEDGE MANAGEMENT

What Is KM? A Basic Definition

Knowledge Management is a systematic and strategic approach that promotes improvements in knowledge processes, the generation of knowledge products, and occurrence of invention. As a system, KM defines and integrates goals and practices, and provides the necessary tools to promote, capture, and disseminate the intellectual capital of an organization. As a practice, it monitors the processes through which an organization creates intellectual wealth.

To manage knowledge is to recognize and focus an organization on its mission and unique business proposition. Knowledge Management deals with the one un-substitutable asset of any company: its people. Knowledge Management is interested in all the elements that allow the individual to create value for the business.

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KM focuses on the value and management of a firm's intellectual capital. The intellectual capital of an organization is assessed and harvested at three distinct and interrelated levels:

- *Individual*: Knowledge created and contributed by the individual is recognized and managed. Individuals will seek associations that satisfy their intellectual, professional, and social curiosities. By understanding these curiosities and supporting these associations, organizations can accomplish more, move faster, and solve problems that cannot be tackled with traditional approaches.
- *Organizational*: Organized, processed knowledge that is shared and used by the entire firm. It is the product of individual and collaborative efforts. It is used, proofed, and proven knowledge that is documented and standardized.
- *Social*: External ideas, community concerns, and regulations that inform, direct, and often elevate the knowledge of the organization and the individual. Social capital can set trends, offer challenges, and spark adaptations that trigger creativity and invention.

A KM practice must recognize, promote, balance, align, and harvest the activities at all three levels.

In Practice:
- Implement and support a community of learning that includes the sharing of design, research ideas, and brainstorming on office practices. (Individual)
- Define a set of activities that facilitates the evaluation of design and office practices to be formalized and collected as best practices. (Organizational)
- Organize the firm's knowledge. (Organizational)
- Make a social commitment part of the firm's mission: State the organization's social and civic responsibilities. (Social)
- Stay abreast of socioeconomic and political trends that impact architectural practice. (Social)

Knowledge Management as a practice has been on the rise in many industries and professional practices. At its core, KM provides tools that enhance and support all the functions of an organization. It facilitates the objectives of any team, department, organization, and industry. For any industry, the successful adoption of KM represents a leadership commitment and often a cultural change. For established firms, the adoption of KM is often slow, starting with a particular initiative or department, and then gradually spreading throughout the organization. Eventually KM becomes an integral part of the practice and operations. Newer firms can immediately capitalize on the implementation of a KM practice, as these do not need to rework established cultures and managerial practices.

Precedents: Theories That Shaped Knowledge Management

KM became a common topic by the mid-1980s. Many of the disciplines and practices that contributed to it, such as Total Quality Management, business process reengineering, organizational management, and so on, emerged in the early 1970s. Managerial and economic theories are constantly evolving to adapt and respond to a fast-changing global market, and these theories continue to shape and inform a Knowledge Management practice.

In the early 1980s, as a result of significant developments in technology, Knowledge Management was viewed by some solely as a technology effort, with ambitions that technology alone would promote and support the knowledge of an organization. Discussion and articles about knowledge workers and intellectual capital as a valued asset of an organization became more common. The connection and distinction between information and knowledge raised ideas and concepts that were augmented by the proliferation of the Internet. The realization of a global economy dominated by knowledge products now provides a new, clearer perspective on this differentiation.

In other forums, KM became and continues to be a philosophical debate about the meaning of knowledge and its intrinsic qualities. This debate is extremely relevant to understanding and properly implementing a knowledge management practice. Knowledge Management does not create knowledge; it promotes the individual thinking and creative processes, it identifies knowledge products, and shares them among the organization. KM is concerned with the message, company beliefs, practices, and rewards that gestate creative, intellectually challenging, collaborative, and productive environments.

In the United States, the architectural industry is now beginning to address the relevance and benefits of KM. The term is not commonly used, and very few architectural firms offer a position for a KM leader. The implementation of, and standardization on the use of technology and information management is not enough to define a KM practice. Although information management is a key component of KM, the practice and reach of KM is far more encompassing. Understanding knowledge at the enterprise level requires awareness and balance between:

- *Day-to-day tasks*: office operations, invoicing, payroll, etc.
- *Improvements to knowledge products*: presentation techniques, BIM standards, contract management, etc.
- *Fostering an environment for creativity*: design reviews of internal and external work, technology forums, material research, and so forth

KM seeks to promote, monitor, and balance all these activities to further the goals of the organization. All these components interact within the context of economic, social, and technology trends.

For architecture firms, the challenge of successfully adopting KM is to expand its definition and implementation beyond the project and the project team; to understand the interdependencies and need for integration among the various groups or departments of the business; and to not reduce KM to the use of technology and implementation of CAD/BIM standards.

All industries face challenges through the implementation of a KM practice. By understanding how other industries overcome these challenges and studying their successes, the architecture community can learn methods and proven strategies for the implementation of KM in its practice. For example, well-established architectural organizations may face resistance to changes on collaboration or documentation practices from its teams, due to their familiarity with older processes. A similar challenge has been faced by some companies in the airline industry, where the large size of the airline and longevity in the business makes for a slow KM adoption. Newer airlines tend to have faster successes because they are able to define and build a culture of knowledge from the ground-up. Specifically, they accomplish this by implementing technology platforms, business processes, and incentives that will guarantee the identification, collection, and sharing of corporate knowledge.

Multinational organizations can teach valuable lessons to geographically dispersed architecture practices and those seeking to extend its practice abroad. Civic agencies such as the United Nations exploit KM by adhering to its technology applications and idea-sharing principles. By providing incentive programs for groups to share successes and best practices, and implementing web-based portals and social networking tools, certain sectors of the UN are able to help governments in smaller countries solve a variety of socioeconomic challenges. Employing KM, the UN is able to provide advice and connect various segments of the population and even different governments so they can share their experiences and successes. In so doing, these countries are able to foster a culture of knowledge among their government groups and private institutions.

Organizations whose business nature is founded on the collection and sharing of knowledge can also teach the architecture industry lessons in adaptability and the need for constant reevaluation of business processes. Consulting firms have based their practice on KM principles. However, in today's global economy, the commercial aspects and competitive environment in which consulting firms operate makes it difficult to reconcile and benefit from the idea of knowledge as a common, shared resource. With the proliferation of information mechanisms, consulting firms are challenged to reevaluate their approach to knowledge management and sharing, to find ways in which their KM practice helps differentiate their practice and becomes an integral part of their value proposition.

The elements of KM already exist in most, if not all, established architecture firms. Most architecture firms invest in programs and/or technologies that support some or all of the elements of KM. Many architecture firms have an enterprise intranet (formal, and most common to older, larger organizations), wiki (informal and accessible to younger, smaller firms), or formal documentation. Its purpose is to promote standards and preferred practices proven by the group, tested and refined throughout its many projects, or under exploration and development. Most architecture firms have CAD libraries and drafting standards, and directory structure, with more or less information on who's who and how to contact an employee. All of these tools represent business and technology components that help define the framework of KM.

WHY KNOWLEDGE MANAGEMENT?

The Knowledge Economy

Most businesses compete based on knowledge. The rate and value of innovations continues to rise, and as a result, a Knowledge Management strategy is critical.

The concept of a knowledge economy summarizes the relevance of KM to architectural practice. In the knowledge economy the currency is knowledge. The processes and rules that governed an industrial economy are revisited as knowledge becomes an economic resource and knowledge products, expertise, and inventions surpasses the economic value of agricultural and manufacturing products. In the twenty-first century, the most valuable products are knowledge products.

Organizations are required to redefine their operational and strategic models in order to transcend and compete across local and international markets, economic backdrops, and community/government regulations. KM brings an organizational awareness that is relevant and applicable to all departments, disciplines, groups, and teams in an architecture firm. KM is not the focus of an organization's strategy and success. Rather, KM is an enabler, an augmenter that supports the unique values and assets of the organization. KM focuses on supporting the intellectual capital of the organization.

A knowledge economy requires business to diversify their financial strategy and constantly evaluate the effectiveness of its management strategies. An architecture firm seeking to open an office in a new location or to expand and develop new areas of expertise must seek fast, efficient methods to disseminate new knowledge across the organization and seek faster profits due to knowledge gains. This need for diversification and strategy management must also be applied internally, to core processes, by developing methods of collaboration between disciplines at early phases of the project and integrating support roles or groups such as marketing, IT, and accounting to the project throughout the entire project life cycle. Once again, by disseminating knowledge faster and managing knowledge profits effectively, architectural organizations improve the quality of service and eliminate redundancies in the design, management, and promotional processes.

Change in the Work Environment

Emerging platforms such as cloud computing, social network tools, open source, and collaborative environment provide diverse options to share and capitalize on knowledge. These platforms and trends have changed the focus of technology and the expectations of what technology should do for an organization.

In addition, the expanded markets have created an increasingly mobile workforce that challenges traditional business models and communication approaches. As the numbers of mobile users increase, so do the demands on and expectations for the mobility of the business. Web-based and mobile applications shift business protocols and technology focus. This introduces the need to differentiate the processes, accessibility, and tools that support generation (input) activities from those used for delivery or output.

Environments like FTPs, extranets, and VPNs are now subsets of a much larger and complex technology that changes the current setting in which the architectural, engineering and construction industries collaborate. The demand is for light web-apps and fast handheld access to business processes and data. CAD and BIM files do not easily satisfy this demand. High-performance processes such as renderings, energy analysis, and animations require high-end equipment for generation. However, to satisfy a fast-paced, mobile business, the product of these memory-intense processes must be light, portable, and comprehensive. KM practitioners need to evaluate the business processes to provide the right tool for the right task. The established IT models based on standardization of equipment and applications, and a three-year maturing cycle for technology, may no longer be valid.

Younger workers entering the architectural workplace expect all of these collaborative and high-performance technologies to be available within the business environment. They do not understand the unique and often limited definitions of collaboration within the architecture industry and may not be constrained by traditional business rules. Collaboration tasks have different needs and meanings depending on whether these are governed by intrinsic or explicit knowledge activities. Understanding these needs helps identify the correct technology to properly support the task. Interested groups and allies (social knowledge) champion some of these emerging platforms, which, although well developed, do pose challenges in a business environment. It is important to understand the expectations of a younger workforce because these will shape the technology environment in a firm, will drive IT budgets, and will impact standard business processes.

Technological Integration

The longevity and stability of construction and building methods led to the definition and implementation of drafting and construction standards. These standards have facilitated the creation of software applications to support the processes. The industry standards and various technology systems, although extremely important to regulate the practice, do not define a culture of knowledge.

In order to benefit from the identification, collection, and sharing of ideas and best practices, the basic infrastructure of any software system must facilitate the exchange of data and provide easy access to information and knowledge. The basic architecture of the multiple systems commercially available and in predominant use by the architecture and construction industry today tackle the various phases and tasks of the design/build process as isolated events and in a proprietary manner. Ultimately, the information and knowledge of the organization must be seamlessly collected from different systems, at different phases, and must remain available to the organization beyond the completion of any and all projects. Higher function knowledge (organizational knowledge) that derives from the integration and awareness of needs and contributions among the participating parties is often obstructed by the technology platforms in which these tools are built.

The Building Information Model (BIM) exacerbates the technology needs. With BIM, we see the need for reconciliation and integration of practices and standards among the architecture, engineering, and construction (AEC) industry. This reconciliation transcends the organization of the BIM model and the level of detail/nomenclature of the BIM components; it impacts the economic models that have been in place within the design/build umbrella for more than half a century.

Differing audiences do require different solutions.

DEFINING KNOWLEDGE

Intrinsic and Explicit Knowledge

Knowledge management is concerned with understanding the activities of the individuals that create and hold knowledge; about identifying, tracking, and monitoring the events and business activities where knowledge is shared or consumed; and about providing the necessary framework to facilitate the flow of knowledge—capturing and measuring it to support and inform the business strategies. Yet to manage these processes and activities, we must understand knowledge within the context of the organization.

Michael Polanyi, a Hungarian physical chemist, categorized knowledge as intrinsic (tacit) and explicit. Intrinsic knowledge is the result of someone's "thinking": a personal act that is influenced by education, cultural backgrounds, and previous personal experience. Intrinsic knowledge has much to do with intelligence, yet it is more than that.

Explicit knowledge is data connected, information analyzed, it is knowledge verbalized. Explicit knowledge is a byproduct of our intrinsic knowledge but does not encompass all of an individual's knowledge. Explicit knowledge is written, spoken, observed, and formalized for others to consume.

- *Intrinsic*: the act of realization (creation)
- *Explicit*: the act of (verbalizing) unveiling

Many other concepts can be attached to these types of knowledge. In architecture, the act of design can be equated to an intrinsic act, purely intrinsic knowledge. Then, to a certain extent, the act of generating the schematics and construction documents can be understood as explicit knowledge.

Intrinsic knowledge is personal, private. Explicit knowledge is collective, public. The ways in which expression of intrinsic to explicit knowledge is captured or facilitated is by itself a central, pivotal concept of knowledge management. To identify and provide the correct environment, tools, and forums for intrinsic knowledge to be formalized and shared across the enterprise is to capitalize on a firm's most precious assets: creativity and invention.

Knowledge in the Architectural Processes

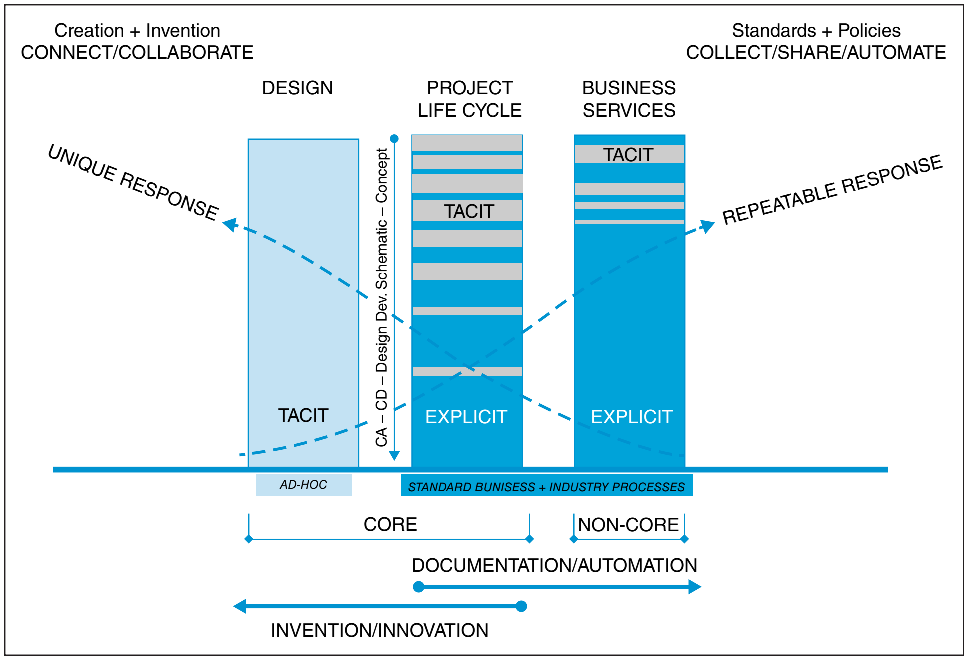
How to Analyze Business Processes to Properly Implement KM

When establishing a KM practice it is important to understand the interdependencies among disciplines (architecture, engineering, interiors, construction, etc.) and the various support arenas (HR, Marketing, Legal, Finance, IT, etc.) that are critical to operating an architecture firm. By understanding the needs, tasks, and goals of each discipline, KM prioritizes initiatives and identifies opportunities for collaboration so that the organization can benefit from these synergies. KM must also be constantly aligned with the business goals, which guide the strategies that then generate its core activity: the projects.

Because intrinsic knowledge is often viewed as the engine behind creativity and invention—activities recognized to be critical in the design industry—it is important to understand where each type of knowledge prevails and the importance of facilitating both in architectural practice.

At its most basic level, intrinsic knowledge can be paired with core functions (design, project life cycle) and explicit knowledge to non-core functions of an architecture firm (HR, Marketing, IT, Legal, Finance). (See Figure 5.13.) Where explicit knowledge accounts for over 80 percent of the business activities and supports a firm's comparative advantage, intrinsic-based activities represent the firm's competitive advantage and unique value proposition.

The business cannot survive on one set of these activities alone, since the mechanisms that promote, facilitate, and support each (intrinsic and explicit) are very different



Doris S. Pulsifer

FIGURE 5.13 Knowledge Management and Design Business Practices

in nature. For example, an online wizard that guides the creation of a new project number upon request is highly appropriate to support and expedite a financial process (an explicit knowledge–based activity); the creation of a project database where a designer can search through the firm's portfolio for project references based on ad hoc criteria is more adequate to support a design process (an intrinsic knowledge–based activity).

In general, process automations, online documentation, and standards tend to be more appropriate mechanisms to support explicit-based activities; while social networks, nonlinear relationship systems, and collaborative environments tend to facilitate intrinsic-based activities. The tools and identifiers to capture and facilitate the conversion of solutions created through intrinsic-based activities into explicit processes are much more difficult to tackle and cannot be relinquished to technology alone; the success for this transition relies on a "culture of knowledge." A culture of knowledge is an elusive term, a dynamic state that measures how well the organization supports the KM message, how the incentives and recognitions that encourage the individual to share its knowledge are defined, and how well the organization benefits from these efforts.

A first step in implementing KM is to understand all of the organization's business processes. Organizations must be aware of the objectives and work flows of all groups or departments, not just the design processes. A work flow allows KM practitioners to identify tasks dominated by intrinsic or explicit knowledge activities. Then processes can be tailored and tools selected that better support the knowledge type. Importantly, work flows allow for the identification of common or similar tasks and problems among groups or departments. Once the common tasks or issues are identified, efficiencies can be obtained by defining and implementing best practices across departments (organizational knowledge).

In large firms, a third step is to identify interdependencies among departments to streamline interdepartmental process. This is also applicable to smaller firms where the focus must be on identifying interdependencies with consultants and vendors to streamline external processes. It eliminates redundancies, duplicate efforts, and promotes organizational empathy. When individuals and groups understand the processes and needs of others, the tendencies and opportunities for collaboration flourish, and the organization as a whole benefits.

In Practice:

- Document work flows: Understand, at a high level what each group does.
- Find common tasks and hurdles among teams; standardize on best practices.
- Identify dependencies between teams; eliminate redundant tasks and streamline processes.
- Implement the best tools and methods to maximize the particular knowledge product—support the predominant knowledge type.
- Publish the work flows of all groups/teams—help create organizational empathy.
- Implement design reviews and encourage office-wide participation.
- Enforce postmortems at the end of a project, and after each project phase completion.
- Make the document and publishing of lessons learned required in your practice; consider the use of wikis to document lessons learned.

Elements of KM

How to Identify, Communicate, and Support the Core Elements of a KM Practice

The key elements of knowledge management are to

- Identify
- Connect
- Share
- Promote
- Capture
- Standardize
- Measure

These elements of KM should be present on all service and operational aspects of an architectural practice. Note that the key elements of KM are expressed as verbs. KM is an active, dynamic practice. It requires the participation of the entire organization, and constant actions that remind firm members of its goals and benefits. Knowledge is not static, and neither are the parameters of practice. Businesses are living organisms within complex, changing environments. To properly apply the elements of KM, the members of the organization must engage in dialogue, collaboration, and analysis.

Knowledge management shares and benefits from many other practices' basic concepts. KM methodology shares principles with other disciplines that are already operative in any design organization. A successful knowledge management practice requires a strong project, risk, and change management foundation. It is important to understand these theories to strengthen the understanding of KM.

In Practice:

- *Identify* important processes in the firm, and whether these are governed by intrinsic or explicit knowledge.
- *Connect* expert matters and business process regardless of role or assignments. Do not be limited to a group or previously defined job responsibilities (role) when composing a team or defining a business process.
- *Share* the knowledge generated through business key activities by creating and promoting events, processes, and systems that facilitate the dissemination of information.
- *Promote* creativity and ingenuity by publicly recognizing the efforts of the team or individuals in accomplishing KM goals; reinforce the practice of successful processes and invest in innovative strategies; engage on community programs (social knowledge).
- *Capture* business processes, design strategies, and project and office management techniques that reflect ingenuity and successful practices.

- *Standardize* best practices at all levels of the organization, from design to operational processes, by documenting, teaching, and making these part of the firm's guidelines. Make the documentation of best practices a mandate for every group and at every level.
- *Measure* success by assessing the accomplishments of your initiatives and projects based on defined firm-wide metrics; evaluate these metrics on an annual or semiannual basis to guarantee the alignment of your KM practice to the firm's business goals and mission.

Framework

A Solid Foundation

Most architecture firms, large and small, lack a framework that will allow them to capitalize on their knowledge assets and products. A framework is a combination of goals, roles, procedures, and technologies; it defines KM in the organization.

A KM framework is a tool used by all within the firm. It provides every group the understanding, purpose, and mechanisms to foster, capture, and disseminate their knowledge and accomplishments among their group as well as throughout the entire organization. Each group or discipline should operate on this framework to support its own tasks and needs.

The defined and documented framework guarantees that new hires will quickly learn and begin applying their firm's best practices, enabling them to focus much sooner on contributing their unique ideas and talents to the business. It also guarantees that the knowledge of the most senior, experienced architects and designers, the HR manager, or CAD gurus remains available to the organization even when that specific employee is busy on pressing, urgent tasks; traveling or in a different time zone; or leaves the firm. The framework facilitates the flow of information and knowledge among departments, groups, or teams; helps to eliminate duplicate efforts; and reduces errors. It also allows the business to centrally gather, measure, and analyze the success of their efforts. With this information, the leadership of an organization can shape and support its business strategy.

This framework constitutes an agreement upon which individuals and groups can create intellectual wealth for the organization.

In Practice:
- Define the KM framework, document it, and communicate it.
- Young and small firms can define KM as a virtual group—that is, promoting collaboration on knowledge initiatives through wikis, online meetings, and chat groups. A virtual group provides small firms the opportunity to expand their reach by including collaborators (external consultants) that might not be part of the firm.
- Rotate tasks and responsibilities for the implementation of KM among the members of the firm to benefit from new perspectives and to keep all members engaged.

IMPLEMENTING KNOWLEDGE MANAGEMENT

Defining the Framework

Apply a pliable approach to guide the implementation of a KM practice by breaking it into essential, manageable parts. A KM framework consists of a KM purpose; KM components; a technology platform; a budget; a measurement and analysis practice; and a re-contextualization policy.

A Purpose

Define the Objectives, Communicate the Message, and State a Commitment

Clearly define and communicate the meaning and goals of knowledge management within the organization. A clear definition of KM establishes a starting, gathering point for the organization. KM is not a solo effort; for it to be successful it must be understood, disseminated, fostered, implemented, expected and compensated, measured, aligned with business objectives, and constantly renewed.

The organization must have a shared definition of KM. This will provide the starting point for the necessary dialogue and collaboration. Through this dialogue, departments, groups, and teams can begin to identify shared needs and goals, and to define strategies that will benefit the organization as a whole.

A clearly communicated definition of knowledge management creates the necessary awareness and sense of urgency among the different disciplines, groups, and teams. This promotes participation and collaboration. It also emphasizes the role and value of each individual in contributing to the success of the firm (individual knowledge).

Architecture is an old profession. It tends to move very slowly in some areas despite its most marvelous, progressive creations and accomplishments. It is human nature to resist change. Almost every individual, group, discipline, and organization will resist change. Resistance to change is rooted in familiarity. This does not mean that change initiatives are wrong, but it does require understanding and attention to overcome. Any KM initiative must state its benefits to the individual, the department/discipline, and also to the organization. KM must identify and manage the obstacles for progress, and focus on the organization's goals.

Knowledge management must have the support of the leaders of the organization. A unified message from the leadership groups stating the imperative of KM is required, like a background song that must be played and replayed throughout the organization.

KM should not be approached as a fad or a one-time effort. The most critical, relevant action of the organization is the successful completion of its projects. KM must not stand in the way of this task but should support, enhance, expedite, and facilitate it. When defining KM in an architecture organization, the goals of the practice must be supported and the benefits of KM understood and communicated by its leaders.

In Practice:

- Make the firm's KM goals and objectives part of the company policies and guidelines handbook.
- Explain KM goals to every new hire, regardless of role.
- Make the participation and support of KM practices a key competency for evaluation during the annual employee appraisal process.
- Invest time and money in KM initiatives.
- Define a certain amount of learning hours per year for every employee.

The Components

Discrete, Prevailing Opportunities Throughout Your Organization

The components of KM are discrete points of opportunity throughout the organization. These components must be identified, understood, and monitored to define and prioritize the initiatives and projects that contribute to the creation of intellectual wealth within the organization. As stated before, a deep understanding of the architectural practice is required to identify these components. Below are some common KM components in an architectural practice:

- Key activities or tasks within the project life cycle that represent knowledge creation or knowledge collection points
- Repeatable business processes and activities that require and benefit from knowledge consumption
- Existing or potential groups that assess, validate, and promote best practices and standards within the organization
- Existing or potential information systems and technologies that promote the capturing, categorization, translation, and dissemination of knowledge

Technology Platform

Guarantee Efficiencies and Continuity

There are multitudes of software applications for the AE market. An architecture firm can control and dictate the use and type of technologies only to a certain extent. Architecture is a collaborative practice by nature. It is common to host different and various processes, technologies, and electronic formats. Since the technology continues to evolve, it is also a common challenge to manage legacy data and incompatible, outdated formats.

A technology framework must articulate a sustainable strategy to capture, collect, translate, disseminate, and maintain the flow of knowledge through the organization. This framework must include and understand the applications and software tools used by the organization; the necessary access layers, including security constraints; the engines that will translate, locate, repurpose, and measure information; and the various repositories where information is collected. (See Figure 5.14.)

The strategy must focus on the mechanism, conventions, structures, and security that will allow the "right" information generated by the "right" group, process, or task to be accessed, repurposed, and made available for consumption by other groups in a nonproprietary mode, organized in a significant manner and at the "right" time. Thus, in addition to collection and repurposing strategies, it is also important to define the nomenclature or taxonomy of the business, a common data model, and security and confidentiality levels; and to understand how these parameters may change through the life of a project. It is equally important to identify the events and timelines required for the revision and/or decommission of information. This platform must be presented as guidelines and best practices to allow for the adoption and evolution of multiple and new technologies.

KM brings IT's focus back into the business. KM acts as a magnifying glass on the business's needs and how IT can best position itself to fulfill those needs. It switches the technology functions from back-end maintenance/support activities to front-end/business-critical activities. KM facilitates the reevaluation of IT efficiencies because it pairs and aligns the business needs with technology options, and it does this at the enterprise level. IT efficiencies can be formulated in terms of cost savings, productivity gains, and business intelligence. When IT switches from business continuity to business

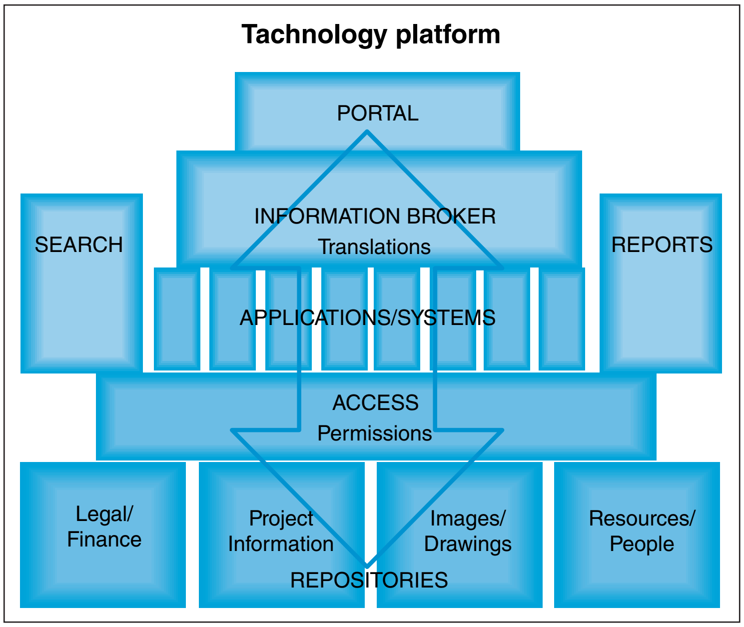


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FIGURE 5.14 Technology Platform

improvements, it becomes an enabler of creativity and invention and a key contributor to the organization.

In Practice:

- Apply the seven elements of KM to any IT initiative to incorporate technology into the organization strategic dialogue and planning.
- Define a security model to protect client confidentiality and intellectual property.
- Consider open-source technologies—these offer great opportunities to capture and disseminate knowledge within the firm at no cost; a wiki is a good tool to promote and facilitate collaboration on a variety of ideas among the firm.
- Evaluate cloud-based storage for project archive and retrieval.
- Evaluate cloud computing resources for application development and tool evaluation/experimentation.
- Evaluate scalable computing resources for computation intensive renderings and modeling tasks.

A Budget

A Scalable Commitment That Foresees and Informs on Business Needs

KM does not have to be a costly proposition. The cost of capturing and disseminating knowledge has diminished considerably in the past decades. KM is meant to be a multipronged, underground, and supporting platform; therefore it can be built gradually. It can tackle initiatives sequentially—first those with no cost, then progressively building the technology infrastructure to further elevate and promote knowledge management. However, whether an organization chooses a gradual approach or a more immediate implementation of KM practice, there is a cost associated with KM. The cost can be minimal, but it nevertheless represents the commitment of the organization's leadership to knowledge management. The definition of a KM budget must be addressed and must figure among all of the other organization expenses.

In practice, a KM budget may include the following:

- Work hours for KM leaders' time: full-time positions or hours allocated per month
- Learning hours: labor cost of the time allocated to each employee to attend continuing education sessions, whether these are offered by the firm or by an external organization outside the office
- Work hours for staff delivered training: time allocated to the preparation and delivery of in-house training
- Cost of lunches or beverages provided during internal seminars and presentations
- Cost of online webinars, courses, and virtual conferences
- Cost of printing learning material and documentation
- Cost of registration for external workshops or conferences
- Cost of consultants for the development or implementation of technologies and business processes

Measurements and Analysis

Monitoring Your KM Practice to Support Business Intelligence

The ability to capture, report on, cross-reference, and analyze success factors through all departments and groups at an enterprise level is extremely valuable, yet often untapped. Metrics and analysis are about understanding and documenting an organization's history and learning from it.

A measurement and analysis practice allows the business to stay lean and efficient in its knowledge management practice, to improve the effectiveness of its systems and procedures, and to define and identify business assets and opportunities for growth and profit. At a more granular level, measurement practices inform management groups how and where to focus their efforts to provide the most positive and immediate benefits to their staff, help support their departmental goals, and contribute to the mission of the firm. KM initiatives and practices require frequent measurement.

Measurement efforts are usually applied at the end of an initiative, a postmortem approach. However, the key performing factors (KPF) for measurement must be defined and communicated at the beginning of any initiative or project. In the same manner that an organization sets goals for a project and measures success against these, the organization must set measurement criteria that are applicable to all business endeavors. These organizational parameters not only benchmark successful implementations but also act as alerts to correct efforts in a timely manner and to capture the statistics and facts that will then be analyzed and constitute business intelligence.

In Practice:

- Define measures for success at every level of the organization.
- Teams, groups, and departments must evaluate, measure, and report against their performance once a year.
- Stay agile. Define initiatives with a long-term view. Implement them in sequential, short duration phases. Measure after each phase and correct long-term plans as needed.
- Projects must evaluate, measure, and report against the project goals at end of each phase.
- Individuals must evaluate and measure their performance against KM goals as part of their annual or semiannual appraisal process.
- Since KM is a firm-wide commitment, the firm must evaluate, measure, and report against the firm's mission and objectives to the entire organization at least once a year.

Re-Contextualization

Keeping KM Current

Knowledge management acts within a business to guarantee continuing profits due to knowledge gains; to constantly identify and exploit knowledge opportunities; and to actively define an environment conducive to creation and invention. To effectively accomplish this goal, KM practices must be evaluated and restated annually and as part of the business strategy.

In practice, conduct and publish an annual review of the KM framework:

- Review its parts to assess whether
  - The KM purpose is in alignment with the organization's mission statement and immediate goals.
  - New KM components have been identified, established components are properly supported, and completed/harvested opportunities have been documented and closed.
- Introduce new technologies in context with the business focus, abandon redundant systems, and tackle the impact of legacy systems and data before the technologies expire.
- Group KM budget items in three groups to validate re-contextualization: support for current, revenue-generating projects and initiatives (continuing profits); funding for new and potential initiatives (new knowledge products); and time and resources for research and development (creation and invention).
- Update the organization's taxonomy to keep analysis and reports current and attuned with the business language, its focus, concerns, and areas of growth.

CONCLUSION

Knowledge is an expression of the shared responsibilities for the collective well-being of humanity and the planet as a whole.

—Jeremy Rifkin

Economic conditions, environmental needs, technology, and social contexts drive the need for a highly specialized architecture practice. The more specialized the skills of the individual, the higher their value within the organization. At the same time, highly specialized individuals are more interdependent on others to accomplish the tasks of the group and the organization. Communication, collaboration, and knowledge sharing are the pillars of a highly specialized team. The complexity of the tasks and business environment provide the organization with unique, critical opportunities for sustainable growth and advancement. The intellectual gains of individuals and the knowledge products of the group will always seek excellence, promote collaboration, and propel the organization to gain intellectual advantage.

By implementing a knowledge management practice, architectural organizations can adapt more quickly, perform more efficiently and profitably, and contribute to a force that can positively alter the models of our businesses and of our industry.

For More Information

The Empathic Civilization: The Race to Global Consciousness in a World in Crisis (Penguin, 2009) by Jeremy Rifkin.

Systems Thinking: The New Frontier—Discovering Simplicity in an Age of Complexity (Systems Thinking Press, 2011) by Stephen Haines.

"The Theory of Business, Complexity, and Getting Work Done" (Innovationlabs.com) by Michael Kaufman: http://www.innovationlabs.com/publications/theory-of-business/.

"What Is KM? Knowledge Management Explained" (KMWorld.com) by Michael E. D. Koenig: http://www.kmworld.com/Articles/Editorial/What-Is-.../What-is-KM-Knowledge-Management-Explained-82405.aspx#.

"Knowledge Management—Emerging Perspectives": http://www.systems-thinking.org/kmgmt/kmgmt.htm.

"Knowledge Management Definition and Solutions" (CIO.com) by Meridith Levinson: http://www.cio.com/article/40343/Knowledge_Management_Definition_and_Solutions.

5.12 Information Management and Services

Bradley C. Horst, AIA, NCARB

Once considered simply the cost of doing business, today robust information management practices and technology-based services stand at the strategic intersection for how we create, capture, and share design ideas throughout the architectural enterprise.

INFORMATION MANAGEMENT

Introduction

Information management: "The science that deals with definitions, uses, value and distribution of information that is processed by an organization, whether or not it is handled by a computer" (*McGraw-Hill Dictionary of Scientific & Technical Terms*, 6th edition, McGraw-Hill, 2003)—is changing dramatically within architectural practices. What was once considered simply the cost or by-product of doing business is increasingly seen as a strategic opportunity for firms to differentiate their efforts in a competitive marketplace. Information management is now at the forefront for how architects think about design solutions in new and more comprehensive ways, during early design and throughout the full life cycle of the project.

With more than 20 years of experience in the AEC industry, Brad Horst is an integral part of EYP Inc.'s management team. He is responsible for driving the technical and strategic vision of the firm's IT organization, and works closely with project teams and clients to drive innovative project outcomes.

Good information management helps architects to do the following:

- Learn from previous projects.
- Automate core business processes, thereby allowing firms to spend more time on higher-value tasks.
- Facilitate the ability to introduce new value and more meaningful insight into design thinking.
- Collaborate and share with internal and external partners in a more seamless and productive way.
- Remain fully engaged with building owners, consultants, and key project stakeholders throughout the duration of the building project life cycle.
- Mitigate risk and drive greater rewards for project stakeholders.

Arguably, information is one of the most valuable commodities in the business world today. But it's not just about information in its generic form as much as it is about how to create, capture, and share the appropriate information with the right people at the right time. Therein lie the challenge and the opportunity with information management: to identify where information management intersects and supports information services (or an information system) and business strategy. With this in mind, it is increasingly clear that architects need new, more predictable ways of working with the information needed to effectively manage business processes today.

For the purposes of this discussion, information management and information services are fundamentally envisioned as a digital process. What once filled cabinets and flat files full of paper can now fit on a USB stick or "thumb" drive. As compared to paper-based information, digital information is easily, quickly, and inexpensively transferred, and enables usage by others.

Of course, the desired benefits of digital information management come at a cost: the cost of providing a well-organized and well-executed strategy information management strategy within a firm. Computers are good at amplifying one's efforts, both good and bad. Therefore, it's very important to have an information management strategy that supports the firm's goals. What follows is a high level look at the role of digital information management for architects, and how a carefully tuned information management and information services approach can support the evolution of professional services over time.

Content Structures

► See Construction Drawings (10.6) for more on CAD and BIM guidelines.

The good news is that architects don't need to begin from scratch when thinking about an appropriate information management strategy. In fact, central to an information management strategy that promotes robust sharing is a strategy built on well-documented industry standards and best practices.

For example, following the introduction of sophisticated Computer-Aided Design (CAD) applications, the National Institute of Building Sciences (NIBS) buildingSMART alliance offered the United States National CAD Standard, NCS Version 5. NCS offers well-thought-out guidance and recommendations on CAD-related topics such as drawing file naming conventions, CAD Layer Guidelines, the Uniform Drawing System, and a host of other key information management topics that are important to a successful CAD implementation.

With the introduction of Building Information Modeling (BIM) software applications, NIBS buildingSMART alliance offered information management recommendations for three-dimensional digital representations of the physical and functional characteristics of a building. "NBIM-US V2 covers the full life cycle of buildings—from planning, design and construction to operations and sustainment." Among other topics, NBIMS-US offers clear "Content Level" guidelines for determining the appropriate amount of building modeling necessary to support the particular design service being offered.

Finally, in 2012 the NIBS buildingSMART alliance released their Construction Operations Building information exchange (COBie) standard for industry review. A document that will ultimately be included in the National BIM Standard-United States (NBIM-US) document, "COBie identifies the minimum requirements for what digital data should be collected during design and construction so that the information is available later to manage assets throughout the life of the building." The COBie standard will become increasingly more important to facility owners and designers as we continue to look for greater building efficiencies beyond the initial building design and construction effort.

The standards and best practices like those offered by the NIBS buildingSMART alliance documents mentioned above should provide most firms with a great foundation for their CAD- and BIM-related standardization efforts. While some firms will use these standards as a starting point for what ultimately evolves into their own custom design and delivery standards, other firms might find that the standards offered provide what they need with little to no modification.

Careful consideration should be given to the amount of time and energy given to any standardization effort. The desired customization should help drive significant market differentiation and/or superior project results for the firm. Also, consider that often the more custom the solution, the less compatible your standard may be within the broader collaborative marketplace.

A firm's success in implementing building-specific standards is often directly impacted by the leadership team's ability and willingness to fully support such an effort. Regardless of firm size or technology support structure, IT leaders (whomever they may be) ultimately need to partner closely with the firm's practice-based Subject Matter Experts (SMEs) in order achieve optimal IT integration results. SMEs may be the very same people who will ultimately be responsible for applying the newly established standards within their own projects; therefore, their involvement from the beginning helps to drive a sense of collective ownership and accountability from day one. Depending on the size and organizational model of the firm, SME leadership candidates could include the firm's chief operations officer, director of architecture, director of engineering, director of project delivery, or director of technical services. In other cases, technology leadership may include external parties, or the technology leader and SME may be the same individual.

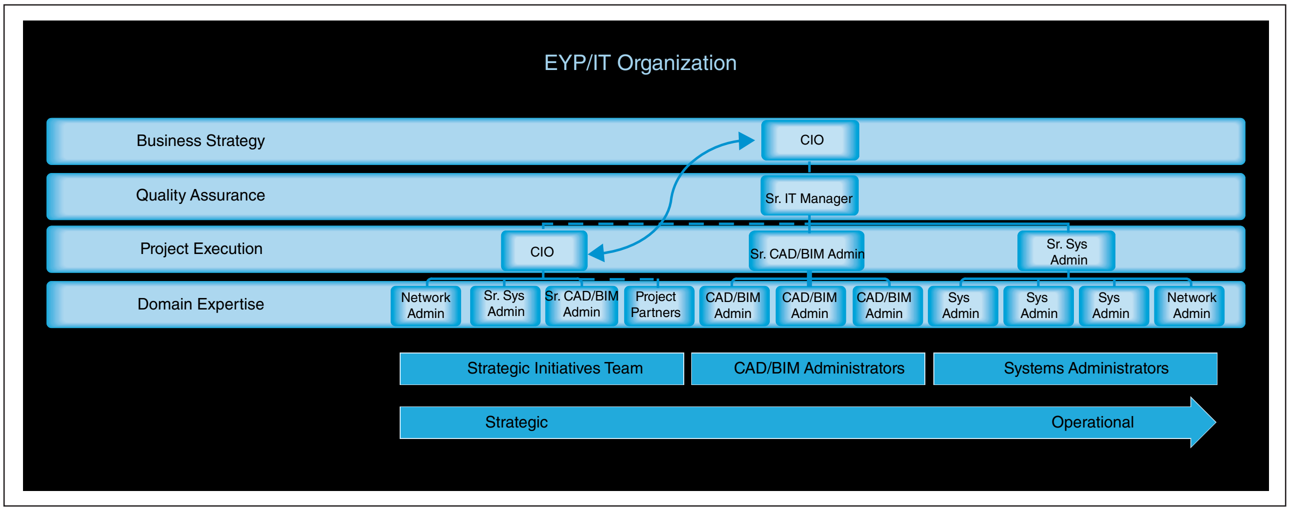
There are many other practice-centric systems, procedures, and tasks that also require careful information design consideration beyond the context of CAD and BIM. In the midsize to larger firms, these efforts are often led by the firm's chief information officer, chief technology officer, or director of information technology. In smaller firms, these efforts might be driven by one of the firm's internal leaders, who in turn may seek additional assistance and expertise from external IT consultants. In other cases, some firms may have someone internal that spends half of their time on IT, and the other half on project work. Regardless of the structure of the available resource pool, there is increasingly a focus on the underlying information strategy and supporting information fabric that helps to make CAD, BIM, Project Information Management (PIM), Digital Asset Management (DAM), Enterprise Resource Planning (ERP), communications, and knowledge management systems all work together in a more cohesive and understandable fashion. Collectively, these systems can combine to create and support a digital fabric that supports a firm's ability to design and deliver projects effectively, and to share and collaborate in more meaningful ways.

What does an IT team look like within a smaller organization? If the firm is reasonably dependent on digital design and production, the firm could have a full time IT manager or director of IT, and a CAD/BIM manager. In some cases the CAD/BIM manager or IT manager might also serve as the network administrator. In other cases, the firm might have one or two internal practitioners manage a combination of external consultants to perform day-to-day IT tasks, thus allowing the practitioners to spend the majority of their time on billable project work. The specific configuration of IT

IT ORGANIZATIONAL CASE STUDY: LARGE FIRM

Figure 5.15 shows the IT organizational structure in use at EYP Inc., a 300-person firm with six offices. Key features of this organizational approach included the following:

- The CIO not only leads the overall IT strategic effortt but is also directly involved in incubating key project initiatives that directly support the corporate strategy.
- The senior IT manager is assigned the tasks ofoverall quality assurance as a way to ensure purchasing and configuration consistency across office locations.
- Two clearly defined positions make up the bulk of the IT organization: the system administrator and the CAD/BIM administrator. The primary benefit of clearly defining these roles is to facilitate the users' ability to direct their IT support needs with greater efficiency.



Brad Horst, EYP Inc.

FIGURE 5.15 Sample IT Organization for a Large Firm

skills and required work effort varies from firm to firm and is dictated by the firm's size, configuration, and expectations around information management and services.

What does an IT team look like for a medium or large firm? Depending on the size, geographic distribution, and the structure of the firm's professional services model, IT might consist of a wider array and combination of positions, including chief information officer, chief technology officer, director of IT, CAD manager, BIM manager, virtual design and construction administrator, system administrator, network administrator, IT manager, database designer, software developer, knowledge manager, web designer, and/or digital project administrator, just to name a few. In some cases, what was once considered a CAD/BIM manager's role on a project team is becoming more of a digital project administration role, as the need to better manage ever more digital information at the project level expands.

Content Systems

Key components of an information management environment include a sophisticated array of environmentally controlled IT rooms, racks of network storage arrays, application servers, web servers, switches, routers, and monitoring and management devices, as well as Internet connections, remote access gateways, Wireless Access Points (WAPS), and security equipment. While larger offices may require any combination of, or even all of, these systems to maintain an appropriate multi-office IT fabric, small or midsize firms may only need one or two well-positioned centralized servers connected via a lighter footprint of networked devices. In the case of the individual practitioner, a stand-alone laptop or desktop system along with a residential-grade Internet connection may be all that's needed to support the practice.

Backup, disaster recovery, and business continuity plans also play an important role in this equation. In the same fashion that network infrastructure is needed to drive the delivery of a rich assortment of informational needs, so is the need to protect these efforts with the appropriate backup and recovery infrastructure and procedures. As the saying goes, "time is money," and architects are all paid for the value of their ideas and expertise, much of which is represented in the form of digital information. Therefore, it makes sense to take intentional steps to preserve the very assets you have paid yourself or your staff to create. Similarly, given that informational assets hold the potential to grow and evolve over time, much as a financial investment compounds with interest over time, then again it would make sense to preserve these valuable digital corporate assets so that future value can be accessed when necessary.

The following considerations may inform the need to save and protect corporate information, as well as provide insight into what, how, and how long it should be saved.

- State record retention requirements
- Internal knowledge management considerations
- Iterative design and analysis
- Management and mitigation of risk
- Financial performance reporting
- Protection of labor efforts
- Automation of business processes and procedures
- Document control and change management
- Downstream design, build, operate, manage, and analyze opportunities

The need to proactively manage backup and recovery should resonate with most firms regardless of size or configuration. That said, the scale of the effort will vary by location, as will the choice of media and means necessary to fully protect specific asset types.

Backup and recovery systems come in variety of shapes and sizes—everything from nightly tape backups, to CDs and DVDs, to automated disk array snapshots, to off-site paper and digital media storage facilities. The form of information to be protected can vary greatly as well. Firms working with very large files may have electronic drawing files, virtual building models, and large graphic images. Information may come in the form of paper ranging in size from the smallest napkin sketches to full size foam-core presentation boards, to large sets of 36″ × 48″ printed drawings. Some firms are increasingly using database-driven applications that offer sophisticated data aggregation routines and downstream analytics that can deliver performance results to mobile devices and custom websites, for example. The range of available record-keeping and preservation techniques and the options for backup and recovery are vast. By bringing together IT expertise and practice expertise, the right solution can be designed and implemented so that information efforts are preserved for when and where they are needed.

Extending the discussion beyond centralized systems and backup and recovery infrastructure, the IT fabric connects well beyond the server room via a complex assemblage of cabling infrastructure. It connects each user's desk and common office work areas into a unified network. End-user devices like workstations, laptops, mobile devices, projectors, digital cameras, plotters, scanners, printers, large screen TVs, videoconferencing equipment, telephones, smartphones, and other collaboration equipment are all designed to leverage the available resources on a network. Collectively, all of these components make up the foundational fabric upon which information management is built and information services are delivered—a fabric that is typically designed, executed, and managed by a firm's internal IT leaders and/or external IT consultants. Consistent with the philosophy of using industry standards for structuring drawing and virtual model information, so too is the case for managing a highly integrated IT infrastructure. Consistent standards, procedures, and best practices are the very devices and mechanisms that will help to deliver a well-thought-out and stable IT infrastructure that in turn will support the firm's strategic and information management needs.

The need for consistent standards and best practices and procedures extends into the structure of project numbering systems, folder structures, and document control systems as well. A well-thought-out system will not only offer quick and accurate discovery of information throughout a network but can also lay the groundwork for further downstream integration across various enterprise content management systems. With the right planning, it is possible to set up information management structures that allow for ready access to an array of project information such as drawings, models, images, financial information, and document controls from anywhere in the organization in an aggregated form, with the simple click of a button. In this case, preplanning is everything.

For example, when considering the status of any project effort, information from multiple content management systems should be leveraged to create a more complete view of the project's actual status. The financial system (or Enterprise Resource Planning system—ERP) can be used to report on a project's financial position, while the firm's Project Information Management (PIM) system is more apt to report on the status of outstanding RFPs and submittals for the same project. Both forms of information are necessary for creating an accurate view of the project's actual status. If there is no longer any budget remaining on the project, and yet the project has an unusual number of outstanding RFIs and submittals, then perhaps there is a problem with this project that is in or even beyond the project team's control. This is but one example of how information aggregation becomes more important as the need for the delivery of the firm's information becomes more immediate, more strategic, and more available to an increasingly broader audience.

One approach to managing consistency across project records is to use the same organizational structure across all systems regardless of paper or digital format. For example, when creating a project network folder structure, consider using the same project folder organizational structure used for the paper-based folders. As another example, the project numbering system that is used in the accounting system might also be used to identify the very same project on the file server. Furthermore, the same project numbering system could also potentially be used to structure your Digital Asset Management (DAM) image library or for your project document control system. These are just a few best practice ideas and techniques that can help to make your network environment more manageable, more nimble, and better able to accommodate the firm's information management needs over time.

Careful selection of applications can also lead to better integration, collaboration, and adoption over both the short and long term. It's important to identify applications that are designed to seamlessly share content with other related applications. With regard to file-based applications like CAD and BIM, common exchange file formats to consider include .DXF, .DWG, .RVT, .DGN, .IFC, .PLN, .VWX, and .SKP, among others. When considering database-driven applications, Structured Query Language (SQL) is a common format that allows database-driven applications to exchange and share information, often in real time. For image files, common file formats might include .TIF, .JPG, .GIF, .PNG, .EPS, or Portable Document Format (PDF). The pipeline that describes how information can be shared across the multitude of applications required of a design organization can be very complex. While the listing above illustrates common formats for CAD, BIM, databases, and image files, this is a small sample of the possible file formats that a firm might be asked to use in order to facilitate highly collaborative project work efforts.

Finally, applications that support network username and password integration, or single-sign-on methods, are often desirable. The fewer the network passwords that users need to manage, the faster the ability to gain access to the information when it is needed. Ultimately, the primary objective for using any application or integration-based standard exchange format is to minimize barriers to adoption, maximize knowledge transfer, determine new and fresh business and design insights, and/or minimize rework and loss of content as information is shared and passed from one party to the next.

Authors and Consumers

While this discussion has so far focused on information management from the standpoint of those who primarily create information (the authors), those who need to find and view information (the consumers) are equally important. It's important to recognize that all applications cannot be all things to all people. Off-the-shelf applications are often designed with particular types of user communities, or particular "personas," in mind. This helps software developers focus their development and marketing efforts in the appropriate manner. Consequently, as software applications become more specific to the industry they serve, one might also anticipate a more selective approach to which user community they wish to directly serve.

For example, an enterprise resource planning system may likely be designed primarily for those in the finance department—those who would use the system as a part of their normal daily routine. But financial information has a broad consuming audience that extends well beyond the finance department; therefore, it is important to also consider how the more casual users would go about finding the information necessary to support their business efforts. A firm's comptroller might require granular project information describing when, where, and for how long a particular project team member has spent time on a project in order to support an external financial audit effort. By contrast, a project manager might only need a higher-level view that provides financial performance insight into only the projects that they are responsible for managing. Similarly, the firm's senior leaders might only wish to see overall firm-wide analytics that offer revenue projection information from a firm-wide point of view.

In the case of a small firm, this may be a trivial matter, as the same person or persons might hold both the author and consumer role. In larger, more distributed organizations, the information management environment may need to incorporate web-based dashboard systems and/or automatically deliver custom reports to compensate for off-the-shelf software. Mobile devices (consumer devices) are increasingly becoming practical candidates for delivering corporate information in a private and highly efficient manner as well. The point is, part of the consideration for designing and implementing an information management strategy is to ensure that IT applications and services are capable of delivering the information you need. Given the broad range of types of users throughout our organizations, it would be most unusual to find a single off-the-shelf application that would adequately provide for each user's specific informational consumption needs. However, by carefully selecting and combining specific applications, protocols, and information services that are designed to work together, the combination of desktop applications and database-driven services can provide the right level of information to the right user at the right place at the right time.

INFORMATION SERVICES

New Opportunities

Traditionally, architects have been viewed almost exclusively as the designers of our built environment. Looking forward, that perception will change as the industry acknowledges that the initial building design is simply step one of a much more comprehensive effort to drive value, efficiency, and return on investment from deep within the "design, build, operate, manage, analyze" life cycle inherent in every project. We see examples where once only design services were being offered, but that now design/build services or even design/build/operate/manage services become practical considerations for the very same architects and designers. This trend is reinforced by the fact that leading AEC software solution providers are beginning to position their products around a more complete building life cycle strategy as they continue to respond to industry demands.

The new digital world, combined with the building life cycle dynamic, is helping fuel new opportunities to extend the range of professional services offerings for those with an entrepreneurial spirit. One of the key value propositions for both Building Information Modeling (BIM) and Integrated Project Delivery (IPD) is the opportunity for cross-functional teams to work more closely throughout the project life cycle in the hope that better design solutions and greater efficiencies can be realized. A dynamic such as this is catalyzed by the free exchange of rich digital information and by BIM's ability to collect, structure, and share increasingly greater levels of project information throughout all phases of a project.

The need to drive more value using digital means requires an evolution in how we work and collaborate with project team members both inside and outside of our respective organizations. In the case of BIM, project participants contribute their content to a single building model or series of connected "federated" models such that all participants can benefit from the work efforts of the entire project team. Rich information about a building is encapsulated in a virtual model and can be digitally shared virtually in real time with all project stakeholders. While the barriers of collaboration have been effectively removed, the need for new techniques for sharing and discussion is very real. In response, information is being shared more readily using large TV displays within ad hoc teaming rooms, and virtual collaboration spaces are being constructed on the fly using web-based desktop sharing services. The old paradigm of physically working next to one's team members is quickly being replaced by real-time virtual teaming that can happen with ease across studios, buildings, states, and even countries and time zones.

The idea of project partnering takes on a whole new meaning as firms realize that they can, technically speaking, work on any project anywhere in the world, and can partner with anyone, anywhere, in the very same digitally seamless fashion. Project teams can be designed with a more specific mix of expertise in mind, and they can scale up or down on an as-needed basis given the newfound opportunities available through virtual project partnering. Where once physical boundaries defined the logical perimeter of your organization, now digital informational boundaries can extend and contract on demand. We live in a global marketplace with a global economy, and with a global workforce competing for the same global resources. Projects that once seemed beyond one's reach perhaps now offer new commission opportunities.

Cloud, Mobile, Social

Information management and information services are redefining the boundaries and capabilities of our organizations and informing how we will practice architecture going forward. To further leverage these capabilities, architects must use information in increasingly more value-added ways.

It was once considered a differentiator when only the largest firms could afford the most sophisticated tools and technologies to drive their practices. This is no longer the case given the introduction of cloud, mobile, and social technologies. Cloud computing leverages the significant resources of large distributed data centers to deliver information services in smaller robust increments and for less cost, all the while preserving the ability to scale those services as business demands dictate. With cloud-hosted solutions, new servers and services can be activated and made available in a fraction of the time of a comparable on-premise server solution.

With this new capability, it's perfectly reasonable to think that by using a cloud-hosted approach, a single practitioner could have as robust an information management infrastructure as the largest organization. Further, the cloud-based infrastructure would be well positioned to scale from one or several users to hundreds or thousands of users, with little effort required of the paying customer. That said, in spite of the various cloud-based configuration scenarios like public cloud, private cloud, and even hybrid cloud, there may still be cases where it makes more sense to host certain servers within the walls of your own organization. For example, certain restrictive project types insist that digital information never leave the firm's private network except through a means specifically identified by the owner.

Cloud computing potentially offers new opportunities to provide a vast array of informational services for external clients. For example, facilities management tasks, space planning services, energy management and monitoring, digital asset management, performative analysis, or even project portal collaboration sites become possible cloud-based options and hold the potential for new services opportunities. With the introduction of nimble, scalable cloud-based information services and solutions, the barriers to adoption of new hosted information technology solutions are potentially reduced. Still, the typical concerns are always there. Where is the information? What is the information? How does one access the information? How can the information be aggregated from multiple sources to create new insights into project work both for internal and external benefit? All are important questions to ask when thinking about cloud, mobile, and social solutions.

► Emerging Technology in Practice (11.6) discusses key drivers for technology development and adoption and describes several emerging technologies and their value to firms and projects.

With regard to mobile computing specifically, few can argue the significant benefit and convenience of PDAs, smartphones, and tablet devices. They provide quick and efficient access to information when and where it is needed. They are portable and well connected. And yet, what makes mobile computing so desirable is the rich information that they provide access to at a moment's notice. Strict information management and standardized practices help to make this happen in a seamless fashion.

While in 2012 many practitioners used nonproprietary information on their mobile devices, the need to have access to confidential corporate information on these devices will continue to grow. Certain AEC software vendors are ahead of the curve with regard to delivering corporate content to mobile devices, with most others in hot pursuit. By introducing mobile devices into the workforce, the perimeter of the organization is extended well beyond the physical walls. This enables the workforce to operate in a disparate fashion from virtually any location: the client's office, the job site, from home during a snow day, and so forth.

Social networking is about being a part of the community, a part of the conversation, from anywhere, at any time. The beauty of social networking is that, again, the barriers to adoption are minimal. With relative ease, architects and others can freely share thoughts with a global community, for virtually no cost. The key question is, what do you want to share or what should you share? Depending on whether the social site is for personal use or for business use, the answers might be totally different…or are they?

One can imagine how, over time, activities on social networking sites may begin to formulate a sort of virtual persona that informs how others view someone's online activities; a representation that is persistent and available to anyone, anywhere. With that in mind, for organizations it's important to once again have a good information management handle on what should be shared, how staff should talk about project work, and who within the organization is telling the story on the firm's behalf. Good information management practices will help provide ready access to the appropriate content that can then be leveraged in an online social networking context. Always keep in mind that once the message is out on the Internet, it can be very difficult to retract.

Invest and Divest

Given every organization's limited supply of time and resources, it is always good practice to make every attempt to focus efforts in areas that will deliver the greatest results and to champion initiatives that can ultimately become a normal part of how to deliver services. In addition to identifying the right initiatives in which to invest, care should be given to identifying proportionate areas where you should divest on a regular basis. For example, if a firm is in the process of moving to a new page publishing application and off of a legacy page publishing application, then the faster the transition the better. Managing two or more information management systems that perform essentially the same task will consume significant resources directly or indirectly as team members struggle with application version control, document version control, duplication of information, translations from one system to the other, and learning curve issues related to the differing applications. Standardizing on a single platform helps to build information and workforce consistency and also promotes better work-sharing and clarity throughout the organization.

Driving Enterprise Adoption

Understanding the adoption cycles for how new standards, procedures, and technologies are introduced into the workplace can be extremely important when delivering a successful information management infrastructure environment. Acknowledging that different people change, adjust, and adopt in different ways, for different reasons, and at a different pace helps one to plan an appropriate strategy for driving adoption for any initiative.

With almost any new initiative, a tried and tested approach to driving adoption throughout an organization is to first identify a small group of champions that will have a vested interest in the success of the initiative. With regard to information- or technology-based initiatives, often this group is very facile in adopting new tools and techniques. Bring your champions onboard early and give them a visible stake in the project's success. Then, help them build out their project teams for making the initiative a reality. When possible, structure the champions' and their support teams' effort around a particular architectural project or series of projects to give it relevance. Monitor their success on a regular basis, and ensure that the resources are available to deliver their success at all costs. The goal is to have these initial champions and their team members move on to new projects, with each forming even more teams that will soon be capable and ready to implement the new initiative within their own project work. As this type of practice is replicated over time and new teams are created from previous team members, the knowledge transfer will continue to expand and soon the entire organization will be well equipped to fully adopt the new initiative for every new project going forward.

In Geoffrey Moore's book *Crossing the Chasm: Marketing and Selling Disruptive Products to Mainstream Customers*, Moore talks in great detail about the different types of technology adopter segments and discusses approaches that one might take when driving adoption into that particular user segment. While Moore's book is often seen as a conceptual roadmap for software organizations introducing new technology products into the mass marketplace, much of what is discussed in *Crossing the Chasm* also resonates for architectural firms, given the challenges that practitioners face when introducing new ways of working, new technologies, and new information strategies.

CONCLUSION

Many firms have a specific vision for design and a particular approach for how they choose to deliver professional design services. They wish to be viewed by customers and the marketplace in a very particular way. Each professional services practice requires an information management strategy that supports and amplifies the differentiating aspects of the organization. As such, it is important that those who lead key aspects of information management and information services design have direct and regular access to the topmost levels of the organization such that they can contribute and provide the appropriate information management response as the firm evolves.

Some might view the design and execution of an information management environment as closely resembling the approach that an architect would take when resolving architectural problems. An information management exercise might begin by first capturing a clear understanding of the various end user and program requirements. Once these requirements are well understood, one can begin to design the system or series of systems that address these requirements, while taking into account optimal forms of efficiency, aesthetics, durability, costs, and usability. As the design intent becomes clear, begin molding the implementation and execution strategy, taking care to include how to market these systems to your internal user base.

Ultimately, as information systems are increasingly central to how practices are run, the information system design will have a direct impact on the success or failure in the firm's ability to design and deliver superior project results. What is needed to collaborate effectively? What is the most desirable way to work? Will these systems amplify staff efforts in a positive way? Does the investment directly support the firm's mission? Is the investment appropriate given the anticipated return on investment?

This article thus concludes with some of the same questions that introduced the topic. As the industry continues to change, so will the questions that must be asked, and the conclusions that will be drawn. Each firm will likely have a different approach to running a practice, and as such, each firm will require a tailored response to what is necessary to drive their digital information management and information services needs.

For More Information

Crossing the Chasm: Marketing and Selling Disruptive Products to Mainstream Customers (HarperCollins, 2002) by Geoffrey A. Moore.

CHAPTER 6

Marketing and Business Development

6.1 Marketing Architectural Services

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To build a successful architecture practice, pay close attention to everything the firm does to attract new business and retain existing clients. A strategic approach to marketing enables a firm to allocate resources to support activities that serve the growth of the practice. This article provides an overview of how architecture firms secure work.

INTRODUCTION

Marketing is the process of bringing new business to a firm in order to sustain and grow the practice. Marketing is much more than proposals and presentations; it involves everything that helps to spread the word about a firm, communicate with prospective and existing clients, and get the work in the door—including correspondence, the firm's website, the quality of the firm's design work, the firm's reputation, even the way the receptionist answers the phone. No matter what role an individual plays in a firm, and no matter how large or small a firm is, every employee has an

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important part in the marketing process by working to satisfy the needs of existing clients and attract new clients to the firm.

Many firms approach marketing in a somewhat haphazard way, but it is important to market thoughtfully and strategically in order to allocate resources efficiently and effectively attract and retain clients. This article and the four that follow discuss marketing-related topics including the basic principles of marketing an architecture firm, the strategic process, research, brand strategy, budgeting for marketing, website development, media relations, business development, networking, social media, the sales process, positioning, targeting new clients, and lead development and tracking.

The topics discussed in this chapter apply to firms of every size. Whether the firm is a sole practitioner or a very large firm, the basic process and principles of marketing are the same, and are vital to the success and growth of the practice.

MARKETING ARCHITECTURAL SERVICES

Marketing architectural services is different from marketing other services or marketing a product. Architecture involves a complex mix of creative and technical skills. In the marketing process, convincing prospective clients of a firm's creative and problem-solving ability, attention-to-detail and follow-through, and passion for the project can all be vitally important. Because what the client or potential client is actually buying is the individual expertise and ability of the team members, differentiating a firm from the competition happens on an individual and personal level.

While it is easy to believe that a prospective client's decision of which firm to hire is rational (that they will hire the firm that has the best experience, capabilities, and fee), the fact is that the prospective client is a person or a group of people, and which firm they choose will also be based on emotional factors. People tend to select people whom they like and trust, people whom they believe will be good to work with and will help them achieve their desired results.

In building credibility with prospective clients and conveying that the firm is the right one for a specific project, the firm's portfolio of prior work is important, but the portfolio will not win the job on its own. The portfolio lets the prospective client know that the firm has done this kind of work before and is capable of doing it for them. From there, the prospective client will make a personal and emotional decision among similarly qualified firms. All the facts about the firm that a prospective client has gathered along the way—including project experience, the quality of work, fee, etc.—serve to reinforce and justify the decision of whom to hire.

► Networking and Business Development (6.4) includes further discussion on reaching prospective clients.

While the marketing efforts of many architecture firms are focused on winning work from new clients, it is important not to forget about existing clients. It is generally much easier and less expensive to win new work from an existing client than from a new one. If a firm has worked for a client and has done a good job, the client has no reason not to hire the same firm again. A firm's first priority in marketing is to keep existing clients happy. If existing clients are happy, they will not only hire the same firm again, they will also recommend that firm to other people they know who may be considering an architectural project. No recommendation is more valuable than the endorsement of a satisfied client.

In marketing an architecture firm, relationships are everything—with clients and with other third-party influencers in the marketplace such as contractors, consultants, real estate brokers, and so forth. People talk, and the relationships that individuals in the firm have will influence the way that others perceive the firm: Positive relationships can help, and negative relationships can hurt. When pursuing work with a new client, it is vital that members of the firm build a relationship with the individuals involved in making the purchase decision. Without some kind of relationship, some kind of natural affinity that helps the client to like and trust the key individuals from the firm who will be servicing the project, it is unlikely that the firm will prevail in a competitive environment. Unfortunately, if a firm enters the selection process without an existing relationship with the prospective client, it is probably already too late—one of the competitors is probably way ahead, and now has the "inside track" with the potential client.

THE PURCHASE DECISION

To many architects and other professionals, "sales" is a dirty word. The idea that they would have to "sell" something makes them break out in a rash. Many people hate to sell. "Business development" has a much better ring to it than "sales." It sounds professional; it sounds like there is an established process for bringing work in.

From the architect's perspective, the business development process is about convincing the prospective client that the firm is the best firm for the job. The conventional selection process is often conceived and explained as very straightforward and linear—moving from hearing about a project to getting more information to presenting qualifications, a proposal, and a presentation; and then, if all goes well, entering negotiations and winning the project.

Instead of a straight line, if we think of this process from the client's perspective, it looks more like a funnel: Many firms are qualified, fewer will be invited to submit a proposal, fewer still will be asked to present, and only one firm will be selected.

Of course, the competitive landscape and selection process vary based on the client's industry. In more public selection environments, such as in government facilities or schools, an opportunity will likely be publicly advertised, resulting in a large number of competitors. When the client is a private company or institution, such as a developer or a corporation, there may be fewer competitors from the outset, possibly an invited list of firms known to have expertise in the specific facility type being planned. And when the client is an individual or a closely held corporation with whom the firm has a long-standing relationship, the firm may have the privilege of being the only firm under consideration.

Before entering any selection process, it is important to understand who the client is, what their priorities are, and what the competitive landscape is. Does anyone in the firm know the client personally? Is it possible to meet with the individual or individuals who will be making the decision? Are the client's objectives and concerns for this project clear to the proposing team? How important is the architect's fee in their selection decision? At what point in the process will fee be discussed? How many firms will be considered? How relevant is the firm's previous experience to the project in question?

► Qualifications, Proposals, and Interviews (6.5) further addresses the go/no-go decision.

Once enough information has been gathered about the project, the client, their objectives and concerns, and the competitive landscape, a decision can then be made about whether to pursue the project or not. This is commonly called the "go/no-go decision."

Once a decision has been made to "go," all efforts should be geared toward addressing the client's specific questions and concerns about the project. The goal in the process of preparing qualifications, developing a proposal, and presenting to the client should be to position the firm not only as qualified and capable but also as the best firm for the project, the firm best able to deliver a project that meets the client's objectives.

THE IMPORTANCE OF GOOD DECISION MAKING

Pursuing new work can be expensive. Depending on the size of the potential project and the amount of effort put into the pursuit, it is possible to spend a great deal of time as well as significant financial resources on printing, binding, models, renderings, travel, meals, client entertainment, etc. Resources, in terms of time and money, are always finite, even in a large firm. Pursuing one major opportunity may mean that there are fewer resources to pursue other opportunities. This is why it is absolutely critical that good decisions are made about which clients and opportunities to chase, and which to decline.

Being strategic, by definition, means saying no to some opportunities. If a firm pursues every opportunity that appears, this is not acting strategically, or even with a strategy in mind. By developing a strategic approach to marketing and by allocating resources intelligently, focusing on the key opportunities that the leaders of the firm really want and believe they can win, the key individuals in the firm can take more control over their destiny as professionals.

▶ See Developing Marketing Strategy (6.2) for a more detailed discussion of strategic approaches to marketing.

In order to make good decisions about where to put limited resources, it is important to understand the client and the competitive environment, and to approach decision making in an objective frame of mind. Research about the client and the project should be conducted in as dispassionate a way as possible. Then, it is important for the individuals leading the pursuit to try to assess the situation from an objective perspective, asking questions such as, "If I were this client, would I hire my firm for this project? If I were this client, and I could hire any firm at all, whom would I pick? Which firm is the absolute best choice for this project? Who has the most experience in this project type? Who has the best press in this area? Which firm feels like the right choice?" It may be helpful to have a conversation with a friend, associate, advisor, or mentor who knows the industry well to ask these questions and gain the benefit of a broader perspective.

Architects often learn about a new opportunity and respond with, "We can do that!" no matter what the project type is or whether they have designed something similar before. But unless no one has ever done a project like this before, the client is likely to hire the firm with the most experience, or at least a firm who has done enough similar projects to convince the client that they are intimately familiar with this type of project. There is usually no point for the client in taking a risk on a less experienced firm.

That said, the value of a relationship with the client cannot be overstated. If a firm's leader has a strong existing personal relationship with a decision maker, they may be able to overcome concerns about inexperience relative to the competition. Clients hire design consultants they like, trust, and want to work with. And that will be easiest to gauge if they have worked with a firm before.

Because of this, when determining how to prioritize efforts, what to pursue, what to decline, and how to spend resources, it is vitally important not to take existing clients for granted, or prioritize gaining new clients over keeping existing clients happy. A firm is far more likely to be awarded work from people who already know the firm, and like and trust its principals, than they are from people they have not met or barely know. It is vitally important to spend enough time and attention on the relationships the firm already has, and not to spend too much time courting new clients at the expense of those existing relationships.

HOW PASSION FITS IN

One often-overlooked factor that can distinguish a firm from the competition is its passion for the project. Because what is being sold is the promise of future performance and the firm's abilities to deliver on that promise, enthusiasm for a project can make a huge difference in influencing a potential client to hire the firm. It is important to find ways to demonstrate how much key individuals in the firm want to do the project, in a way that is natural and proportionate to the project. For example, on a very important project, it may be perfectly appropriate to say, "This is the most exciting project that has happened in this city in years, and we are very excited at the opportunity to work with you on it!" but if the project is small or not very exciting, the passion of, "We really want to work with you!" may be all that can be mustered. It is important for the firm's principals to decide why they want to do this project and then figure out how to express this passion to the client. In a close race between competitors, enthusiasm can be the factor that wins the job for one team over another.

That said, passion can also get in the way of objective decision making. It is too easy to take the attitude that, "This project is important and we really want to win it, so the facts aren't really important here. We're going after it full-on no matter what." It is critical to step back and consider the possibility that the firm may lose the project and really evaluate objectively whether the pursuit makes sense. The firm may decide to pursue it anyway. But at least then the firm's principals are entering the process with their eyes open, and making good decisions about how they are prioritizing their time, and how much energy they are devoting to this pursuit at the expense of other activities.

THE MARKETING TEAM

Described throughout this chapter are important activities related to marketing the architecture firm. A challenge for each firm lies in determining which of the activities described are reasonable and necessary for this firm and how much help is required to do it. There is some rough correlation between the size of a firm and the number of marketing staff. Generally, firms hire their first full-time marketer when they have 25 to 35 staff members, and their second when they have around 65 to 70. From there, the ratio of marketers to staff is about 1 to 50, or a little lower. It depends, of course, on how diverse the practice is, how effective their marketing efforts are, and how hard the firm is pushing into new markets.

For a sole practitioner or a firm with fewer than 25 people, it is important to be creative about how to address marketing needs. A firm may decide to hire a marketing consultant to help, or may find one employee—either an architect or an administrative staff member—to be a part-time marketer. In either case, it is critical to be very clear about the required tasks and expectations in order to provide the necessary guidance for the part-time marketer.

Firms follow different strategies for hiring marketers and building their marketing team, depending on their specific objectives and requirements. For some firms, media relations are critical, and their first hire may be an in-house media relations director. Other firms may use a consultant for media relations, but start their marketing team with a marketing director and later add a coordinator.

Architectural marketing is still a relatively new field, so the profession of architectural marketing is still in the process of formation. Most currently practicing professional architectural marketers grew into their roles from some other field. While most have college degrees, very few studied architecture or marketing; many are artists or writers or architectural historians. They tend to learn what they know about marketing on the job, mentored by other marketers or learning on their own through trial and error. Successful architectural marketers share many attributes: They tend to be flexible, creative, smart, and have excellent interpersonal skills, both in terms of communication and their ability to collaborate.

Though there is not much applicable formal education available for architectural marketers, a rough career path has evolved over time. It is increasingly common to find architecture firms that recognize their marketers as integral to their operations and give them increasing responsibility with the firm. The sidebar outlines the most common titles for architectural marketers and a brief description of what they do.

► Office Administration (5.10) covers marketing and other administrative positions in detail.

It is important to note that marketing for architects is a tough job. Burnout is a frequent problem. Marketers are often under the gun, working on deadline, pushing to get something out the door. It is not uncommon for marketers to work a significant amount of overtime. As a result, many marketers leave the industry after a year or two, and less than half stay for more than five years. As an architect, it is important to recognize the challenges that architectural marketers face and to support them. If a firm has a good marketing staff, it is important to do whatever is possible to retain them for as long as possible.

Aside from the workload, another key factor that drives turnover is how the firm's leadership treat the marketing staff and how they are as professionals to work with. Marketers take responsibility for meeting deadlines and getting proposals, presentations,

COMMON TITLES AND ROLES FOR ARCHITECTURAL MARKETERS

Marketing Director

- Directs the marketing effort for the firm
- Reports directly to firm principals
- Leads the marketing team
- Has responsibility for creating and implementing the marketing plan and marketing budget

Marketing Manager

- May or may not supervise other marketing staff
- Manages the preparation of proposals, presentations, awards submissions, and other marketing materials

Marketing Coordinator

- Prepares proposals, presentations, awards submissions, and other marketing materials
- Works with the firm's staff to gather data and create materials

Media Relations

- Represents the firm to the media
- Is responsible for creating and implementing the firm's media strategy
- Maintains relationships with editors, reporters, and other representatives of the media

Business Developer

- Makes contact with potential clients and sets up meetings for the firm's principals
- May be an industry specialist, with established existing relationships in a given industry that can help open doors

qualifications, and awards submissions done on time. Do the leaders of the firm support this or do they frustrate it? When the marketer says they need something by Thursday, does the principal-in-charge hand it in on Friday? When the firm receives an RFP or other important communication from a prospective client, is it sent to the marketer right away or does the principal who received it hang onto it for a while? Does the marketer feel as if they know what is going on, or that they only get selected information? The marketer generally wants to be a partner to the firm's leadership in building the business of the firm. The closer they can come to that aspiration, the longer they will likely stay with the firm.

Marketing Consultants

Whether or not a firm has marketing staff, there are times when it may make sense to hire a consultant. Marketing staff may have certain expertise in one area or another, but it is unreasonable to expect the marketing staff to be experts in everything. Sometimes it may be necessary to call in an expert consultant to help with a specific problem, exercise, or long-term initiative.

There are quite a few consultants out there who specialize in marketing-related areas and who are familiar with the business of architecture. A firm may hire consultants on a temporary or contract basis to help with strategic marketing initiatives, branding, business development, graphic design, web design, writing, media or public relations, photography, videography, presentation training, sales training, or other areas. The relationship that a firm generally has with a consultant is very different from the relationship that it has with an employee or staff member. There are real advantages to hiring a consultant to help rather than counting on permanent staff, especially in a smaller firm. These advantages include being able to get the right person for the right job, making less commitment than with permanent staff, having more leverage, and being able to try out different professionals who provide the same or similar services.

MARKETING SYSTEMS

The technological systems that architecture firms use in the process of marketing their services have evolved rapidly in recent years. Knowledge management is vital to the success of a firm's marketing efforts and growing its business. Knowledge management

▶ See Knowledge Management (5.11) and Information Management and Services (5.12) for related information on knowledge and information management systems.

includes all the systems—whether electronic, physical, or procedural—that enable staff to easily store, find, and utilize valuable information. Databases and filing systems can help, but it is unreasonable to start with a filing system or database and expect organization to be the natural result. Each firm has to begin with an organization system that feels natural, then add and build systems to formalize the organization and communicate how information is to be captured and shared.

Some firms have cultures that more effectively support knowledge management than others. Knowledge management requires people to be comfortable freely sharing information with each other. If a firm has a culture in which, for whatever reason, people with knowledge are regarded as more important than those without it, and where people are not comfortable sharing their information, it is going to be very difficult to institute an effective knowledge-sharing system. Real estate brokers are notoriously bad at institutional knowledge management, because the professional success of a broker is predicated on the broker having information that his or her colleagues do not have.

For firms that get it right, knowledge management can be a true differentiator, demonstrating a clear difference between a firm and its competition. When a client asks a question to which an architect does not personally know the answer, whether it is about one of the firm's past projects or which audiovisual consultants they work with, how long does it take to find the answer? Does the architect need to ask a person, or can the answer be found in some easy-to-use electronic or physical resource? If the architect can find the right information quickly, they will look much smarter to the client.

Think about all the different kinds of information a company needs to capture and maintain—on projects as well as in areas related to finance, legal issues, human resources, and marketing. Categories of information necessary for marketing and for which firms often implement knowledge management systems include research, leads, people, projects, and staff.

Research: Trends, Articles, White Papers, Thought-Leadership

Many professionals are conducting informal research all the time, through the articles that they read and the formal and informal conversations they have with fellow professionals. Research is in many cases difficult to store and track because it can often be free-form information. It does not usually fit into a database, because the information generally is not easily separated into neat fields that can be searched later. Research information can also appear in lots of different formats, some of which are on paper: newspaper and magazine articles, white papers, reports, notes, etc.

To support a firm's marketing efforts, it is important to create a system for storing research and other information that relates to the work of the firm. Start with an empty physical file and an empty electronic file. Fill each with appropriate information such as articles, web links, and other information. Segment and organize the information in ways that are logical, forming a system for organization and retrieval. It may be advantageous to explore link-sharing and notetaking/sharing tools. Link-sharing tools like Delicious allow tagging, indexing, and sharing an infinite number of links on the Internet. Notetaking/sharing tools like Evernote enable the collection and sharing of notes and other content. Tools like these can help a lot in the collection, tagging, and sharing of a tremendous amount of online and offline information.

Leads: Managing Information down the Marketing Pipeline

In order to manage the business development process, it is important to find a way to track opportunities as they develop from leads to prospects, and then to projects. Some firms use customizable off-the-shelf systems to do this, while others develop their own systems. Lead-tracking software applications are commonly referred to as client (or customer) relationship management systems, or CRMs. Some providers refer to their systems as "sales automation software."

There are many systems out there, none of which are specifically designed just for architects. However, a few are specific to the broader industry and are used by architects, engineers, construction firms, and related consultants. Deltek and Cosential are two industry-specific providers of lead-tracking and other software. There is a much wider choice of CRM software that is not specific to the industry, but the challenge with using sales automation software that is not industry-specific (such as Saleslogix or Salesforce.com) is that this software will need to be customized to track information that is important to architects (such as project size, facility type, construction cost, etc.).

Some firms have built their own systems using an off-the-shelf database system. In these cases, the cost of building a system may actually be greater than the cost of buying an off-the-shelf system, when staff time, bug fixing, and other factors are considered. Many firms that build their own systems eventually migrate to one of the commercially available systems.

Many firms structure their lead-tracking process around weekly business development reports and meetings. The meeting provides an incentive for key business developers to update their information on the reports, and provides a forum for discussing important leads and issues related to business development.

People: Clients and Contacts

Lead-tracking software is generally able to store and share information on contacts as well as information on opportunities. It is critical to have an effective system for collecting, updating, and sharing contact information on clients and other people that the members of the firm have relationships with. Make sure the contact management software that is selected enables the firm to do all the things that it needs to with contact information. If the firm is planning to create a series of e-mail blasts or a printed client newsletter, it is important to make sure that the contact management software is able to create and manipulate mailing lists with the contacts that it stores.

Many firms have the challenge of integrating multiple contact management systems into one. Each partner or principal wants to maintain their own contact database in Microsoft Outlook or some similar address book system. When it comes time to do a mailing, all of the different address books have to be integrated and sorted to prepare the mailing. Therefore, a much better choice is a scalable, integrated contact management system that everyone can use from the start. Ideally, it is of course best to avoid maintaining duplicate information in more than one system, if at all possible.

Projects: Past Experience

When a firm is pursuing a new project, it is important to identify the firm's previous experience that is most relevant, and then to prepare qualifications to represent this experience. If the firm is small or is a new firm without a significant portfolio, this will be a somewhat easier task than if it is a large firm or a firm with a long history. But whatever the size of the firm, it is critical for the firm to institute some sort of system for tracking project information.

There are several choices for how to track information on projects: Use an off-the-shelf system created for our industry, create a proprietary database system, or use a file system that is key-worded for attributes that can be searched on later.

The file system is the simplest to start, and if it is set up right, it can easily be converted to a database later. Create a basic form (see Table 6.1, for example) for information on projects, fill out the form for each project (one file per project), and store all the files in the same folder. Make the form using a two-column table, with questions/

TABLE 6.1 Sample Project Information Form

Client name:
Project name:
Project location:
Project size (in sf, sm, acres, hectares, etc.):
Other key quantities (number of keys for hotels, number of beds for hospitals, number of units for apartment buildings, etc.):
Services provided (architecture, interior design, planning, etc.):
Project budget (construction cost):
Project fee (if a public project):
Firm team members who worked on the project:
Consulting team (firm name and discipline):
Project start date:
Construction start date:
Project completion date:
Project description (100–150 words):
Sustainability factors (LEED certification, etc.):
Client contact:
OK to use as reference? (Y/N):

categories down the left (project size, facility type, etc.) and answers on the right side. Then, when an opportunity comes up and relevant projects need to be identified, use your computer's search feature to look for any files in the folder that contain certain text (such as "laboratory" or "Rhode Island") to find the appropriate projects.

One of the greatest challenges of collecting project information is deciding when to collect it and who should collect it. Often a marketing coordinator who is not directly involved in the project is entrusted with the responsibility to gather project information. The marketing coordinator then has to track down this information from the project team. As this is usually a secondary responsibility of the marketing coordinator, the information may not get collected consistently, but will be done instead when the information is required for a specific proposal. It would be far better to create a system wherein the project manager could provide and update project information throughout the development of the project.

Project information is more than just data, however. It is important to capture images, plans, and other assorted files for use in marketing later. As a specific design project proceeds, be conscientious about the materials that are created for the project, and organize them in a logical way that makes it easy to find them later. Everything that is created as part of the project process may be useful later in trying to win the next project. Store site photos, "before" photos, renderings, sketches, construction snapshots, team photos, and so on in one place.

When the project is finished and documented through snapshots or professional photographs, store those with other project documents in a physical project file, as well as in an electronic project file.

There has been a lot of innovation in image database or gallery applications, like Extensis Portfolio. These systems enable the tagging or keywording of thousands of images, and, depending on the system, may enable the images to be exported in a wide variety of ways, or to be displayed in galleries on the firm's website.

Staff: Resumes and Statistics on the Firm's Staff

Like project information, readily accessible information on the firm's staff is vitally important when pursuing a project. It may be important to know which architects are registered in a certain state, or speak a certain language, or have worked on laboratory projects. Resumes, of course, are the primary place where this information exists, and it is worth putting in the effort to make sure that resume files include all the information that may be needed later on any individual staff person. In some cases, however, it may make sense to create or use a database for tracking information on staff members. Both Deltek and Cosential have portions of their software packages designed to track staff information. When creating a custom project information database, it makes sense to consider adding staff information to this database, so that it is possible to track who worked on which projects.

THE REST OF THE CHAPTER

The following four articles in this chapter contain additional critical information on how to market architectural services to prospective clients.

Developing Marketing Strategy

This article describes the process of developing a marketing strategy for an architecture firm, including an overview of how research in a number of different areas informs the planning process, analytical techniques to evaluate a firm's opportunities, developing action plans to prioritize marketing activities in specific markets, and using the marketing plan as a tool to audit the firm's performance over time.

Public Relations and Communications

This article describes the process and tools of developing a communications plan, including utilizing tools such as website design, social media, media relations, design awards, promotional materials, advertising, and crisis communications to spread the firm's message to all of its audiences. A backgrounder on commissioning architectural photography accompanies this article.

Networking and Business Development

This article focuses on how to build business through personal relationships, which all professionals develop over time, intentionally or unintentionally, through networking. Key topics in this section include developing a sales plan, growing a network, networking events, networking via social media, and the role of trust in networking.

Qualifications, Proposals, and Interviews

This section describes the process of responding to a specific opportunity through the process of preparing a qualifications document, a proposal, and a presentation. Specific topics that are discussed include the go/no-go process, reading the RFP, how to organize and run a strategy session, crafting a response to an RFP, coordinating with subconsultants, how to prepare for an interview, researching the client and competition, and what to do to follow up after the interview.

CONCLUSION

This chapter is a very high-level overview of key topics in the marketing process, from strategy, to public relations, to business development and networking, to the sales process. This is ideally an integrated part of the way that every architecture firm operates on an ongoing and continuous basis, as a practice grows over time.

It is important to bear in mind that the common practice in marketing changes over time with evolutions in social trends and the development of new technology. It is important to view each new marketing activity as an experiment, so that those involved can learn from it, getting better and more practiced over time, continually improving in their ability to communicate with potential clients in order to bring more work to the firm.

For More Information

Society for Marketing Professional Services: www.smps.org.

Rainmaking: The Professional's Guide to Attracting New Clients, 2nd edition (Adams Media Corp., 2008) by Ford Harding.

It's About THEM: Building the Market-Driven Organization (Jacques Management, 2010) by Richard G. Jacques, AIA.

Architect's Essentials of Marketing (Wiley, 2005) by David Koren.

Marketing Professional Services (Prentice Hall, 2002) by Philip Kotler, Paul Bloom, and Thomas Hayes.

Marketing Handbook for the Design & Construction Professional, 3rd edition (BNi Publications, 2009) by the Society for Marketing Professional Services.

6.2 Developing Marketing Strategy

Ted Sive, FSMPS

This article presents a defined and specific approach for developing marketing strategy, combining internal and external research, analysis, and rigorous choice. The process puts marketing plans—including business development and sales, public relations and messaging, proposals, and more—in the context of broader firm strategy and business planning, including firm systems, tools, finances, and human relations.

THE ESSENCE OF MARKETING AND STRATEGY

Strategic planning—including marketing planning—should be one of the most exciting things leaders of architecture firms do. Building a plan is the opportunity to discover what firm leaders want and why, to envision and articulate the desired future, and to motivate specific action. The process should be engaging and productive—an opportunity to recharge passion for architecture and practice. The plan, whether for a sole practitioner or a global leader, should be an action road map that is understandable, breakable into doable pieces, scalable with growth, and modifiable to evolving conditions.

▶ Strategic Planning for the Design Firm (5.3) presents a broad discussion of firm strategy.

The focus of this article is squarely marketing strategy: creating succinct targets for market types, business development, public relations, and more, based on sound research and analysis. Because the definitions of strategy and marketing are frequently mixed and misunderstood and the overall process is feared, what follows defines *marketing process* within the broader context of *firm strategy*. The entire strategic process is mapped out, with significant detail and examples for the more marketing-focused components.

At the most basic level, a strategy is a plan to achieve a specific goal. What does the firm want to be? How does it get there? A strategic plan connects personal and firm passion and abilities to the "real world," and maps the most effective way to reach desired goals. Crucially, it's as much a determination of what the firm is *not* going to do (such as the types of opportunities not to pursue), as what the firm *will* do. The firm may be interested in all sorts of creative and technical challenges, but it can't be all things to all people, and clients almost always want specialized expertise. This is especially critical in marketing strategy, because the most successful marketing links specific firm skills and desire to a very specific client or market, sales targets, and public messaging.

PITFALLS AND OPPORTUNITIES

The most successful strategic efforts build upon the following dynamics:

Strategy is always a work in progress; the most strategic firms are rigorous in their process, yet flexible. All plans become outdated the moment they're finalized. Conditions change constantly and unpredictably. Perhaps the economy reduces capital for sustainable resorts, a competitor loses their lead laboratory designer, the office market gets a little healthier, or a friend offers special consideration in a coveted project type in which the firm doesn't have experience. Developments like these demand strategic flexibility with

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(1) mastering the *process* so that re-analysis and change can be quick and effective, and (2) a *plan* that can be easily accessed, updated, and woven efficiently into the practicalities of firm decisions and management.

Retreats (advances?) are terrific opportunities for creativity and enthusiasm, for taking out the proverbial "blank slate." But good strategic planning requires good information and forethought. Rather than one multiday retreat with limited preparation, it's usually better to distribute the key steps over time, with research and communication between. This allows for reflection, processing, and smart decision making. The strategic planning steps are described later in this article.

Strategic planning is a powerful opportunity to leverage multiple voices and audiences in the firm and build internal excitement and energy. Different voices have different ideas and ownership in the plan; a successful effort carefully sequences activities to engage all stakeholders, while maintaining leaders' decision-making and process control. Participation of the "troops" can include (among other activities) research, creative visioning exercises, or weaving a specific "high-level" idea into day-to-day and project management realities. Successful firms use strategic planning as a major opportunity to reach out to staff and show strong leadership, communication, and inclusiveness.

Strategy isn't a separate activity, it underlies everything. A good strategic plan should weave into the day-to-day activities of everyone in the firm, and help allocate scarce resources. Strategy is the all-the-time baseline, the tool deciding the most important thing to do or say, whether writing a press release, developing a concept design, or hiring/training staff. Example components:

- A one-page, highly formatted "so cool employees will post it at their desk" declaration of mission, vision, and values (MVV)
- A one-page dashboard tracking key activities and goals
- A detailed market-specific plan to chart the multiple efforts required to enter a new market or keep an existing one
- A short action plan detailing the most important and powerful design focus, technical resource development, or brand-building efforts

The approach for the firm should target both summary and detailed strategic documents, and weave strategic initiatives into existing company tools and processes. While a strategic plan may be dozens of pages, specific parts should live strongly on their own, and be easily revised and edited. For example, a "Health Care Market Plan" will include significant detail on targeted clients, conferences to attend, papers to write, and research and networking activities, and should guide the day-to-day activities of marketing staff and key health care marketers. It should also include targeted clients and influencers, but if the firm has a good working customer relationship management (CRM) database, don't re-create the data, use the CRM system to identify targets. This "Health Care Market Plan" might target the potential future purchase of a small specialty firm in a new geography, but leave plans for the integration of that purchased firm, in terms of leadership or staffing or systems, to the more *operational* sections of the firm's strategic plan.

CREATING AND LIVING STRATEGY

The "Creating and Living" theme and eight steps of strategic planning that follow are based on organizational concepts and terminology jointly developed by Ted Sive, FSMPS, and Bill Strong, SMPS. The eight steps are: Discover Potential; Analyze Opportunity; Synthesize Direction; Declare Soul; Structure Enterprise; Connect Clients; Channel Aspirations; and Audit Performance.

The balance of this article describes an eight-step program in two overlapping phases: *creating the plan* (including research, analysis, and perhaps a retreat), and *living the plan* (carrying through strategic goals throughout the operational and marketing inner-workings of a firm). The components of the "living" phase are also in essence the table of contents for a strategic plan.

While the emphasis of this article is marketing strategy (choosing clients, markets, project types, publication goals, business development methods, and more), that marketing strategy must be developed within the context of overall firm strategy, which includes core mission and vision, theories of architectural practice, and operational tenets and aspirations. This paper describes a road map for the entire process, focused in the marketing realm. While this process—or formula—works for firms of all sizes, clearly there will be wide variation in areas of focus and quantity of work. And last, while the diagram presents a lineal progression, with information and discovery leading nicely to decisions and further planning, strategy in any firm evolves over time, and many of these activities can happen out of sequence.

Discover Potential

For any firm of any size in any economy, there's a wealth of potential. The old aphorism that we're just specks of sand in the universe reminds us of that infinite potential. The goal here is to consider "What can we be?" "How might we grow and expand?" Look around and ask "What don't we know, and how can we learn it?"

In discovering potential, the point is to gather data, objective and subjective, internal and external. This can be organized into five dimensions or root forces that drive architecture firms. Each is an area of specific research:

1. Passion
2. Markets
3. Perceptions
4. Competition
5. Trends

Passion

What are the firm's people most passionate about, individually and collectively as a firm? What drives people's work as professionals? Why did they become architects? What have firm members learned and experienced, and how has it changed them? While this is not a research topic in the traditional sense, thinking of it as research reinforces that concept of diving into and uncovering previously unknown facts. Find some way—leading a discussion, interviewing each other, throwing a "beer Friday"—to articulate passions. Broadly, there are two groups to consider:

- *Leadership*. Being an owner or principal is first and foremost leadership; leaders drive the firm, and their visions and desires are key. Leaders have the job of inspiring others, yet that comes after honestly assessing what is individually and mutually desired.
- *Talent*. Any firm larger than one person involves important differences in outlook, reaction, and capability; during strategic planning leaders must work to discover the staff's perceptions, views, meanings, and excitement. This is particularly true with societal and business trends toward empowerment, most notably with Generation Y.

Markets

Any strategic plan must reflect the real world outside the firm. This means researching the world of clients, how they consider and interact with architects, and what affects their buying choices. Along with accumulating and continuously updating information about clients and potential clients, architects must also consciously work to understand clients by thinking in their language and "walking a mile in their shoes."

The following is a generic list of topic categories and questions to consider when conducting market research. Start with this list and edit to the particulars of the markets being considered.

UNDERSTAND THE DIFFERENCE BETWEEN MARKETS, PRODUCTS, AND SERVICES

A critical step in research is defining markets correctly. A frequent mistake is defining markets only by how the firm sees them (and possibly as firm studios are structured), instead of defining markets by *how clients see and define themselves*. While the definitions can be gray and overlapping, understanding the difference between market, product, and service is fundamental to discovering useful information.

MARKET

A market is a collection of similar companies or institutions with specific facility needs, defined as clients see themselves. A facility manager for a school district typically identifies with the public K–12 market, not the "education" market, as that includes other, very different buyers, such as private universities. When markets are correctly differentiated, actions can be based on what is important to a type of client. A helpful guide for defining markets is to consider the professional organizations or networking venues clients use. For instance, many K–12 buyers attend Council of Educational Facility Planners International (CEFPI) conferences, while their university counterparts attend the Society of College and University Planners (SCUP) events.

PRODUCT

A product is a specific type of built environment that clients need. Continuing the example, K–12 clients buy a variety of buildings, from elementary schools to vehicle fleet maintenance facilities and performing arts centers—three distinct product types within one market. Some product types overlap markets; for example, some high school libraries or athletic facilities are just as elaborate as some university or city versions.

SERVICE

A service is how professionals describe an intellectual, design, and/or technical deliverable. In working for that K–12 client, an architecture firm might perform facility condition surveys, conceptual design, "full" architectural services, public outreach, and/or construction management. These are five distinct services offered to a specific market.

Honing a list of markets, product types, and services is a good first step for architecture firms. This helps all staff understand clients and market the firm more cogently, and sets those responsible for market research on a clearer path.

Market Definition
- What is the market, as clients define it?
- What geographic area will be the focus?

Clients
- Location?
- Size and growth potential (personnel, company revenue, ambition)?
- Design and construction needs: What services and products do they buy? What delivery methods do they use?
- Competition/influencers: Who works with them (architects, engineers, contractors, other)? How do they grade and select competing architects?

Dynamics
- What is the overall market size, currently and in the future?
- What are the economic drivers for this market?
- What broader social, demographic, and other trends might influence this market?
- Are there trends in the types of projects within the market? For example, is educational philosophy driving a substantial change in building form?

Networking and Organizations
- Where do the clients and influencers congregate (market sector conferences, associations, social networking)?

Market Research Sources and Examples
- Client organization websites and trade journals (Urban Land Institute [ULI], National Association of Industrial and Office Properties [NAIOP], CEFPI)

- In-person interviews with existing customers
- Conversations with subconsultants, contractors, and subcontractors
- Data and reports from AEC organizations (Associated General Contractors [AGC], AIA)
- Specialized AEC data sources (McGraw-Hill, AIA, PSMJ Resources, Design Intelligence, commercial brokerages)
- Local business and/or specialty media (business journal analyses of largest, fastest-growing, etc., businesses)

Perceptions

It's an old joke: "So, enough about me. What do *you* think…of me?" In this dimension of research, firms learn about themselves from an outside perspective. With better understanding of how the firm is perceived, both on its own and as compared to the competition, comes a better ability to solve deficiencies and identify opportunities. Opportunities include gaining brand awareness, growing into different product types with existing clients, or improving a capability. Remember, what the client thinks (perception) equals reality.

In the "Connect Clients" section later in this article, the value and process of project reconnaissance is considered. These are questions specific to projects (response time to requests, availability of key personnel, listening skills, construction document quality, and many more). These surveys are a hugely valuable component of client care, different from the firm perception surveys that are very information-focused for strategic planning.

Topics

A perception survey asks clients, "How do you see us?" This can include:

- Client's definition of the firm's client service and "brand"
- Firm strengths and weaknesses in design, technical, management, communication, and other aspects
- Identification of competition, and comparison to them
- Suggestions for process improvement
- Perspectives on or identification of clients similar to themselves, including the client's competitors
- Perspectives on future trends in that client's market (anything from product delivery models to growth potential)

Pointers

- The best questions are open-ended (*not* yes or no, and only occasionally multiple choice). This leads to a real conversation with the client and to learning what the client feels is important, in their language.
- Surveys can be conducted by firm personnel, which builds relationships and can start with a helpful familiarity, or by an external consultant, which generally leads to more frank responses and a clearer "big picture."
- Remember that *clients* are sometimes different from *owners/users*; for example, the client might be a developer who is building a turnkey project for a corporate owner, or a third-party owner representation firm.
- Many clients have different levels of decision makers—perhaps there is a day-to-day project manager, the executive, and even a building committee. Each might have different priorities. It is important to determine who makes the real decisions, and who is accessible.
- Focus on how the firm can help the client, not on potential upcoming projects. The goal is to understand their perceptions so that better service can be provided, not to make short-term gains.
- Surveys can be expanded to include collaborators, subconsultants, and others with knowledgeable perspectives.

Competition

Clients are buyers. Buyers have choice, and they always—implicitly or explicitly, consciously or unconsciously—compare and contrast among firms. Competitor analysis is an underused strategic tool, and another excellent way of discovering potential and possibilities, while also building "client-thinking" skills. Following is a list of characteristics to consider; it is important to see the competition from both the framework of what is known, on speculations, and on the perceptions of shared clients—these may not be the same. Again, client perceptions are "reality."

Analysis Categories, per Competitor

- Markets they work in
- Products they design
- Services they offer
- Geographies and office locations
- Leaders and key business developers
- Marketplace perceptions (brand)
- Key clients and projects

A QUICK AND SUBSTANTIVE START TO COMPETITOR ANALYSIS

Creating a competitor analysis is an excellent way to reach out to "talent" in the firm and involve them in strategic planning. Bring staff together for a focused discussion of their perceptions of competing firms.

It helps staff think strategically. Architects, as a result of passion for design and often broad interests, sometimes develop "rose-colored" and limited views of competing firms. Real differences in skill and resume can be minimized or misunderstood. Forcing a group to think like clients draws out the real differences between firms, and helps marketers to think like clients.

A little time can unearth a lot of information. With limited preparation to create a matrix and organize discussion, a focused meeting of even 60 to 90 minutes can yield a lot of data. Different staff will have different views into the competition, perhaps from working there, or from peers, subconsultants, and others.

Trends

The last dimension of research is the industry itself: What are the important trends in the world of AEC and real estate?

Topics

- *Teaming and delivery methods*: How are they evolving and affecting the process of how the firm works in the broader industry?
- *Technology*: How is new technology affecting practice?
- *Society and cultural trends*: How are broader trends, such as demographics, affecting the business of architecture and related professions?

Pointers

- Industry publications and conferences are full of research and prognostication on these topics.
- An internal brown-bag lunch is productive for drawing in a variety of perspectives and inputs.

Analyze Opportunity

Research during the "Discover Possibility" step will yield a ton of information. In "Analyze Opportunity," begin with that information and answer the question, "What does it mean for the firm?" The analysis can be broken into two categories of opportunity: *possibilities* (such as taking expertise in urban housing from one city to another, or leveraging a new hire's resume to enter hotel design) and *obstructions* (such as a new competitor, or the need to strengthen "augmented reality" visualization expertise for technology clients).

Analyses to Consider:

- What characterizes clients in a specific market? How do they fit the firm's mission, vision, and values (MVV)?
- What is the firm's market share?
- What characterizes or differentiates the firm's existing or potential future work in the market?
- What and where are the opportunities and risk/reward of geographic or market expansion?
- How does the firm compare to the competition, and what risks and opportunities does that identify?
- What specific expertise is required to pursue a specific goal, and what does the firm have/not have (gap analysis)?

RETREAT EVALUATION TECHNIQUES

Described below are four analytical techniques to analyze opportunity and uncover potential paths. Each can be used individually, and is particularly effective for group work.

SWOT

Perhaps the most well-known tool is a SWOT (strengths, weaknesses, opportunities, and threats) analysis. Create a document with four quadrants, and populate each quadrant as a group per the specific market or topic:

- *Strengths* of the firm and individuals per the specific market or topic
- *Weaknesses* of the firm and individuals per the specific market or topic
- *Opportunities* involving clients, projects, technical skills, people, etc., for the firm
- *Threats* that might potentially have a negative impact on the firm

STOP/START/CONTINUE

A variation on SWOT, Stop/Start/Continue (SSC) fosters brainstorming but may get more quickly to participants' beliefs and opinions already present, with discussion around:

- What the firm should stop doing
- What the firm should start doing
- What the firm should continue doing

SCENARIO DEVELOPMENT

A bit more complex in structure than a SWOT or SSC, Scenario Development splits a large group into smaller ones, and asks each group a similar set of questions to be answered specifically for that group's scenario. For example, the group might come up with these potential "ten-year future" themes:

- More competition from large firms with broad interdisciplinary (such as mechanical and structural) services
- A key client wanting more "boutique" specialties
- National retail clients wanting one firm to do work everywhere
- 30 percent adoption of the Living Building Challenge in the university market

The group would then split into four, each addressing one of the above themes and answering questions such as the following, starting with the assumption that the scenario is true:

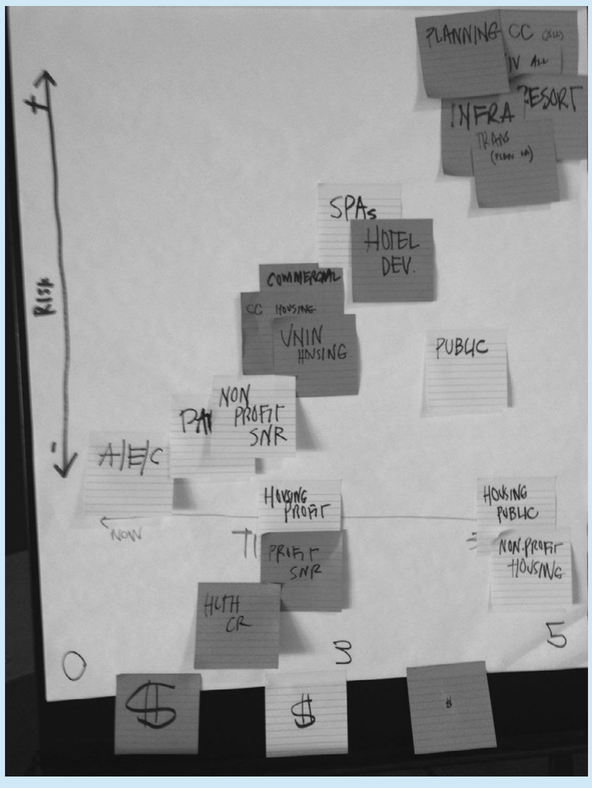
- What technical resources might be demanded?
- How might the firm add resources in-house, or team with other firms?
- What will be the procurement methodology?
- What would be good upstream business development opportunities to start developing relationships now?

After each group reports back, the whole group can then look for "killer ideas" or strong themes that resonate across more than one scenario.

QUICK HIT RETURN ON INVESTMENT (ROI) ANALYSIS

The last technique focuses on financial return. Given a set of potential markets, products, or services, the group works to answer what kind of return a set amount of marketing investment ($50,000 in labor and expenses, for example) might provide, and/or the chance of success relative to time horizon. A sample matrix graphs market options in three dimensions: financial return, risk, and timeline.

Figure 6.1 is a Quick Hit ROI from an architecture firm analyzing $50,000 in marketing investment. The X-axis is time, one year to five years; the Y-axis is amount of risk; and the color of each note indicates the likely return—green: $1,000,000, blue: $500,000, and red: $100,000.



Ted Sive

FIGURE 6.1 Quick Hit ROI

Synthesize Direction

This step is often the hardest: choosing the key focuses that will drive the firm for the term of the strategic plan. These include *operational* improvements and additions; *marketing* choices of specific markets, product types, and services to pursue; and an *action plan*, with key must-do activities. All of this is inexorably tied to choosing what the firm will pursue, making only as many choices as the firm can fund. To complete the resource-loading aspect of strategic planning, a high-level *budget* and *timeline* are developed. These illustrate the firm's financial commitments to specific initiatives, and the sequence and timing. Synthesize Direction is analogous to Conceptual Design. Determine the key big-picture goals for each category, including the fundamental "design" of the firm, each of which will be further developed in the plan itself, much as Design Development furthers basic design concepts.

Focusing on the marketing components, the firm needs to choose which markets are active, growth, and reactive.

Active Markets

An active market is one where the firm wants to maintain an established and significant market share (defined as the percentage of a market the firm typically performs). Maintaining an active market is a high bar in and of itself, with activities including the following:

- Maintaining existing relationships
- Forming new relationships as decision makers and the clients themselves change and move on
- Attending conferences to maintain market knowledge and visibility
- Keeping close attention to client care on existing projects to foster repeat work
- Preparing qualifications statements and proposals, typically in response to RFQs and RFPs

Growth Markets

A growth market is one with the opportunity to significantly increase the firm's market share, with significant opportunity to gain new clients and/or projects, while staying consistent with the MVV. Growth market activities include all the activities in active markets noted above, plus:

- Building alliances with potential new team members (e.g., specialty consultants)
- Performing research and development to maximize skill sets and find creative ways to add value and gain competitive advantage
- Growing internal skills special to technical/design challenges of the market
- Potentially accepting less profit as investment in growing internal skills or more aggressively marketing the target)
- Hiring strategic talent

Reactive Markets

Choosing reactive markets is that important, difficult choice to "not do," resulting in little or no proactive pursuit. Opportunities that do come along might still be considered, subject to a rigorous go/no-go evaluation (see below), with pursuit only if there is no opportunity lost in active or growth markets, or other strategic endeavors of the firm.

RESOURCE LOADING

An excellent tool for forcing strong decision making on "doing" and "not doing" is to inject resource modeling into strategic decisions. While a strategic plan informs the "how" of day-to-day activities (the tasks that need to happen no matter what, such as designing and managing projects), a strategic plan is also fundamentally about the special and unique and specific activities the firm wants to undertake. For these activities, there are three basic "pots"—staff time, direct cost, and schedule. Resource modeling is applying strong business rigor to make choices based on what can and should be invested in these pots.

For example, one simple tool is determining how much of the current marketing budget is required to maintain the current quantity of work in pursuit of current markets with current methods. The rest of the budget, and perhaps an addition, equals the available budget for new strategic marketing initiatives, for the growth markets or additional pursuit of the active markets as defined above. As alternatives are evaluated, estimate costs erring on the high side.

Declare Soul

This is the "heart" of any strategic plan, the firm's inspiration and essence. There may be a clearly articulated MVV already. If not, or if they need to be rethought or confirmed, now is the time. This is where the planning process ends, and the strategic plan begins "living." Following are the three "animating principles" for a professional service firm, of why the firm exists and why it matters:

Mission: The firm's *purpose*—why it exists and its function in the greater world

Vision: The firm's *destination*—where the firm will be in a given amount of years, stated at least in part in objectively measurable accomplishments

Values: The firm's *interaction*—how the firm works with clients and collaborators, as well as internally

Structure Enterprise

To enact and live its soul, a firm needs structure—how it is organized, specific roles, what tools are used, how they are used, etc. Structure Enterprise guides this structure, including critical highlights and direction of how to enable strategy in the "everyday." In the case of big, visionary goals, this may really change the "how" of the firm's daily work.

Leadership

Organization and Communication

A fundamental job responsibility of firm leaders is living and leading strategy. Who are those people, and what are their roles? An organization chart not only indicates decision-making authority, but also empowers the strategy of "how" a firm wants to conduct work. If increasing design skill and recognition is a key strategy, who is responsible for this, and where do they live and interact with others? What is the person's job description?

Transition

▶ See Ownership Transitions (5.6) for a detailed discussion of transition planning.

As a strategic plan will cover a number of years, firms should consider not just the present structure, but also the future. Who will the leaders be in 10 years? Will they come internally or externally? Will ownership be important for those leaders, and how will they obtain it? (The most successful long-term strategic efforts closely link ownership transition plans with core strategy.)

Talent

▶ The Human Resources Management Overview (8.1) addresses the many aspects of an architecture firm's staff management.

Human Resources

The talent in an architecture firm lives the strategy in day-to-day projects and work pursuits. What skills need to be developed? How will new staff be indoctrinated in the firm's MVV and key tools? Do specific capabilities need to be hired?

Tools

▶ Chapter 12, Quality Management, covers quality control methods and issues.

▶ Chapter 10, Design Project Management, addresses management of architectural projects in detail.

▶ See Chapter 11, Technology in Practice, for a specific treatment of technology use and management.

In executing projects, leadership and talent use tools to carry out the work. To move strategy into the day-to-day, firms should ask: What are the key tools in the firm, and do they help or hinder the firm's goals? What would benefit from focused development and resources?

Design: definition and tools for architectural design processes

Technical: building systems and information resources, construction document quality control

Process: project management tools and standards

Information technology: CAD, BIM, the electronic flow of information, knowledge capture for firm expertise

Financial Management: project and firm financial tools and processes

Connect Clients

Structure Enterprise focuses on a firm's internal structure and tools—the firm's *operational plan*. Balancing that and focusing externally is the firm's *marketing plan*, the core of how the firm's soul intends to connect with clients and the world outside. Following are the key components of a marketing plan.

▶ Financial Management Overview (7.2), introduces a detailed series of articles on financial indicators, systems, processes, and planning in architecture firms.

Brand

A firm's brand is the sum total of external understanding and perceptions of a firm. The brand components of a marketing plan are the tools a firm uses to shape those perceptions. Perhaps the most important tool is a brand statement, a 300- to 500-word summary for the essence of the firm, how it is distinguished from competitors, and the value that it brings to clients. In many ways a brand statement is an external retelling of the MVV. Other brand components include the firm's name, logo, iconography, tag line, and visual imagery.

Markets

On one sheet of paper, distill the key markets the firm works in, and whether those markets are growth, active, or reactive, as defined above.

Go/No-Go

This is a tool to determine whether a firm should pursue a specific client or project. The model should be personalized for a firm's truly important considerations, including fundamental firm strategies, specific resources needed, the deadline for the pursuit, the time frame of the work itself, and the risk/reward ratio. Some criteria might be required (e.g., "Do we have an existing relationship?"), while most would be part of a point system, with a minimum number of points required to proceed.

▶ See Qualifications, Proposals, and Interviews (6.5) for further discussion of the go/no-go decision.

Public Relations

The firm's public relations strategy is the key effort to influence what the broader range of potential customers, stakeholders, and the general public think about the firm. These plans may be for the firm as a whole, and/or specific to the Growth and Active targets for the firm.

▶ Public Relations and Communications (6.3) includes a detailed discussion of media outreach.

MARKET TRANSCENDENT VS. MARKET FOCUSED STRATEGY

The architecture field has many examples of firms that have grown and prospered with a very strong market focus. WATG has built an internationally recognized practice and clear standing among market leaders based on laser focus on hospitality design. While almost all firms benefit from a disciplined approach with market-based planning regardless of size, location, specialty, or design ability, some firms' marketing strategy can transcend market delineations. These firms manage to sell something different, or that cannot be seen through the lens of market-specific expertise.

This transcendence can be a product or service type as described above. For example, a decade ago "sustainability consulting" was a differentiating service, and a number of architecture firms (Mithun in Seattle, for example) grew their practices across multiple markets with this service. Other firms are experts in particular product types, such as vehicle maintenance facilities. Many firms have similar differentiators, yet still market-based planning and understanding their clients is the most effective start for strategic planning.

Only a few firms really transcend market focus. This ability is usually the result of a strong design or service attribute that allows them to pursue and win clients in many markets and geographies. Kieran Timberlake of Philadelphia, recipient of the 2008 AIA Firm Award, has built an international reputation significantly rooted in their research-based practice, including the study and development of new products, assemblies, and delivery methods, such as the use of prefabrication. In 2010 they were awarded the billion-dollar U.S. embassy in London, a project far beyond their previous project size or type. Miller Hull, the Seattle-based 2004 AIA Firm Award recipient, developed a very strong reputation for environmentally sensitive and context-driven design long before "sustainability" became common lexicon. That work, for a still modest-sized firm, launched the firm into public works and research facilities, and even very large projects such as a half-billion dollar border crossing station between Tijuana and San Diego at San Ysidro.

▶ Networking and Business Development (6.4) addresses relationship marketing.

Business Development

Firms are hired by individuals and teams who are mostly hiring other individuals and teams. Interpersonal relationships—the one-on-ones between architects and clients and influencers—are the building blocks. Business development is about targeting those individuals and organizations, specific tools, and the actual personal connections involved to build and maintain relationships. Remember that these one-on-ones are not limited to firm leadership, but also management and design talent.

Client Care

Client care is about performing work and relating to existing clients, which should be tightly intertwined with the marketing plan. The best marketing is to keep current clients, which is aided by "living" the firm's strategy on each project. Good client care is about building strong working relationships and understanding how clients grade project performance, then making sure the firm performs at an outstanding level on each project.

COMPONENTS OF A MARKET SECTOR–FOCUSED MARKETING PLAN

1. Market definition
2. Focus
   - What cross-section of Market, Service, and Product is the firm targeting?
3. Market share
   - Estimate of market size and revenue goal
   - Geographic definition
4. Clients and influencers
   - Core existing and responsibility
   - Targeted new and responsibility
   - "Considered, less focus" (list of clients of potential interest, certainly to respond to, but not top targets)
5. Brand and public relations
   - Any key market-specific messaging needed? (desired press/media, advertising, website or collateral brochure development, etc.)
   - Organizations/conferences/speaking/memberships
   - Targeted activities
   - Monitor only
6. Budget and schedule
   - Labor: marketing staff percentage of time
   - Labor: technical/management/design staff percentage of time
   - Expenses: conferences, training, press activities, social media campaign
   - Operational needs: training, tool development, etc.
7. Monitoring
   - Tools and check-in schedule

"BUSINESS DEVELOPMENT" OR "CLIENT CARE"?

Another area of confusion in both terminology and definition is in "Business Development" (BD) and "Continuous Client Care" (CCC). While there is a significant overlay of activities, "business development" as used in this article defines forming and maintaining person-to-person relationships with the specific goal of obtaining future projects. "Client care" is used here to describe a range of activities undertaken with existing clients on current jobs to create more effective working relationships, successful and profitable work, and greater likelihood of repeat work.

Both BD and CCC benefit from

- Education, training, and discovery regarding the differences between individuals, what they enjoy and don't enjoy; how they process information, make decisions, and act under stress; and what their jobs specifically demand in terms of information and process

CCC programs build on this and can include

- Starting projects with discussions or workshops to establish team communication guidelines and process (this is similar to much of the content of "partnering" sessions)
- Creating and implementing a firm-wide process for regular and formal project check-ins with the clients, both during and after the project
- Techniques and activities for building teamwork on a diverse project team

Channel Aspiration

The details and specifics of the operations plan and marketing plan address the totality of the firm and how strategy is being executed. this step is about the action plan, where the goal is to highlight the most crucial deliverable components and inspire everyone in the firm to live the plan daily. The action plan is composed of two components: energy and specificity.

- *Energy*: The people in the firm fuel the strategy. Most people, most of the time, want to feel part of something bigger and visionary—this might be especially true for architects, many of whom are drawn to the industry by passionate interest in design, buildings, or social change. Another way to define *energy* is inspiration, and part of the strategic plan should be tools to communicate with and energize the staff.
- *Specificity*: Specificity is another form of fuel. A key component of a strategic plan is a list of the *most important* activities to build and maintain the firm's unique vision. While enterprise and marketing plans generally have fixed components with only some information that changes from time to time, the action plan is a few pages, and very current, comprising specific deliverables with specific due dates.

An effective action plan format ties very specific assignments of who is doing what task when, to the "bigger picture" tactics and goals. Table 6.2 shows an example of one from "Acme Architects."

TABLE 6.2 ACME Architects Action Plan

	Goal(s)	Strategy	Task	Lead	Date(s)
	HR/Communications				
A	Increase staff retention Key Performance indicators	Celebrate promotions.	Clarify process for communicating promotions (including quarterly and e-mail).	SM, JA	6/30
		Increase senior leadership visits to field.	Suggestions for senior leadership visits to field (especially projects not "theirs").	JB	5/31
		More closely support/monitor employees during their first nine months.	Define process for RMT checking in on new employees (so they're not isolated).	PO	6/30
	Operations				
B	Increase revenues and early "upstream" exposure to clients.	Establish service department.	Develop plan for service offering and operational structure.	JA	6/1
			Distribute and comment.		7/1
			Approve.		
C	Build company "lessons-learned" knowledge.	Expand on project recap/report (from retreat) and complete as projects close-out.	Develop standard format/ form.	KG	✓
			Communicate with Project Managers and others.		6/31
			Monitor with project close-outs.		
	Marketing				
D	Increase interview hit rate.	Conduct presentation skills training.	Work with consultant to develop training and practicing needs.	PO	
			Identify external providers and internal resources.		
			Identify participants and schedule training.		6/30/07
			Training complete.		

PART 2: FIRM MANAGEMENT

Audit Performance

Just like a routine physical with the doctor, the firm stays healthy and identifies challenges through honest self-analysis, ideally before issues become "diseases." The goal is to put in place a set of measures and a regular check-in process, to continually ask, "How are we doing on our strategy?" An audit performance report card will measure key performance indicators (KPIs) addressing the four key components of strategy (as noted below). KPI audit and analyses may lead to adjustments and refocuses. Client targets may be altered (perhaps due to unforeseen market changes) or operational efforts doubled (such as bringing in a BIM consultant to help create a firm-wide BIM education series). An additional benefit of auditing is that it really begins the next strategic planning cycle, since evaluation of KPIs can generate the next round of "Discovering Potential."

Perhaps most important is creating and testing KPIs so that what is being measured is significant and indicative of what the firm leaders see as measurements of success. Don't just rely on traditional or accepted measures; for example, focusing too much on financials rather than whether the firm is truly living its strategy.

Objective measures of *soul*, how the firm is living its mission/vision/values, may seem counterintuitive: How can an objective formula measure something that is inherently subjective? For one firm a core value is "distinct solutions" for every project, and they measure it by asking at project close-out, "What appears in the project that never has previously in one of our designs?" While this objective approach doesn't fully address success to an MVV component, the value of the measure is as much in the *discussion*—really forcing participants to define what is meant by value, and measuring not so much for the statistic but for the rigor of testing and verifying, and for continuing the discussion.

Operational plan metrics are the more traditionally understood KPIs. The following is a limited list of examples:

- Project profitability
- Company-wide overhead rate
- Staff utilization
- Employee turnover
- Revit utilization (or transition into any new process or paradigm)

Following is a range of *marketing plan* metrics:

- Market share (firm's portion of total fees in a defined market)
- Total net fees and profit per market and trends over time
- Proposal short-list rate (short lists/total competitive pursuits)
- Interview selection rate (selections/total short lists)
- Direct award work (percentage of new work fees acquired without any competition)
- Marketing budget vs. actual
- Significant new client contacts (new relationships with real potential jobs current vs. last period)
- Public relations (PR) targets and results (number of mentions, placements, articles)

Since the *action plan* includes specific details of "who is doing what task when," auditing is a simple review of those tasks.

Quarterly check-ins are excellent forums for leadership to gather, remind themselves of key strategic goals, and review these KPIs.

CONCLUSION

There's an ongoing conundrum with strategic and marketing planning: while it is important to understand the whole process, it's also important that strategic planning doesn't bog down in that process. Here are some pointers to effectively adapt what's described in this article:

- First, use this model and terminology to define the process.
- Next, use the process diagram to assess what information and tools are already available and what might need to be created.
- Potentially, start with some easy activities to build commitment and excitement.
- Look for ways to pull in different voices for broad buy-in and wider views.
- Don't worry about being "done" with all the components of the plan: Understand the process so it's clear what was completed and what wasn't.
- Consider content more important than graphics.
- Finally, be realistic in the schedule. Keep the process tight to maintain momentum and build excitement, while allowing time for research, reflection, and reasoned decision making.

For More Information

The Art of Managing Professional Services: Insights from Leaders of the World's Top Firms (Pearson Prentice Hall, 2010) by Maureen Broderick.

Good to Great: Why Some Companies Make the Leap…and Others Don't (HarperBusiness, 2001) by Jim Collins.

60-Minute Strategic Plan: Planning and Problem Solving for the Real World (60 Minute Strategic Plan, 2006) by John E. Johnson and Anne Marie Smith.

The Zweig Letter: See "Better Business Planning." Aug 23, 2010. http://www.zweigwhite.com/trends/thezweigletter/index.asp.

6.3 Public Relations and Communications

Michael J. Reilly, FSMPS

Communicating a firm's distinctive value, experience, and personality in a memorable way is essential to growing the business. Armed with the right strategy and message, design professionals can (1) chose the communications channels best matched to their target audience, and (2) create marketing content to attract, inspire, and converse with the right clients.

Communicating with client audiences was once a straightforward process with just a few options to promote a company's message, ideas, and experience. To reach prospects and clients, "outbound" marketing pieces—newsletters, postcards, brochures, press releases, and white papers—were produced and sent. Ads and directory listings were placed in client-read publications. Then e-mail marketing arrived to add another communications vehicle, followed by a new set of digital channels including online video, blogging, micro-blogging, webcasts, e-books, and the 24/7 online dialogue of social media engagement.

With an ever-growing array of options for communicating, and fast-changing client preferences for receiving a firm's messages, a strategic and planned approach to

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public relations and marketing communications is needed for architects seeking to set their practice apart from the competition.

DEVELOPING A COMMUNICATIONS PLAN

For the same reasons a building is designed before it is built, investing some time in developing a communications plan will provide multiple benefits and avoid confusion over the firm's message.

Besides the obvious benefits of setting priorities and gaining consensus, planning for communications and PR can provide unexpected gains. For example, while brainstorming how to publicize expertise in designing college dining facilities, someone may see the opportunity for a stronger promotion campaign if research is conducted with students whose dining fees pay for campus food services. Another firm with mission critical facility experience may seize the opportunity for mutual benefit by teaming with a client to pursue speaking appearances on data center planning.

The secret is to keep the planning part simple. One or two pages, done with precision and purpose, can be more valuable than the big three-ring binder on the shelf. Build the exercise around a few vital questions. Work together as a group to answer the questions and explore options. If a marketing and business development plan is in place, use the work already done on that plan to inform decisions on communication and promotion objectives. Questions to get started include the following:

- How does the firm want to be perceived? What does it want to be known for?
- What values, attributes, and specific personality fit the firm the best? Make a list of the words describing these characteristics.
- What type of work does the firm leaders and staff love to work on—and want more opportunities in?
- Is there sufficient growth in this market type in the next two to three years?
- What is it that the firm leaders do, know, or hear from clients that is valuable to share? Is this any different from what the firm's competitors do/know/hear?
- How do clients in the firm's market learn about architects, capital expansion, and buildings? What organizations do they rely on, which publications are they reading, and what online resources have their attention?
- What are the opportunities to communicate knowledge of innovations, cost strategies, design, and technology to help position the firm as a provider of choice for architecture and planning?
- Do the firm's current tools—website, social media pages—tell the right story?
- What are the stories the firm tells when citing examples of its work and success as a firm? What do these stories tell the firm about its message and about what makes it different?

Take the time to work through these strategic questions. For many firms, some primary or secondary research is needed before they can be answered. Client research, conducted by firm staff or an outside consultant, will provide powerful insights on the true strengths and outside perceptions of the firm.

Put Actions and Assignments in Writing

Once the marketplace and strategy questions are answered, and competitive advantages in key client markets are identified, it's time to define tactics. Map out the specific topics, audiences, and communications vehicles to integrate into a marketing program. Use an easily shared tool to list these and to assign responsibilities. Table 6.3 shows an example of a basic spreadsheet tool for planning and tracking communications activity.

TABLE 6.3 Basic Spreadsheet Tool

Client Market	Topic/Expertise	Opportunities/Actions	Person Responsible and Timetable
55+ residential development	Designing for empty nesters	Interview clients on trends and in-demand features/amenities. Review secondary research on buyer preferences and behavior. Blend this research with our design experiences into a how-to article and presentation.	Peter D to lead client survey and secondary research (by 9/30) Marketing team to identify social media, speaking, and print publications to target (by 9/30) Joan M to write initial article with help from PR consultant (by 11/1)

Set specific goals and measure results, preferably every quarter. Examples of specific goals for a communications and public relations:

- Make two speaking appearances at national health care conferences in the next year.
- Research marketplace trends; write and publish one regional and one national article on "Design for Empty Nesters" in the next 18 months.
- Support/communicate publishing and speaking with social media postings online via Twitter, LinkedIn, and YouTube.
- Create two-minute online video on low-cost, high-impact renovations for commercial properties.

Fundamental to communications planning is identifying what makes the firm distinctive, and how to express these qualities to differentiate it from the competition. Business strategist and author Scott McKain summarizes the differentiation quandary this way: "In professional services, the clients making the decision are not making it very often. What do they need to know about your company? If you can't talk about the distinctive parts of your service, the client has to decide on price" ("A Conversation with Scott McKain," *SMPS Marketer*, June 2011, interview by Mike Reilly). Showing a firm's distinctiveness and value provides all clients, experienced or not, with the information needed to make an informed choice.

WEBSITE CONTENT AND DESIGN

The single most important source of information and inspiration for clients is the firm's website. What was once designed and produced as an online brochure is evolving into something much different. The best websites integrate social media content, video, and blogs. This integration of social media channels into the company website is changing and building upon past conventions, making websites more dynamic and helping them earn higher search engine rankings on Google, Bing, Firefox, and other search engines.

Outside-In Thinking

When determining what should be included on the firm's website, the best starting point is to ask, "If I am a client searching for an architect, what would I want to know?" (See Table 6.4.) By taking this outside-in approach, interesting and valuable content ideas for the site will rise to the top. When replacing or upgrading a firm's site, think of the task as similar to putting together a great meal for cherished guests. Each element (or course) should work together to enhance the experience.

Keywords: Optimize Websites for Search Engines

An entire body of knowledge exists around boosting website success with Google and other search engines. The most important step is keyword use. A keyword is a word or series of words that a client might type into their search engine when seeking

TABLE 6.4 Key Features and Considerations for Website Planning

About the Firm	Be factual, brief, and avoid clichés. Retire descriptions such as "client-driven" and "market-focused" in favor of authentic information about the firm.
Staff	Websites should celebrate the firm's creative talent. Clients relate to people rather than things. Showcase company culture, including community engagement, mentoring, and teaching.
Portfolio	Select a cross-section of design work; include client testimonials when feasible. Be careful not to slow down load time with image-rich pages.
News	News is one of the most visited pages; site visitors want to see anything new and newsworthy. Write news items in straightforward, objective style.
Blog	Blogs are an excellent thought-leadership tool and search engine optimization strategy, yet not for everyone because of time commitment to regularly update.
Knowledge	If blogging is too demanding to pull off, a knowledge center page with advisory pieces, published articles, and best practices is a smart option.
Social	Integrating social networks with the website helps increase followers to Twitter, LinkedIn, and Facebook and makes it easier for clients to find the firm. Social tools also help drive traffic to the main site.
Careers	Describe for potential employees what is appealing about working at the firm. List open positions and update listings frequently.
Community	Philanthropy and community engagement activities show the flip side of design excellence. If the firm has a community story to tell, why not tell it?
Contact	List a real person and his or her e-mail address; people are reluctant to use a generic "info@" address. Be sure to include the company phone number(s) in an easy-to-find location.

architectural services. These keywords are not the company name, rather what the firm is and what it does.

For example, if a firm's design specialty is laboratory renovation, use "laboratory renovation" on the site and in the captions of images placed on the site. Words like "architecture" or "renovation" or "planning" are too general and prevalent to be factored into search engine rankings. The more often a word is searched on, the more

ADVICE ON WEBSITE CONTENT, NAVIGATION, AND DESIGN

Mark Guarino of Guarino Design in Cambridge, Massachusetts, knows websites. Trained as an architect and working as a graphic designer, he has designed sites for several design firms and other professional service companies. He shares his insights on the ever-changing nature of websites:

On content: "Most clients are often more interested in the process behind a great project rather than seeing only beautiful photos of the finished work. Fortunately, today's websites are flexible in design, able to accommodate a variety of formats and features showing a firm's work and personality. A video walkthrough of a new construction site or an e-Paper feature showing a firm's thought leadership are two examples of the ease of adding content. The content management tools support these updates, and integrate well with social media."

On design: "Web design is no longer about creating static, structured designs. Instead, we are adapting websites to be interactive with the devices displaying the site, smartphones and tablets especially. This has changed the programming side of web production, and made a lot of existing sites obsolete. It's no longer an online brochure, it's a platform for online dialogue."

On navigation: "While content and features change, we still have a standard set of navigation headings that people are familiar with and expect to see. If you try to be different by introducing something new, you make it harder on any visitor. Stick with the familiar headings: About Us, Portfolio, News, Contact Information."

Guarino advises against loading too much information onto the site. He often encounters clients determined to include every project. "Be selective," he says. "With digital communication, less is more."

competitive it is. Look for less competitive keywords that describe the firm's expertise: *urban planning*, *theater design*, and *multifamily housing* are examples of specific keywords.

There are a number of different tools that can be used to determine the competitiveness of a specific keyword as well as suggest keywords. These tools include the Google Keyword Tool or Internet marketing firm HubSpot's *Suggest Keywords* feature in its software's Keyword Grader tool. To optimize the images on the site and have them appear in Google images searches, caption the images and use keywords in the captions.

According to search engine optimization experts, the best advice to improve a website's ranking is to regularly create and publish new content. Google's web crawlers reward fresh material postings and are programmed to reward websites that update postings frequently. Blogs and other social media integrated with the firm's website are ideal for providing such new material on an ongoing basis.

SOCIAL MEDIA AND DIGITAL COMMUNICATION

When social media content first began to show up on YouTube, LinkedIn, and blogger sites, some wondered how important social media would become for clients. It did not take long to realize that social media communications done right—interactive, entertaining, and educational—provide an opportunity to influence new and existing clients. (See Table 6.5.)

A second and equally important opportunity social media offers is inbound marketing. Inbound marketing is based on the premise of drawing clients into a dialogue, helping them with information they can use, creating content they value, and building credibility for the firm by showing an advanced understanding of client needs and problems.

The term "inbound marketing" was coined by Brian Halligan of HubSpot in 2005. The concept behind it was explored and advanced by Seth Godin in his book, *Permission Marketing: Turning Strangers into Friends, and Friends into Customers* (Simon & Schuster, 1999). Both intended to contrast the more interactive and content-rich marketing activities with long-established, conventional outbound marketing methods such as cold calling, advertising, newsletters, brochures, and mailers. The message and content of purely outbound tools focus on the features of the company (*Hey, look at me!*) instead of providing information of importance to the client. These methods require an interruption to be seen or heard, rarely justifying the interruption with any value. Consequently, clients tune them out.

The emergence of social media and inbound marketing methods can be expressed as a *pull* strategy, as compared to the *push* of outbound methods. Social media tools allow clients to connect to firms on their terms, and at their option. Two things make social media and inbound marketing particularly applicable to architects:

1. *Design is a consultative business*. Integrating digital communication tools and using them to converse online with clients and prospects is a natural extension of the advisory skills used every day by architects. Presenting creative options to a client, teaching young staff members, and sharing insights with engineers and builders require a similar shade of the critical thinking needed to create lively online content for blogs.
2. *Clients are using the web to find experts*. Clients manage projects involving high dollar value, long buyer research cycles, and knowledge-based service delivery. As explained by Halligan, "In these areas, prospects are more likely to get informed (through social media) and hire someone who demonstrates expertise."

Social Tools

The fundamental shift from strictly promotional communications to a more educational and helpful dialogue is occurring for three main reasons:

- Traditional marketing methods based on promotion (all about us) are expensive to produce and increasingly ineffective.

- Clients are seeking information on the Internet early in the process of short listing and selecting architects. Conventional websites are part of this online presence, yet proving firm expertise with relevant online content in addition to the website is an effective strategy for being found.
- As generational patterns evolve, a demographic shift is taking shape within the decision-making process. Building trust online and in-person is increasingly expected, sought, and valued.

The conversation on social media is shifting from questions about business value, client use, and return on investment to mastering and managing its implementation. Identifying who participates, and how much oversight there is on individual postings, is a frequent dilemma. Many firms are also challenged to find the time to create content and keep up an online dialogue. (Is there any marketing or business development action where time is not the big challenge?)

In response, architecture firm leaders are implementing a long-term social media strategy. They are nurturing in-house correspondents, developing new resources inside and outside the firm, and producing engaging social content.

TABLE 6.5 Social Media Advantages and Challenges

Tool or Site	Advantages	Challenges
Twitter	Immediacy, simplicity of use, transparency, popularity Potential reach is unlimited Particularly valuable to follow (and be followed) by editors and online journalists/bloggers	Need to decide on an individual or firm voice and be consistent Requires ongoing monitoring to ensure fast response to tweets Creating a strategy for what is appropriate content for Twitter
YouTube and Vimeo	Video is the fastest-growing source of information on the web Ability to visually capture the personality, culture, and cool stories of a design firm Capability to set up a distinct channel for the firm and direct web traffic to and from it	Determining the level of video and studio production for the audience Keeping videos short enough for online viewer to stay with Choosing the right individual(s) to feature in on-camera roles
LinkedIn Groups	Ability to join and become a contributor to LinkedIn groups within a firm's client work sectors Ease of finding individual clients and decision makers, and ease of them finding the firm Ease of extending personal network and staying in touch with past clients	Assigning responsibility for tracking LinkedIn activity in key groups Following the high volume of updates and postings Educating all staff on how to use LinkedIn for business purposes
Company Blog	Ideal method of establishing and reinforcing thought leader position Ability to easily link audiences to blog from other social media Ease of posting video and images within blog Opportunity for comments and dialogue	Maintaining frequent postings to keep it from becoming a negative Keeping a consistent voice and style Avoiding all-about-us syndrome
Facebook	Ease of posting images and updates Large volume of users and interconnectivity across Facebook platform Potential home base for internal communications and info sharing among staff of firm	Better suited for consumer-based companies than professional services Need to monitor and quickly respond to messages Need to regularly update

Media Relations and Getting Published

Adoption of social media and access to social channels for self-publishing provides new depth to public relations. Regardless of their size, firms are in an era that offers many options for communicating their stories. Working with editors, reporters, and broadcasters to earn coverage in magazines, newspapers, and journals (and their online outlets) is an ongoing activity performed by the marketing team and firm principals, sometimes in collaboration with a public relations firm.

Earning coverage and building a relationship with the press requires two things: (1) a targeted approach to the media, and (2) a compelling story to tell. Here are four steps to take to increase success in gaining the respect and attention of the media.

Public Relations Planning

- *Start with two questions.* "Where are we looking to grow revenue in the next twelve to twenty-four months?" "Which markets are on the rise?" Focus the PR time there. Not only are editors more interested in growth sectors, there will simply be more stories and PR opportunities attached to any sector where clients are spending money.
- *Be selective.* Tie PR actions closely to marketing goals and objectives. Trying to cover too many areas—and trying to keep everyone happy at once—is nearly impossible.
- *Go beyond project PR.* Zero in on specific topic areas where the firm can show expertise. Editors are more interested in trends, topics, business change, and economic impact than they are in projects. Telling the "back" story behind the project success increases the odds.
- *Cross-pollinate.* When planning, take the opportunity to repackage the stories and topics developed for media outreach with social media publishing. The summary of the firm's best thinking on zero-energy buildings submitted to a client publication can be put to work right now as a blog post.

Targeting

- *Build a media list.* Contact information for target publications can often be found in the "About Us" or "Contact" pages of their websites. A better source is one of the commercial media directories. Like most other fields, journalism has a high rate of staff movement, so verify names, titles, and contact information using LinkedIn, Twitter, or web searches.

If the budget for purchasing a list is limited, check the local library to see if they have online access to a media directory. There are some free online resources, including Yahoo's media and news directory.

- *Review editorial calendars.* Each publication provides a calendar of the topics and feature sections they are planning to cover in each issue during the calendar year. Look for topics related to the firm's work and clients.
- *Read the magazines.* It sounds simple, but a frequent complaint of journalists is being sent pitches and news releases that are not related to what they cover. Take the time to learn how or where a story may (or may not) fit. Each magazine has its own philosophy for considering stories. They may have different slots within the publication: guest editorials, case studies, news sections, and feature pages.
- *Review past coverage on the topic.* Find out what reporter or editor writes on the firm's business or clients, and understand in advance the publication's expectations for article and author submissions. Take the time to learn how to fit the pitch into the unique needs of the target publication, broadcast outlet, or blog.

POPULAR MEDIA DIRECTORIES

Cision Media Directories: http://www.cision.com/.

Vocus: http://www.vocus.com/.

Yahoo Media Pages: http://dir.yahoo.com/News_and_Media.

Burrelle's Luce Media Directories: http://www.burrellesluce.com/.

The A/E/C Publicity Directory: http://www.fuessler.com/pub.html.

Gebbie All-in-One Directory: http://www.gebbie.com/.

Thomson Reuters MyMediaInfo: https://mymediainfo.com/index.html/.

Each publication has a unique purpose and focus, and most of their stories relate to that editorial focus. For example, *Urban Land* magazine covers development economics and commercial real estate trends throughout the world. A local retail project debut, unless it includes a first-ever application of a new idea, will not be relevant to their editor. It will be relevant to the community press outlets, however.

With any target publication, research whether a particular target publishes news release information, whether they accept contributed articles, how long the publication lead times are, etc. Of central importance is learning who among the editors, reporters, and broadcasters covers the particular beat/topic the firm is pitching.

Last, validate the research by finding out what publications the firm's clients read and follow online. Each market sector offers several trade and professional journals, association newsletters, online and print magazines, blogs, and news sites. Ask clients, and in-house client ambassadors, which publications are most read and respected.

Contacting the Media

Because so much of what journalists see from those who pitch them is poorly conceived and poorly targeted, taking time for due diligence will open up opportunities that others will likely miss. A thoughtful approach, informed by front end planning and targeting research, provides an enormous advantage when contacting the press.

When asked for advice for marketing professionals who want to land their firm on the pages of his monthly magazine, *ARCHITECT* editor-in-chief Ned Cramer was quick to suggest taking a deeper view: "We are obviously interested in design quality, but we are more interested in how a firm was able to achieve it. We like to see something remarkable on the process behind projects, the collaboration, technology and teamwork. How the architect arrived at the solution is more exciting than to just see the solution alone as an image. It's about the storytelling process, getting beneath the surface. Focus on the back story."

- *Calling vs. e-mailing*. Most daily journalists are under time pressures that make it difficult to spend a lot of time fielding calls. E-mail, perhaps followed by a brief call to see if the suggestion is appropriate, works well. Editors with monthly publications are more open to a phone call. Always ask up front if they have time for a brief conversation. If not, schedule another time with them for the call.
- *Brevity works best*. The volume of e-mails and phone messages editors receive can overwhelm their ability to review and respond. The best advice: get the message across quickly. If they are interested, there will be ample opportunity to send additional information. A well-composed paragraph or two, accompanied by a low-resolution photo, will in most cases provide enough information.
- *Try to build a relationship first*. Know their preferences and what they write about. Follow them on Twitter. Try to meet face-to-face. When talking with a journalist, ask for their advice on developing the story idea. Be patient—the topic may not fit their needs today, but may be perfect a few months later.
- *Be honest*. Identify potential problems up front. If client approval for publication will be slow in coming, or there is a community issue such as NIMBY, make sure the editor knows. Waiting to reveal bad news can jeopardize the current story, and undermine the goodwill needed to get the next story published.
- *Discuss expectations and exclusives*. If a story is being pitched to multiple publications, let the editor know. The weekly *Boston Business Journal* has little interest in a story that may land on the business pages of the daily *Boston Globe*. Most editors want to be the first with any story, so a candid discussion on exclusivity helps everyone.

Following Up

One of the questions most often asked about media relations is how to follow up on pitches and press releases sent via e-mail. While each situation presents a set of unique conditions depending on the relationship, there are some basic guidelines to follow.

Never call an editor and ask, "Did you get my press release?" If it didn't bounce back, they got it. With feature article pitches, a brief e-mail or phone call two to three weeks after sending the pitch is appropriate, and is a courtesy to the editor who may have lost track of the pitch. Keep the follow-up short, and acknowledge their busy schedule in all communications.

Do not conclude that there is zero interest just because there is no response. It may be simply a back burner topic for the target journalist at this time. Look to connect by phone or e-mail before drawing any conclusions.

If there is no interest, thank the editor for taking a look and ask what kind of stories he or she is seeking at this time. Asking questions is the absolute best PR tactic. If there is interest, learn what the ground rules are for publication. Do they need an exclusive? How likely is it that the firm and client will be named in the article? What do they need for images, and when?

TRANSLATING PROJECTS INTO COMPELLING STORIES

My uncle Bill knew how to tell a great story. His secret: an instinctive ability to zero in on precisely what his audience most wanted to know. By drawing you into the story and relating the narrative through your experience, he made it personal and memorable. These same skills can be put to work when we communicate about projects.

Keep in mind the one irrefutable fact about the projects you communicate in presentations, proposals, websites, and articles: The audience isn't necessarily interested in someone else's story. They are far more interested in their story. So we all need to be more like Uncle Bill and make it theirs by keeping it personal, brief, and entertaining.

Three suggestions to translate a project into an effective story:

- *Find the conflict.* At the heart of every famous story in literature is controversy. For design firms, the conflict is most often rooted in the overarching problem the client faced, the doubts about a proposed solution, or the risk faced by the team if a project failed. Solutions are only meaningful when the stakes are high.
- *Import the voice of the client.* Without the client's perspective, a project story is one-dimensional. It's me telling you what a great job I did. Use the client to elevate the urgency faced. Ask the client to say how your firm's accomplishment helped them improve their business, change their culture, or fulfill their larger mission.
- *Start at the end.* Instead of recounting the experience from initial engagement through project closeout, start with the outcome. "Here's what we learned on that project" is an inviting way to begin the conversation.

Design Awards

For design firms, winning awards positions the company as an innovator, expert, and problem solver. Awards for architecture advance the firm's design standing, differentiate, and foster recruitment. A coveted award win also boosts morale, thrills clients, and recognizes the often unheralded role of the architect in the success of a project.

But first the firm has to win. The first and most important action to take is to decide whether the award is winnable. A rational, researched go/no-go process is essential. It should be just as thorough as the one used to decide on project pursuits.

Scrutinize the criteria to make certain the project matches up and will earn high scores across the board. Look at last year's winners and compare them to the proposed entry. Will there be a single winner in each category or multiple winners recognized? Review the jury names if available. Are these jurors, based on their background, knowledge level, and pedigree, more or less likely to fall in love with the entry? Last, consider whether winning this particular award advances the strategy and standing of the firm. Would winning help the firm's business development efforts by increasing reputation?

If the award is winnable and fits a strategic purpose, it's time to get to work on creating the best award entry possible. Suggested approaches and actions that will help separate a firm's entry submission from the competition:

- *Find the big idea.* To rise above the competition, an award entry needs to answer one tough question. "Why should others care about this?" Start the process off by answering that inevitable jury question. Quiz the client about the value—the *real* value—that the design or team delivered. Identify and quantify all measurable benefits: to the community, to the environment, to the profession. Make sure the entry is memorable.
- *Reach out to insiders.* Talking with past jurors and past winners will offer valuable insights and help plan the approach and format. Ask for their advice on what makes the difference between winning and losing, and what mistakes should be avoided. Ask the sponsoring association staff or publication editors if it is possible to review past winning submissions. Most people are willing to help, but have to be asked.

▶ See the backgrounder accompanying this article, Commissioning Architectural Photography, for a detailed discussion of how to get great images.

▶ Qualifications, Proposals, and Interviews (6.5) addresses preparation for proposals and other competitive processes.

- *Invest in photography*. Great photography is often the most important factor in winning awards. Award competitions exist to provide compelling content for a magazine, or to enliven an awards dinner during an annual conference. Images help tell the story to the jury and to subsequent audiences, especially for complex planning, architecture, and construction outcomes. This is a visual age, and every contemporary audience is visually sophisticated.
- *Plug the gaps*. Every award entry has a weak link. It may be the graphics and the illustrations on hand. Often it's the writing to support the project's goal, big idea, obstacles overcome, and impact delivered. If the goal is to win, these weaknesses have to be addressed. Bring in graphic design, illustration, or communications help to work on the entry materials and plug the gaps.
- *Energize the "voice" of the entry*. Most award text is written like a history book. Though factual, this plain style of writing can be fatal in a jury room. If the entry reads the same as the others—with no distinct voice or differentiation—it's easy for the jury to dismiss it. Energize the package by using interesting quotes from clients, team members, end users, etc. Frame the message by providing some tangible research data or excerpting a news article supporting the firm's message. Use active verbs. Edit, rewrite, and polish until the piece comes to life.
- *Make it user-friendly*. Make it easy for any reviewer to quickly find and align entry responses to selection criteria. Draft a simulated score sheet based on the criteria provided in the call for entries. Leave plenty of white space, use inviting and elegant packaging, and introduce bright graphic elements as a navigation device throughout. Before submitting the entry, enlist an objective and trusted reviewer to test how effective and accessible it is.
- *Hire a proofreader*. Typos, font use errors, or grammar miscues can sink even the strongest entries.

One last word of caution: Start early. Allowing adequate time to strengthen the entry, polish the text, produce better visuals, and secure client quotes will often mean the difference between disappointment and celebration.

Marketing Communications and Promotion

Firm promotion encompasses an array of external communication formats, with the shared purpose of reaching a client audience to educate, inform, persuade, entertain, and inspire (see Table 6.6). These can be either analog or digital communications, or some combination of the two.

The goal with these campaigns should be to avoid the "all about us" trap and create promotions that tackle client issues, needs, and challenges. When based in the client's

TABLE 6.6 External Communication Formats

Promotion	Advantages	Challenges
Postcard mailers	Easy and inexpensive to produce Work well as a campaign series Less likely to be left unread in the recipient's inbox; simple to read Easy to track delivery rate through tracking returned cards	Message needs to be succinct Not a distinctive or memorable format in most cases; can be seen as bland No interactive component unless offering an incentive to reply
Client research and surveys	Multiple uses for acquired research; use across several channels and forums Effective with clients, especially in research-based sectors including education, health care, technology Opportunity to partner with clients on the research or at least as participants in the research	Commitment of time and careful thought into objectives and desired research findings Creating a survey or questionnaire tool that is long enough to capture meaningful data but short enough to encourage participation Choosing the best method for information gathering; building a sufficient size of the sample pool

Promotion	Advantages	Challenges
White paper	Works well for research and other substantial content Ability to format for digital viewing Ability to offer paper for download via the firm website; capture leads by having visitors sign in with contact information	Requires a big investment of time to research and write; needs research Frequently used format in B-to-B marketing; may be seen as a commodity
E-mail campaign	Easy to manage using e-mail services such as Emma, Constant Contact, MailChimp, and iContact Ability to segment clients into specific sectors and customize Integrates well with social media Efficient tracking of data via bounce-backs of e-mails sent	Most effective when focus is on the client's world and solutions offered; too often it's seen as spam because of a purely promotional message Need to have a quality list; list needs to be segmented by client type Campaign e-mails need to reflect a memorable theme or big idea to work
Brochure	Helpful overview for clients of firm capabilities and experience Ability to hand over impressive printed piece to client at a conference or after an interview Digital printing allows for small quantities to be printed	Often replicate the information on the company website Time-consuming to plan, design, and produce Can be of low value to client if the content and message is primarily about the firm and its projects
E-paper or e-book Market-specific brochure or book	Ability to combine images and text in a flexible, modular piece Opportunity to showcase a deep expertise with a particular building type, technology, or process Well suited to use across channels and easy for others to forward to colleagues Opportunity to team with clients on content within the piece	Requires a high standard of visual appeal and graphic impact Requires a deep knowledge base in the subject area; not the right tool for every firm

world and providing value to encourage a conversation or an opportunity, their effectiveness is clear.

SPEAKING TO CLIENT AUDIENCES

One of the most effective ways to prove expertise and expand reputation beyond the region is to speak in front of client audiences. In addition to the opportunity to impress a group of clients, the entire firm benefits by virtue of the selection to speak and its implied endorsement of the firm and the speaker on the program. Here are a few steps to increase the odds of selection as a conference speaker:

- *Find the right podium*. Conference organizers post a call for speakers on their websites anywhere from 6 to 12 months in advance. To research possible audiences for a topic or specialty area, an excellent search engine is available at www.asaenet.org. Maintained by the American Society of Association Executives, the site provides a searchable database of professional associations and trade groups by keyword. Click on the "Community" tab on the ASAE home page and select the "Gateway to Associations" option.
- *Nail the topic*. Once a target audience is selected, look at the conference theme and take the time to talk with conference organizers. Ask questions: What sessions drew the largest audiences last year? Do they have member data available to help identify topics? Are panel programs or lecture formats preferred? Ask if joining is required in order to be considered to speak. A little detective work goes a long way.
- *Present with a client.* Most client associations value the experience of the end user or owner, making chances for selection much greater when the client is part of the presentation. Teaming with a client will also offer an additional reason to spend time with a favorite client.

- *Stand out.* To rocket past the competing speaker proposals, the proposal has to sizzle. Picture the selection committee plowing through dozens of speaker applications. Use active verbs and lively descriptions that will translate to a powerful conference brochure or print mailer. Get help from the marketing team or copywriter to help the package and session summary stand out.
- *Go the extra mile*. Before submitting, enlist the help of a third party—a client or a colleague—to review the draft proposal. A candid opinion on the session's relevance to the target audience is helpful. Other ideas to elevate a proposal: Add an appendix with relevant news clips and published articles on the subject or project; if available, include testimonial letters verifying speaking skills.

ADVERTISING

For design firms seeking to influence a broader audience or enter a new geographic market, intelligent use of advertising can advance marketing and sales objectives. By adopting a smart ad strategy, and communicating a firm's distinct value through a well-conceived message, advertising can be a good investment.

Given the high cost, firms should have a clear objective and strategy behind any ad buy. Resist purchasing ads in response to a one-time bargain opportunity, or as a reaction to what competitors are doing. The key to advertising strategy is to be highly selective in choosing the outlet. Once selected, stick with it and repeat ads as frequently as possible to achieve the highest impact. One-time ads are easily forgotten; to be effective, repetition is key. Be strategic and follow a few lessons learned by others:

- Before committing, make sure the ad placement aligns with growth objectives for the target audience. It is better to focus on the so-called "vertical" ad vehicles—the trade and professional publications with a verifiable readership consisting of real clients and prospects. Resist the temptation to display ads in more "horizontal" publications, which reach people who are not in a position to hire or recommend architects.
- With the competition for advertisers greater now than ever, look for an ad placement that offers value-added benefits beyond just the ad itself. Keep in mind that publishers and client associations are producing trade shows, hosting awards programs, maintaining high-volume websites, and managing subscriber or member databases. This valuable mix of products and services allows the potential advertiser to be creative in negotiating a partnership deal as part of the ad contract.
- Underwriting in partnership with the local public radio station can be helpful in reaching decision makers and keeping the firm name front and center with a large audience of existing and past clients.

COMMUNICATING IN SPECIAL SITUATIONS

The flip side to ongoing and planned communications is the special or often unexpected event requiring outreach to clients, employees, and the public. Although it is difficult to prepare for every potential circumstance, some thought and scenario planning can be helpful.

- *Crisis communications*. Events from natural disasters taking down office operations to an incident of workplace violence can overwhelm even the most experienced company. The best defense against being caught unprepared is to develop a crisis communications plan that covers a number of potential scenarios: accidents, lawsuits, negative press, employee wrongdoing, and others. An important element of the plan is a clear chain of communication to quickly put the key firm leadership in touch with each other and with staff. Assigning a single point of contact for communicating with the press, and having a playbook for that response, is crucial.
- *Mergers and acquisitions.* Even though mergers and acquisitions have a far greater lead time than other events in this group, the risk of miscommunication is high. A plan for communicating the merger, including exact language on the impact on employees,

the continuing operations and service for clients, and the plan for any change in name, needs to be carefully worked out and agreed upon by the two parties. A news release and internal announcement, prepared in advance and containing the facts of the merger or acquisition, is a key part of this planning. Anticipate every possible question that a reporter, client, or employee could ask, and prepare the answers in advance.

- *Firm omitted from story on project design or construction*. This familiar scenario is repeated all too often in the mainstream and business press. Unfortunately, the name of the architect is frequently omitted from a new project story, even when one of the firm's renderings is used as the lead visual in the story. And once the story is published, there is little a firm can do to correct the oversight. One option is to write a letter to the editor, not to complain but to praise. Compliment the coverage of the project, mention something else of interest that was not in the story, and identify the project design team. The best action is to try to prevent the omission from happening before anything is published. Include a clause in the client contract that any use of project renderings and images be credited. Talk with the client in advance of any project milestone, and ask that they include the firm in any of their press releases and announcements. Do the same with the builder and other project team members, and pledge to include them in return.
- *Negative review of design work*. Whether appearing in the metro daily newspaper or in an online blog, the negative review is a painful and unexpected jolt. Deciding on whether to respond will be based on what the criticism is, whether the review information is correct or not, and how damaging the review is to the reputation and integrity of the firm. A letter to the editor (in the case of traditional media) will help to correct any errors or misconstrued reports in the review. A reply to an online review, pointing out anything that was missed or incorrectly stated, can help to mitigate the damage. Two things to keep in mind: Never counter a bad review by saying the design was what the client asked for. Maintaining loyalty to the client, even if the criticism is aimed at something they insisted on, is essential. Second, realize that there are times when it's best to stay silent, and let others debate the design. Some of the best architecture ever built was met with harsh reviews when first seen.

CONCLUSION

Design practices are built on reputation. For architects, the value of communications and public relations is to strengthen professional reputation and advance a relationship with existing and prospective clients. A thoughtful, consistent communications effort accomplishes this by informing, educating, and inspiring. The mission is to convert audiences to clients.

It takes an investment of time and resources to be successful in this mission. When starting or restarting a communications initiative, avoid trying to accomplish too many actions at once. Start with practical and affordable first steps. Choose areas best suited to the firm's strengths, and best matched with the clients the firm needs to reach.

By focusing the activity and measuring results, the firm will gain experience and prepare for even more success at the next level of engagement. As everyone in the design profession knows, great achievement starts with taking that first imaginative step.

For More Information

Society for Marketing Professional Services: http://www.smps.org/.
American Marketing Association: http://www.marketingpower.com.
Public Relations Society of America: http://www.prsa.org.
Hubspot Marketing Resoures Center: http://www.hubspot.com/marketing-resources/.
Collapse of Distinction: Stand Out and Move Up While Your Competition Fails (Thomas Nelson, 2009) by Scott McKain.
Positioning for Architecture Design Firms (Wiley, 2011) by Jack Reigle.
The New Rules of Marketing and PR: How to Use Social Media, Online Video, Mobile Applications, Blogs, News Releases, and Viral Marketing to Reach Buyers Directly (Wiley, 2011) by David Meerman Scott.

BACKGROUNDER

COMMISSIONING ARCHITECTURAL PHOTOGRAPHY: COMMUNICATING (VISUAL) VALUE

David Seide

This backgrounder will inform the architect about how to select a photographer. It will review the nuts and bolts of how an assignment estimate is formulated, including some possible cost controlling options. Finally, it will begin to suggest possible working scenarios in light of new technologies and collaborative possibilities.

Originally from Niagara Falls, New York, David Seide combines his degree in architecture from the University of Illinois with his passion for photography. His Chicago studio, Defined Space, creates distinct images of architecture that represent his clients' conceptual designs.

Shy of actually visiting a site, photography (and more recently videography) is a primary means of perceiving a place and defining what we know of it.

SELECTING A PROFESSIONAL PHOTOGRAPHER

Know Thyself

The approach to finding and commissioning a photographer is the same as for finding an ideal client. Since the photographer will be visually representing and communicating the firm's expertise, aim to hire based on what the firm represents—its identity, mission, values, and goals.

Identify Needs and Objectives

Identify what the firm wishes to accomplish with the photographs and what will be considered a "successful" photography assignment.

These goals should be in sync with the firm's communication plan. Think about how (on a mobile device, in print, etc.) and where (in an office, on the fly, etc.) the photographs will be viewed, and who the audience (potential clients, peers, etc.) will be. Strategically plan the objectives to be achieved.

A great photograph is one that's not only beautiful aesthetically but also illustrates the conceptual intent of the design. If the photographer and the firm are in sync, this quality will be evident within every photograph. A haunting example of this can be seen in Figure 6.2, a photograph of the entry to the Illinois Holocaust Museum & Education Center (designed by Stanley Tigerman) as a "guard" is directing a "visitor."

Consider Approach

Most photographers have a specific approach they prefer to follow. Some will jump right in, while others may want a meeting, a walk-through, or some time to "scout." Finding someone who "gets you" and is in tune with the firm's modus operandi is the foundation for a successful relationship. The variables that will need to be considered include experience, style, cost, and chemistry.

David Seide/DefinedSpace.com

FIGURE 6.2 Entry to the Illinois Holocaust Museum & Education Center, Skokie, Illinois

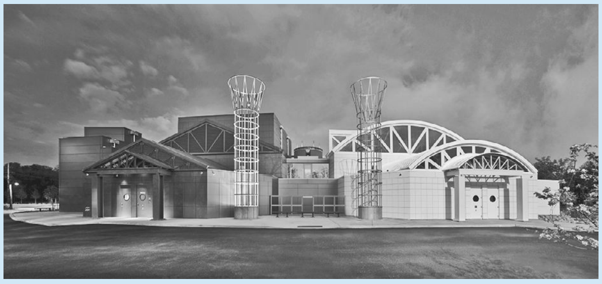
Visual Communication

Each visual representation should elucidate the project, help define the firm's identity, and position the firm's brand.

An example, shown in Figure 6.3, of the Illinois Holocaust Museum & Education Center combines three different photographs (from three different days, times, and weather conditions) to tell a unique story of that place. By combining a dusk (left) with an early morning (middle) and a bright sunny day (right), the photocomposition tells a complete narrative in one image.

Research the Candidates and Commission a Photographer

Just as each architecture firm is unique, so too are photographers. Look for someone who has the technical skills, creative capacity, and business acumen to do the job. Ask about their experience. Get a sense of their passion and enthusiasm for the assignment. Review their website or portfolio. Meet them in person.



David Seide/DefinedSpace.com

FIGURE 6.3 IHMEC Cover

ESTABLISHING THE ASSIGNMENT PARAMETERS

Assignment Description

Start by identifying the site location; a site plan can be very helpful. Next, describe the project. Is it new construction, a rehab, or an addition?

Specify the quantity of photographs to receive: exteriors, interiors, and perhaps aerials. It is helpful to supply floor plans and any sketches or renderings, so that the photographer can visualize the setting.

Time Frame

It's always best to plan for photography well in advance. The photographer will take into account not only the ideal time of day but also the most opportune time of year.

Budget and Controlling Costs

It's best to view photography as an investment instead of an expense. Still, cost is often a factor, and the most obvious means of controlling cost is by keeping the number of views as few as possible. A scout of the project often helps accomplish this—spend some time in and around the site, scoping out vantage points, looking at compositional elements, and taking into account the design solutions that were used to achieve the concepts and goals of the project. The images that come out of the scout can be discussed, tweaked, and consolidated into a final list. This efficient plan of attack crystallizes the focus of an assignment and allows the photographs to tell a complete and succinct story. Keep in mind that "photography by the pound" or a shotgun approach often waters down the story. The Miesian philosophy "less is more" holds true for photography.

From owner to architect, contractors to consultants, product manufacturers to suppliers, everyone will want use of the photographs. By sharing the costs of a photographic assignment, expenses can be spread out, making it less expensive for all those that participate.

LICENSING AND RIGHTS GRANTED (AKA COPYRIGHT)

Much like an architect's drawings, a photographer's images are considered intellectual property and are protected by copyright. The value of each photograph is commensurate with the value it brings to the user.

Pricing a License

To use a photograph, one must be granted a right to its copyright (limited or otherwise) in the form of a license. Photographers consider the following factors when calculating a licensing fee:

- *Category*: how it will be used (editorial, commercially, etc.)
- *Placement*: where it will be used (in print, online, etc.)
- *Frequency*: how often will it be seen (quantity of press run or page hits)
- *Duration*: how long will it be used (once, monthly, yearly, in an archive)

Most architectural photography licenses include a "rights package" or "bundle of rights." A good resource to further understand this is the Picture Licensing Universal System (PLUS).

Traditionally, design firms want to use the photographs for the following:

- *Trade collateral*: brochures, direct mail campaigns, leave-behinds
- *Corporate communications*: portfolios, A/V presentations, trade show displays, annual reports, newsletters, wall décor
- *In-house desktop publishing*
- *Public relations*: corporate promotion, press kits, design competitions
- *Electronic*: home website

Work with the photographer to establish a boilerplate of rights (license) that works best for the firm.

Usage: Traditional (Portfolio), Social Media, Editorial

What was once a print portfolio has evolved into electronic formats viewed around the world on handheld devices, social networking sites, and industry-related news outlets. Traditionally, rights for using photographs for promotion (a firm's Facebook or LinkedIn page) are included. However, sharing sites such as Photobucket, Twitter, FlickR, or YouTube are typically not included. Read each site's terms of service to be certain of user rights. Rights to use photographs by a third party are also typically not included. Photographs cannot be duplicated without the photographer's permission or authority. Third parties can (legally) be included in the estimate before the photography commences or afterward and license their use as stock.

Editorial use continues to be a touchy subject. The publication knows that both the firm and the photographer want to get published. However, neither a photographer nor an architect should be expected to subsidize a for-profit publication.

Creative Negotiating: "Elegant Options"

If budgets are crunched, try to identify shared interests and work together for mutual gain. Look for alternatives that offer value but are not necessarily money-based (e.g., additional work, web links, print overages, trade of services, etc.). Use creative problem-solving skills to come up with elegant options.

Photo Credit or Attribution

Just as architects like their firm to be mentioned when a building is referenced, so, too, do photographers want their work to be recognized. It is important for attribution to be present.

(continued)

The Fine Print (Terms and Conditions)

Read these carefully, as they are set up to safeguard both the client and the photographer. If unclear about certain terminology or if you wish to have something changed, be sure to discuss these issues before photography commences. Many items can be negotiated.

One item of note is client representation: The client is responsible for sending an authorized representative to the assignment. If no representative is present, the client must accept the photographer's interpretation as to the execution of the photography.

NEW OR VALUE-ADDED SERVICES

Certain viewing technologies are developing in parallel with construction techniques, and we are beginning to see them used. For buildings with moving parts (for example, retractable roofs or weather/light-sensitive skins), video is a natural medium. A skilled photographer may be able to produce clips that can add even more visual interest or understanding to the project, website, or digital portfolio. Incorporating these in a multimedia presentation can have a huge "wow" factor when pitching new business or showcasing a particular project. The production expenses for a video assignment can be considerable, but so can the payoff.

For More Information

American Society of Media Photographers (ASMP) "Find a Photographer" site: http://www.findaphotographer.org.

"Preparing for Professional Photography—A Checklist" contributed by ASMP to AIA Best Practices: http://asmp.org/pdfs/Best_Practices/aiap016443.pdf.

Picture Licensing Universal System (PLUS): http://www.useplus.com/index.asp.

6.4 Networking and Business Development

Karen Compton, CPSM

Networking transcends relationship development and seeks to create a level of trust among prospects, clients, and business partners. This section correlates the firm's business development (sales) plan to networking responsibilities each person has within the organization and explains how to measure the firm's return on investment for these efforts.

INTRODUCTION

Networking is the most direct and effective means of developing business in the twenty-first-century economy. Yet it is the least understood and practiced tool of the design and construction industry. Most view networking as the dreaded task of talking to people about what work they have coming up. The truth is that effective networking is born out of a greater understanding of purpose. It is based on a clear definition of one's business goals, sales (revenue) needs, and the roles and responsibilities each organizational member plays in reaching them.

In fact, networking is a tool much like advertising, conference attendance, or publications, used to further advance a business objective or sales strategy. Without a clear sales plan, it is difficult to select the right tool to achieve the objective, leaving many to question the value of networking. This is often the case as receipts for meals, receptions, and conference events mount with no resultant new work or increase in potential for defined project opportunities.

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Without a clearly defined sales plan to support business objectives, networking is little more than business-financed socializing. What, then, is a sales plan? And, more important, how does networking support sales plan objectives?

ESSENTIAL ELEMENTS OF THE SALES PLAN

The basic sales plan has four essential elements:

- Sales goals
- Competitive analysis
- Market analysis (economics of the markets served)
- Marketing/communications plan

Sales Goals

It is insufficient to say, "We must win work." The vague imperative begs the questions, "How will we win work?" "When do we need to win the work?" and "Where will we go to define the work?" More important, it dooms business development/marketing efforts to failure, as it offers no clarity as to how success or failure will be measured. Sales goals, also referred to as business development goals, must set in "SMART" terms. SMART stands for "Specific, Measurable, Achievable, Realistic, and Timely." These attributes provide those supporting business development/sales with an understanding of the desired outcomes and how they will be measured.

Specific

Specific sales goals are those that seek to define a project type or project opportunity within a specific market sector. An example of a specific project goal would be a new 30,000 square foot (sf) classroom building or a 35,000 sf classroom remodel for ABC City College. Although some may argue that this is often difficult to do, having specific goals will facilitate effective networking.

Whether developing business from new client sources or from new opportunities with an existing client base, it is important to make the distinction between a prospect and a target. Many focus their networking efforts on prospects—clients that may have future work that can potentially be acquired and thereby generate revenue. By concentrating networking efforts on prospects, significant business development costs may be incurred with very little return on investment earned for the effort. Effective networking puts attention on *targets*: specific project types (i.e., classrooms, corporate yards, or utility infrastructure). By focusing networking efforts on targets, business development/sales efforts can develop questions and gather information critical to winning a specific project.

Measureable

Quantifiable goals are those that enable measurement of the outcome of a business development effort: for example, a new 30,000 square foot classroom building with a gross fee of $535,000 or a 35,000 square foot classroom remodel for ABC City College with a gross fee of $585,000.

Achievable

Specific goals must be within the size, scope, and capabilities of a given firm. That is not to say that a firm cannot reach to pursue larger and more complex projects. However, networking is effective when it concentrates discussions and pursues information on specific projects that are achievable. In the competitive industry of design and construction, few clients and colleagues want to waste time discussing or exchanging information on projects that exceed a firm's capabilities.

Realistic

There is nothing less motivating than establishing a sales goal that is unrealistic. Technical professionals such as architects, job captains, and project managers want their networking and sales development efforts to be successful. Setting unrealistic goals (i.e., $2,000,000 per year in new fees when the firm has never grossed more than $1,000,000 in a year) is not only unrealistic; it is demoralizing when the goal is not achieved.

Timely

Sales goals must have a timeline in order to support a firm's business objectives. Timeliness may be expressed in terms of month, quarter, or year. For example, a firm that requires $250,000 per month to meet payroll or $350,000 per month to achieve profitability needs to meet sales objectives on a monthly basis. Time parameters do more than provide a constructive basis for networking. Time frames provide a means of accountability by and between those involved in sales/business development and the achievement of the sales objective.

The concept of SMART goals is applicable to the pursuit of new sales as well as existing client sales and is an effective means of engaging other leaders (e.g., project managers, technical professionals) in the process of sales and business development.

Competitive Analysis

While information about the competition is readily available online—their size, services, and expertise—nothing substitutes for secondary research (questions and feedback) on users or clients. The ability to win work is directly proportionate to the amount of information available to develop a proposal and prepare for an interview. While networking is critical to gathering information, its usefulness is not limited to projects. Networking can also be critical to understanding the competition.

The objective is to understand the competition in a way that a firm would know itself, to improve proposals and project delivery. These are questions best asked of clients and others who have worked with the competition. In the pursuit of this type of knowledge, an adversarial posture will inhibit the free flow of information. It is imperative to listen and learn, not to defend or become combative. These are some effective open-ended questions:

- "I notice you've used XYZ firm. I'd like to understand what you feel they do well?"
- "We'd like to be able to add value, where do you see they are able to add value?"
- "Do you perceive that they have strength in a particular area?"

Market Analysis

It is important to understand the economics of a market sector. This information paints a picture of the sectors' available funds and level of interest in investing in design and construction. While terms like the "Billing Index" and GDP are all terms associated with the macro-economy, it is the micro-economy that is a direct indicator of architectural firms. Sources of information such as local economic development corporations, annual reports, capital improvement plans, and programs for institutions, legislative allocation, or bond funding all give rise to a clearer picture of how a market sector such as education, health care, or housing may behave.

But even these sources grow stagnant, once printed. Peer-to-peer networking about the market, its behavior, and trends gives clarity of direction. This must extend beyond "How's it going?" and "Are you guys busy?" conversations. For a firm to thrive, it must note the presence of funding and investment available for clients to make a decision to engage an architect.

Marketing/Communications Plan

Having identified sales goals and having understood the competition and the market in which the firm operates, the Marketing Communications Plan serves as the vehicle to tie those elements together. It defines what types of activities the firm will undertake and how it will use data and information previously analyzed. A typical plan includes the following:

- Win-loss data
- Market sector priorities
- Roles and responsibilities
- Conferences
- Public relations
- Advertising
- Budget

Win-Loss Data

Many firms track their "hit rate." The "hit rate" can be expressed as the number of proposal pursuits won relative to the number of total pursuits. While many firms do this type of analysis, they stop short of looking at other key performance indicators (KPIs), such as the number of proposal pursuits short-listed relative to the number won; and the number of proposal pursuits interviewed relative to the number won. Each expression tells a different story. A low percentage of proposal pursuits short-listed suggests that the written document is not competitive and should be reevaluated for its ability to craft a compelling story. A low percentage of proposal pursuits resulting in an interview relative to the total suggest that the interview skills of the team should be reevaluated.

Market Sector Priorities

While there are firms that claim to be able to service 13 market sectors, all equally well, the truth is that none of us are equally good at all things. Therefore, it is necessary to be honest about what a firm is good at, and utilize time wisely. There is only so much time in a day. Rank the markets the firm services from 1 to 10 based on experience, portfolio, staff, and references. If references are weak or poor due to a past performance issue, address this and shift priorities and networking strategy. Pursuing all markets is likely to waste valuable time.

Roles/Responsibilities

Accountability. Everyone wants it. No one wants to be part of it. But here is where it all comes together. *Who* has the responsibility for certain client types or client relationships is just as important as *what* they are to do. Both must be defined. More important, everyone must agree to the rules of engagement before the game. What is each person accountable for? Leaders within organizations have varying roles involving new sales. The best practice is to agree on these roles upfront. Will the partners look at only what a person brings in the door as new work? Or will they look at new relationships or new contacts? Finally, there has to be someone who directs the game. While everyone can play, there can only be one coach. Therefore, one person must be responsible for knowing everyone's roles and responsibilities, and have the authority to hold them accountable for achievement.

Conferences

Distinguish between continuing education conferences and networking opportunities. A room dominated by professional peers is likely to be for continuing education or a nice cocktail party. A room dominated by potential clients is likely to be for networking. Here are the conference rules:

- Identify conferences and events that clients from the firm's market sector(s) attend.
- Identify workshop topics or sessions that they are likely to attend and attend those, as an opportunity to network.
- Limit booth participation so that it is possible to network throughout the conference. An unmanned booth is deadly, but a staffed booth is costly if clients don't come by.
- Know who is attending the conference before going. Get a conference attendee list and identify key people to meet for achievement of sales goals.

▶ Public Relations and Communications (6.3) addresses the specifics of public relations, including the total communications plan, website content and design, social media communication, media relations, and advertising.

Public Relations

Most firms can't afford or don't have public or media relations. This is the function that controls the firm's messaging to the mainstream (i.e., print and social media). Public relations are not to be undertaken lightly. Skills and expertise, as well as relationships in this field, are unique to the media and print world. That being said, if a practice is able to afford a public relations company, the PR professionals must have a copy of the firm's business development and networking plan. This is necessary in order for them to develop a consistent and cogent message about the firm's business goals and objectives, as well as its design work. As part of the marketing and communications plan it is important to state goals, objectives, targets, and cost.

Advertising

Like public relations, advertising isn't something that many firms can afford. Advertising takes many forms (e.g., conference booths, trade publications, and display ads). It is important to understand the goal of the advertisement. Most ads are designed to heighten awareness, not increase sales. That said, it is important to view this tool as a small arrow in the quiver and not the bow itself.

Budget

For each of these tools, develop a zero-based budget. A zero-based budget is one in which each line item must be justified and allocated. It is not a carryover from the previous year with an "escalation" for the cost of living. Rather, it is a thoughtful analysis of the funds needed to accomplish each line item in the marketing/communications plan. More important, it should reflect a reconciliation of what is needed (zero-based) versus what funds are available. For most of us, the budget required rarely meets the budget we have. That said, the budget should reflect the trade-offs (compromises) of the budget plan.

TRUST AND THE PURSUIT OF NETWORKING

While professional networking goals are often based on finding out about a particular project opportunity, the ability to achieve that objective requires developing trust. Networking must be done with the sincere effort to first identify the client's needs, issues, and concerns; then to ascertain where, if at all, a firm fits within the context of addressing those needs. Developing trust takes time and, as a result, so does networking. Some best practices to help build trust with potential clients and with peer-to-peer associates:

- *Extend beyond oneself*. Trust begins with putting others first. Open and direct communication, be it peer-to-peer or professional-to-client, begins with an understanding of what challenges and opportunities are being faced. In some cases, those issues are facility- or building-related. That might lead to an opportunity to build trust by offering knowledge or a resource that could help.
- *Share information*. Effective networkers share knowledge freely and openly with others who require the information. This practice is comparable to making bank deposits. Sharing information is like depositing credits into a bank account. Making a withdrawal at some later point is possible because there are credits upon which to draw. At the time a deposit is made, it may be unclear when the withdrawal will be required. When information and knowledge are shared and "deposits" made with many individuals and a broad spectrum of professionals (in, out, or tangential to the industry), timely, significant, and meaningful "withdrawals" are available at a future date.
- *Be credible*. Although networking is perceived as the ability to connect with people and engage, its success hinges on credibility. To network effectively, demonstrate expertise, but also be conversant in subjects that interest other people. This is not a one-sided approach. People network with those whom they consider to have valuable and credible information, so develop and maintain a professional knowledge base while simultaneously gaining knowledge of others' practices and businesses.

- *Have integrity*. Such a simple word, but it is *the* cornerstone of relationship management and development. It begins with a simple idea: Keep promises made and respect the confidentiality of information shared. If an information source is confidential or sensitive, guard it with fortitude. In addition, and equally as important, be responsive to those who reach out for information. It is critical that we respond to colleagues and peers' requests for information in a timely manner. For principals and partners this is often difficult but still important. Timely response is key to establishing integrity in the marketplace.
- *Listen, don't speak*. The final tenet of trust building is listening. It is a true fact that if the mouth is engaged the ears don't hear. Those who network want to speak, but they also want to be heard. Those who listen are often the ones whom clients and peers trust most. Ask questions and seek clarification in the pursuit of a personable engagement between two individuals.

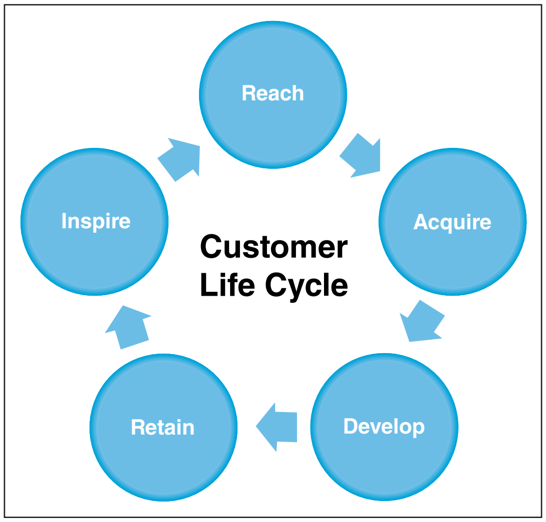
If the objective of networking is to develop trust and good relationships, not just to find project opportunities, then participation will not be perceived as one-sided. The resultant networking will be more effective. However, it is often difficult for the principal(s) or the partner(s) to be the sole networkers for their firm. The role and responsibility of networking can and must be shared and distributed throughout the organization.

MULTILEVEL MARKETING

Introduced in the 1960s through product-based retailers such as Amway and AVON, multilevel marketing is the process of expanding a sales force by developing and creating a "down line" of individuals to foster relationships at various levels within an organization. In its full concept, multilevel marketing (MLM) extends compensation and rewards to "down-line" team members through a hierarchy of compensation.

On its surface, MLM is the means by which most architecture firms develop work. Technical and/or business development staffs are tasked with developing trust-based relationships at various levels within a potential client group or organization (see Figure 6.4).

The most effective efforts are those in which staff work across peer-to-peer lines to establish relationships and open lines of communication. In this scenario, firm leaders (e.g., partners, principals) are tasked with developing relationships and networking with different levels of individual than midlevel staff persons (e.g., designers, architects, and job captains). People are most comfortable in engaging with people who are most like them. It may be intimidating for a project architect to engage with a campus president or the executive of a major corporation. Their knowledge base and perspectives about design and delivery may be widely different.



Karen Compton

FIGURE 6.4 Client Life Cycle

PART 2: FIRM MANAGEMENT

To be effective at MLM, one must first understand the client life cycle. The client life cycle consists of four phases:

- *Reach*. Reach seeks to expand beyond the core of a firm and utilize individuals to reach its clients through a personal network of colleagues, friends, and associates. In architecture practices, project architects, managers, administrators, and interns are used in this way. However, most stop short of developing a cohesive strategy that pairs individuals with their client equivalents. As a result, many struggle to develop both business and trust relationships and are eventually viewed as "unsuccessful."
- *Acquire*. This is the second and perhaps most important phase. Many have misinterpreted this step as acquiring business, but that comes much later. This acquisition is of knowledge—knowledge of the client's business, *not* just their project issues. Many invest an inordinate amount of time in understanding the client's *project* needs but stop short before seeking to understand the client's business: what they do, how they do it, and where the challenges and opportunities are to improve it. Instead, the focus is on the "solution" and the "idea" without truly understanding the client's problem—lack of funding, low enrollment, etc. As design professionals, it is important to seek understanding of trends, demographics, and legislation that might affect clients. This will help to achieve the ultimate reward: trust.
- *Develop*. Developing a network of peers, colleagues, and cohorts is something that requires an investment of time. Enduring relationships are built over time and with a commitment to remain in contact even where there is no real and present need.
- *Retain*. Finally, retention is key to not just a long-lasting network but a deep one. It is not uncommon to lose track of people when they leave employers and to become dismissive of lower-level staff when they leave an office or institution. Be aware that today's staff person is likely to be tomorrow's leader; and yesterday's colleague is often tomorrow's decision maker. The client life cycle values relationships at all levels.

Most architects entered design school because of love for the creative process and its output, not because of a passion for networking. As a result, it is important to structure preliminary networking activities with respect to the levels at which staff (technical, mid-management, and principal) are able to engage. This is particularly important for firms seeking to develop their midlevel managers as future firm leaders. Networking objectives must be structured for success. If not, the perceived failure in relationship management, trust building, and networking will result in disengaged staff.

DEVELOPING CLIENT INTELLIGENCE: STEINBERG ARCHITECTS

In 2004, California-based Steinberg Architects had two offices—one in northern and the other in southern California. As a midsize architecture practice, at the time, the northern California office had 40+ staff, and the newer office in southern California had a small team of 10 and a goal to develop a presence in the region.

The firm's experience had historically been in the K–12 schools and housing, but California was preparing to do a significant number of community college projects, and the firm saw the opportunity to leverage its K–12 experience into community college work. The question became, "How?" The firm set out to define a client-specific plan for community college work. The projects would be financed through bond sales at the community college district level. While previous bond sales had been through the state, the fact that bond sales would be authorized at the local level shifted decision making to local jurisdictions.

Based on that information, the firm's business development consultant sought to identify specific community colleges that had project types that complemented the work the firm had done in the K–12 field. While there were a diverse number of building types (e.g., gyms, classrooms, student services buildings), the firm settled on the primary pursuit of classroom and gymnasium facilities. Moreover, the consultant identified a service area that would focus the firm's efforts.

Working with the firm principals, a specific goal was set: to secure two new classroom buildings with a minimal fee from within the largest community college district within southern California. Each of the office principals was given the task of developing, establishing, or leveraging relationships with college presidents and user-group staff. The business development consultant was tasked with developing relationships with facilities managers, O&M directors, and business managers in order to develop a rounded and high-level understanding of the college and the facility issues. The division of roles and responsibilities under this scenario mirrored the structure of MLM.

Where were these client-related people to be found? Through a network. The business development consultant contacted engineers, contractors, and other design associates known to have done work in the education area and asked questions about the decision makers, issues, and challenges associated with each of the targeted campuses. In some cases, no one knew anything, and in other instances, colleagues knew details of what the challenges were on campus, the decision-making group(s), and what the topic(s) of conversation should be focused on when meeting opportunities arose. They provided valuable anecdotal information relative to the competition and key to the campus and its decision-making base.

In the fall of 2004, the firm participated in two targeted community college conferences aimed at facilities managers and presidents in an attempt to better understand governance, decision making, bond funding, and needs and challenges the campus faced in their lack of understanding about the design, construction, and management process. They were not there as presenters; rather they were there in an attempt to understand the client's core business to offer specific solutions. This incubator-setting of clients served as the backdrop for firms seeking and sharing information about campus facility developments and opportunities.

Armed with a division of roles and responsibilities, and an understanding of the competition, campus issues, and process, the business development consultant and office principals went on to set client-specific meetings to discuss what they had learned and to ask project-specific questions in anticipation of an RFP expected in the winter of the following year.

Although unsuccessful in its first attempts at community college work, the firm did go on to propose and secure its first classroom building project in 2005. Their proposals and interviews reflected an intimate understanding of the governance and finance processes, and deep understanding of the campus's issues and challenges, not just from a facility point of view but also from a service delivery point of view. Winning submissions would later show campuses how the firm could increase efficiency, enrollment, and capacity, aspects that were not addressed in the RFP document issued by the campus but were critical to the campus's core business.

TEAMING, ALLIANCES, AND PARTNERSHIPS

As previously stated, networking extends beyond identifying a specific project opportunity and exchanging information relative to that project. Networking encompasses the need to identify and develop trusted associates with whom work can be shared. Teaming is one common scenario, with the Design Architect/Executive Architect relationship a prime example. Under this setup, the relationship develops in response to a particular project and is identified as a team. The "team" is usually an outgrowth of the acknowledged constraints and opportunities of a project, such as the location of the site relative to each party, or of the strengths and weaknesses of each team member.

Alliances take a slightly different shape. Alliances are often the result of two firms that come together on a short-term basis or in response to a particular project or building type. The relationship is often seen as mutually exclusive between two firms, and can provide benefits to the client that may not be realized through a team association. A common example of an alliance is that between a funding source (such as a public-private partnership) and a design builder, who together are able to provide a comprehensive turnkey solution.

Partnerships often, but not always, take a legal configuration. Like alliances, partnerships often provide clients with benefits that may not be realized through a teaming association. Under such configurations, architects, clients, and other associates might share in the financial or performance risk and reward of a project.

A working knowledge of these terms and conditions is important in the development of a network. Networking or relationship building extends to the pursuit of partners and associates with which to execute projects and deliver service. It is important to understand the difference in arrangements or association and to understand the business of potential partners. This is often referred to as Business-to-Business (B2B) networking.

▶ Project Team Agreements (17.2) and Small-Firm Collaboration (5.7) further discuss teaming and other collaborative arrangements.

The goals and objectives of B2B networking are slightly different from Business to Client (B2C) networking. Through B2B networking, the objective is to:

Discuss, if given the right opportunity, how two firms might work together. Whether choosing to be team members, alliance partners, a legal joint venture, or any other structure, the arrangement is nothing more than a by-product of a common understanding. Informative discussions that spring from networking opportunities should take place absent the pressure of an RFP or RFQ response. When facing a deadline, it is often challenging to think clearly about the division of work, the sharing of risk, the strengths (and weaknesses) of each firm's staff, and the relationship with similar or complementary client bases.

Develop a mutual understanding of each firm's portfolio and strengths. Dynamic shifts in the national and construction industry economy can lead enemies to become "frenemies." Under such conditions, firms should be willing to explore what might be gained by an alliance with another firm to broaden those strengths and deepen the value of the portfolio. This discussion, however, must transcend each party's self-interest and view the association through the eye of the client. Clients are becoming more sophisticated in their view of the design industry. They look at teams and alliances through a narrower lens than practicing professionals. That lens looks at the value they as the client gain, the cost that they save, and the risk that they mitigate. B2B discussions must be able to answer those questions.

Explore project synergies. Rarely does a client need a bigger horse—meaning two firms coming together that do the same type of work and provide the same level of service. Often a client needs and values a horse of a different color—meaning two firms that serve the same markets but provide different or complementary services. One example might be programming expertise matched with excellence in architectural design. Another could be a team that leverages expertise in design of a certain building type into another sector, such as a military housing firm that may want to enter the student housing market. Both scenarios are viable and should be fully explored in any B2B discussion.

B2C networking has a different set of objectives. Under B2C networking, the goals are to:

Understand a client's business challenges. This is Rule #1. Before the firm can help someone, it must first understand the challenges—not only from a facility stand point but also from a business standpoint (i.e., funding, politics, governance, etc.) In asking clients about their business challenges or problems, accept that being able to solve all of them is unlikely. However, an effective B2B networker will be able to provide a cadre of resources in other business or practice areas such as banking, legal, or real estate to address concerns and problems. Remember, this isn't about finding opportunities, it's about building trust.

Deliver. Rule #2 is simple: Deliver on the promise to find a resource(s), to tap into a network of friends, colleagues, and associates to find the right answer, or put the client on a path to resolution. While the goal, as firms, is to find and mine opportunities, the real purpose is to build business, both current and future.

If only one question is asked of the client, ask them this: "What keeps you awake at night?" The answers might surprise and enlighten. While it may be facility needs, design requirements, budget and schedule constraints, or myriad other issues that can be addressed by design professionals, the issues may be far more personal: new division head, no resources, etc. These are the real issues that, unless they are addressed or on a path toward resolution, may dim the promise of project opportunities.

Get the specifics. It is insufficient to ask, "What projects do you have coming up?" and then make the quantum leap to developing a winning team and proposal. Ask probing questions of the client about:

- Building context, including design standards and guidelines
- Program
- Users or stakeholder groups

- Budget
- Acoustics, AV, and networking requirements
- Security and accessibility
- Energy and other sustainability goals
- Timing
- Delivery method (design, design-build, etc.)
- Preferences, if any, for engineers or interiors firms
- Preferences, if any, for design platforms such as BIM, REVIT, or AutoCAD
- Minority, small business, or disadvantaged enterprise goals

Suffice it to say, the more information gathered about a project or project opportunity, the better prepared the firm will be to respond to the request for proposal or request for qualifications.

▶ See Qualifications, Proposals, and Interviews (6.5) for related information about responses to RFPs and RFQs.

Define the selection process. In much the same way that the specifics of the project opportunity need to be defined, it is important to develop an understanding of

- Decision makers
- Qualifications-based selection
- Negotiated procurement
- Dual envelope selection

Under the provisions of the Brooks Architect/Engineer Act (40 U.S.C. 541 et seq.), professional services, including architecture, should be negotiated and based on qualifications, not price. However, many clients are not required to follow this practice. This is especially true of smaller institutional clients and private sector projects, such as residential.

TECHNOLOGY AND NETWORKING

Social networking is the modern-day "virtual cocktail party," where information is shared, posted, or exchanged in a virtual world. As stated by Erik Qualman, founder of Socialnomics, which provides data, statistics, and studies on social networking, "We don't have a choice on whether we *do* social media, the question is how *well* we do it." Without boundaries, social networking can add up to lost time and decreased productivity for any firm. It is important that the firm have an acceptable use policy (AUP). An AUP has several key elements:

Responsibility for content and enforcement. First and foremost, the responsibility for any content developed belongs to the firm, not the individual. It is important to make that distinction since ramifications resulting from content that might be seen as erroneous, slanderous, sensitive, or defamatory are viewed as the legal responsibility of the firm. Because content is the responsibility of the firm, so too is the enforcement of the terms and conditions of its use, including the use of email, blogging, network resources, "netiquette," duration of use, access to other sites, and the posting or reposting of content.

Whether enforcement is the responsibility of the information technology director, the operations manager, or the principal in a small firm, enforcement of the policy must be consistent with clear consequences for failure to comply. It is no longer a question of whether there will be breaches of an information technology policy; it's a question of when. Acceptable behaviors and consequences for noncompliance must be clearly defined before embarking on this brave new (and ever changing) world.

Security policies. While handling of confidential information, password management, and viruses are often addressed as adjuncts to information technology policy, it is important to remember that what is posted, shared, or exchanged via social networking or electronic media exists somewhere in perpetuity. Confidential information, or even information that may be considered sensitive, should never be exchanged or shared via a social networking site or other electronic platform. Save those issues for face-to-face meetings.

Content ownership. The AUP must delineate the ownership of content that is developed. Content developed at work and for the purposes of promoting the firm is often the intellectual property of the firm. However, limited rights of usage and/or acknowledgement of authorship should be given to potential staff contributors and those involved in social networking via blogging or other formats.

Copyright and plagiarism. While the issue of copyright and plagiarism is largely associated with written content such as articles, blogs, and posts, all AUPs should acknowledge the laws of copyright and strongly discourage the use or representation of another's materials or ideas as one's own. Plagiarism, as defined by plagiarism.com, includes:

- Turning in someone else's work as one's own
- Copying words or ideas from someone else without giving credit
- Failing to put a quotation in quotation marks
- Giving incorrect information about the source of a quotation
- Changing words but copying the sentence structure of a source without giving credit
- Copying so many words or ideas from a source that it makes up the majority of the work, whether credit is given or not

► See the backgrounder Copyright Law for Architects (5.1) for a more detailed discussion of related legal issues.

While plagiarism is a moral issue, copyright infringement is a legal one and hefty fines may be imposed on those found in violation. Develop policies mindfully. If there is concern about the parameters of copyright, consult with an attorney on the subject.

Restrictions. Any policy regarding Internet and specifically social networking sites must address the issue of content restrictions. Content should be limited to the exchange of technical or practice-based information and should limit personal use or representation of the content as belonging to anyone else other than the firm. It should expressly disallow personal or adult content, as defined by the firm.

NETWORKING EVENTS

It is impossible to network only through social and Internet-based applications. At some point, it is necessary to leave the office and meet and talk to people, be they businesses (Bs) or clients (Cs). Before charting the course, define the places to network. For B2B networking, peer-to-peer conferences are very effective as sources for developing intelligence on competitors or the market. These may include the AIA National Convention, brokers conferences, developer conferences, and other events. There are many options, but for those just starting out, focus on conferences that provide the least intimidating environment. Local or regional business meetings such as chambers of commerce, Kiwanis, Rotary, or Lions Club are a good start for beginning networkers. For intermediate networkers, national or business-led forums are wonderful options.

For B2C networking, select trade shows and conferences that clients of the firm attend. It is unproductive to attend a B2C networking event where the only attendees are other architects. Understand the reason for attending specific conferences or workshops and be discerning. Continuing education *is not* an objective in the world of networking. It's a lucky by-product, perhaps. Be clear that the prime objective in attending such a conference is to *win new work*, not advance professional education. Try to secure a list of conference attendees prior to the event, and determine whom to meet and why. If unable to do that, based on the business development plan objectives previously discussed, then do the following:

- Determine the types of people or professionals to meet.
- Have a short set of questions ready.
- Bring plenty of business cards.
- If technology is enabled, and the venue is appropriate, be able and willing to go online via iPad or smartphone and talk about experiences and observations.
- Do not push firm brochures on people; save that for the follow-up.

CONCLUSION

Effective networking requires a clear plan and strategy in order to accomplish a specific objective. In the absence of a plan, most principals, partners, and leaders try to network, only to be met with frustration and increased overhead costs. The sales plan is not intended to provide undue structure. Rather, it is intended to be a road map by which to manage overhead cost and increase productivity.

Every product-based company has a defined sales plan. Such a plan attempts to define its consumers, their buying patterns, and price point. It also defines the competition, the demand for their product, and, more important, how they are going to communicate about it—to sell it or to improve it. Architecture should be no different. Yet, in the twenty-first century architects know less about their clients than they should; and often use an incomplete set of tools to develop relationships, build trust, and yes, find new opportunities.

Networking is a valuable tool in a kit that is developed through patience. Networking, even when effective, does not produce results overnight. The time horizon may vary from a few months to a couple of years, depending on the depth and breadth of information to be shared. In retrospect, the time horizon, while long to some, is not unrealistic given the time required to develop trust and foster integrity in the pursuit of new opportunities. As a result, it is imperative that every person within the practice involved in networking knows their role and is committed to the pursuit. Each must be open to the demands of trust, integrity, and information sharing and not selfishly invested in "what's in it for me." Finally, networking events and situations should be chosen that are reflective of the skills and ability of the networker. Failure, or the perception of it, is common for the first-time networker. Accept it. Embrace it. And use each opportunity to explore challenges and potential solutions. The opportunity for success arises not from pursuing the narrow goal to "win new work," but from mastering networking as a critical business skill.

6.5 Qualifications, Proposals, and Interviews

Sally A. Handley, FSMPS

Responding to RFPs and preparing for short-list interviews are two of the most important marketing functions. A thoughtful approach along with advance planning and organization can help minimize the effort and maximize a firm's hit rate.

Spotting a publicly advertised request for proposal (RFP) for a project that firm leaders or marketers have been tracking, or receiving an RFP from a long-pursued prospective client, can be cause for celebration. At long last, there is a feeling that the firm's long-range marketing efforts are paying off. But euphoria can quickly turn to panic as the RFP is reviewed and the magnitude of the task ahead is understood. In firms both large and small, the proposal process can often be chaotic and overwhelming.

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There are three basic steps every firm can take to reduce the anxiety surrounding the proposal process: The first is to take a good, hard look at the RFP and determine the likelihood of winning the project. The second is to approach the proposal with the same degree of organization with which a design project is approached. Finally, and most important, procedures and processes must be developed to organize the information most commonly asked for in client RFPs.

THE GO/NO-GO POLICY

Frequently firms respond to too many proposals without really considering how realistic their chances are for winning. The more proposals prepared, the more diluted the proposal effort becomes, because time is finite, and even if people work 24/7, the more proposals put out, the less time there is to spend on each one. The secret to a successful proposal effort starts with a good go/no-go policy. Pursuing work that the firm is not qualified for and is unlikely to win is self-defeating and diverts time and money that can be better spent on marketing activities that are more likely to result in jobs won.

There are many ways to approach a go/no-go policy. One size does not fit all. Some firms focus on whether or not a project has the potential to yield a profit. Others focus on a project's potential for publicity that can increase name recognition and identity. Whatever approach is used, policy guidelines should be summarized in writing and a scoring system should be used to give the policy teeth. Here are some sample questions that cover the issues firms should be considering before beginning the proposal effort:

- Does the project fall under our mission?
- Is the project in a target market sector?
- Is the project in our geographic range?
- Is the project the appropriate size?
- Is the budget realistic? Funded?
- What is the potential for profit?
- What is the client's reputation and payment schedule?
- Who is our competition?
- How were we selected to receive the RFP?
- Can we demonstrate relevant experience?
- Can we provide a truly responsive proposal in the time frame?

Firms can develop their own scoring scheme. Three or more noes to the first six questions is a likely no-go. The last four questions require more analysis.

There may be overriding reasons why the firm might say yes to a project that doesn't pass the go/no-go test. For example, the client may have lots of profitable work and a reputation as a great client. Often firms may be asked to propose on a project smaller than their no-go minimum. Clearly, this is a test opportunity that most firms may not want to pass up.

This detailed approach to judging whether or not an RFP is a go or no-go reduces long-shot proposal efforts that actually diminish the effectiveness of an overall marketing effort. If a go/no-go sheet is developed and completed each time a proposal is completed, a chart can be created that demonstrates over time where marketing hours and dollars are being spent with no return, and where dollars spent are winning work.

THE PROPOSAL PROCESS

Reading the RFP

In order to complete the go/no-go assessment, be sure to read the entire RFP. This may sound obvious, but all too often in a hectic-paced environment, it is tempting to cut to the chase and just read what needs to be done, skipping the full scope of services and going right to project description, the proposal requirements section, and the due date. A thorough reading of the RFP is a must. It's possible to discover that the firm doesn't qualify to respond because of certain requirements.

Taking time to read the project description and scope of services, as well as the extraneous requirements that don't always appear on the requirements page, will actually save time and result in a much better proposal. There is nothing worse than finding at the end of the proposal process that a lengthy form mentioned elsewhere in the RFP was overlooked. Also, there may be specialty subconsultant requirements that have to be met. These are issues no one wants to deal with after they are nearly done with the RFP response, a day or two before it is due.

The Strategy Session

Both small-firm practitioners and principals in large firms need to conduct a brief strategy session to get the proposal off to a good start. The purpose of the strategy session is to determine answers to the following questions:

1. What is known about the client?
2. What is known about the project?
2. Who is the competition?
3. Why should the client choose us for this project?

No matter the firm or staff size, these questions need to be answered in order to develop a proposal that demonstrates understanding of the project and the client. Knowing who else received the client RFP, or which firms are most likely to respond to a publicly advertised RFP, is important in order to understand the context in which the firm is competing. Finally, a compelling argument for why the client should select the firm must be articulated clearly and concisely.

Relevant project experience is a key element of any argument for why a firm should be selected. Projects that illustrate a firm's capabilities, but that are not similar in size or scope to the project being proposed on, may not be relevant. Clients want to know that the design firms they select have experience with similar projects and understand the issues and nuances of a particular project type. Clients renovating a vehicle maintenance facility may not be impressed by a design portfolio consisting of renovations to office buildings or schools, even if those projects won awards. The Relevance Formula in the accompanying sidebar provides guidelines for determining what is most relevant to a client and how to order relevant projects in a proposal.

If a team is working together to produce a proposal, all of the key individuals involved need to participate in the strategy session. Depending on the firm size, these might include the principal-in-charge, the project architect, the project manager, the proposal manager, and/or marketing coordinator. The proposal manager or the marketing coordinator should be assigned the task of taking notes that will be distributed to anyone involved in preparing the proposal. Additional tasks to be completed during the strategy session include the following:

1. If it hasn't already been done, designate the principal-in-charge and the project manager.
2. Create a checklist, schedule, and budget.

THE RELEVANCE FORMULA

This is a formula for determining the relevance of past project experience to a current proposal. The project might match each one of these criteria:

- *Client*: It's the same client.
- *Service*: The same service was performed.
- *Market sector*: The client was in the same market sector—for example, transportation or pharmaceutical.
- *Facility (if applicable)*: The project type is the same—for example, a bridge or laboratory.
- *Attributes*: Special attributes, requirements, or situations are the same. For example, the project must be LEED Silver or BSL-3.
- *Location*: The assignment or client is in the same location (city, county, state, or region).

An appropriate order can then be built based on the projects that have the best mix of criteria matches.

Here it is: This is the formula, in order from best to worst projects to use:

- Client, service, market sector, facility, attributes, location
- Client, service, market sector, facility, attributes
- Client, service, market sector, attributes
- Service, market sector, facility, attributes, location
- Service, market sector, facility, attributes
- Service, market sector, attributes
- Client, service, market sector, facility, location
- Client, service, market sector, facility
- Service, market sector, facility, location
- Service, market sector, facility
- Service, market sector
- Service, location
- Service

By applying this formula, the right projects will be in the right order every time.

From *Proposal Development Secrets: Win More, Work Smarter, and Get Home on Time* (Amazon Kindle edition, Feb. 9, 2012) by Matt Handal, reprinted with permission.

▶ The backgrounder WBE/MBE/DBE/SBE Certification (3.1), addresses qualification for certification as a small business or as a woman- or minority-owned firm.

PART 2: FIRM MANAGEMENT

3. Select subconsultants who will constitute the project team. (Be sure to review any requirements, such as MWBE (Minority/Women-owned Business Enterprise) goals or specialty consultants, needed for the project team to be compliant.)
4. For large projects, define responsibilities and how the team will interact, and create an organization chart.

During the strategy session, the note taker also wants to compile a list of questions that come up. Note any RFP requirements that are vague or about which there is uncertainty and clarification is needed. Every RFP has a point of contact or a specific procedure for asking questions. When the questions are compiled into a single list, one member of the proposal team should call the point-of-contact to get answers.

Often clients hold pre-proposer conferences and/or walk-throughs of the project site in order to make clear their project goals and answer questions. A member of the proposal team should always attend. Ideally, the project manager is the right person to attend. When that is not possible, the proposal manager or marketing coordinator may attend. Although not always technically oriented, marketers often are adept at discerning client concerns underlying the technical challenges.

Following the strategy session, the designated note taker needs to compile a checklist. The checklist should include deliverables, responsible individuals, deadlines, and packaging and delivery method. Table 6.7 is a standard checklist that is a start and can be altered for each proposal. Circulate the checklist immediately, and post it to a central spot for team access. The checklist is a dynamic document and may change based on information obtained throughout the proposal process. Everyone needs to be notified when changes are made.

Whether or not there is an individual on staff with the title of Proposal Manager, one individual needs to be designated the proposal manager, champion, or advocate for any given proposal. This individual is the keeper of the checklist and the individual who monitors daily the status of all deliverables. It is best if this individual is not a principal, who is most likely to have client- and project-related responsibilities that will take priority over the proposal process.

For sole practitioners, the checklist is a must. Any amount of time set aside to work on the proposal should begin with a review of the checklist. The valuable tool keeps the process organized, ensuring that long lead items don't get lost in the process. (See Table 6.7.)

TABLE 6.7 Sample Proposal Checklist

Deliverables	Who's Responsible	Due Date
Cover letter		
Executive summary		
Scope of work		
Project approach		
Schedule		
Team resumes		
Experience		
References		
Fee proposal		
Packaging		
Delivery method		

Subconsultants

The value of long-standing relationships notwithstanding, subconsultant selection should not be something done on autopilot. Subconsultants should be selected based on their ability to enhance the chances of winning a project. Sometimes that means reaching out to new firms that have specialized experience with the project type or client being pursued. In addition, there must always be a good faith effort to comply with client MWBE requirements.

Optimally, meeting subconsultants is something done on an ongoing basis, so as not to have to scramble to locate the appropriate MWBE or specialty subconsultant for the first time during the proposal process. Pre-proposer conferences, which generally make attendee lists available, are an excellent way to meet potential team members already pursuing the project. Keeping a database of firms cross-referenced by their disciplines, client connections, and certifications will make subconsultant selection much easier at proposal time.

As soon as possible after subconsultants have been selected, notify them of the intention to include them on the project team. Determine exactly what subconsultants need to provide, the format in which their qualifications are to be prepared, and the deadline for receipt. The proposal manager or coordinator should be in charge of this effort, and the point of contact for any questions the subconsultant might have.

How Subconsultants Can Enhance Your Chances of Winning

When the firm I worked for decided to pursue an on-call contract with the Veteran's Administration, we realized that we needed to be strategic in selecting subconsultants for our team. We had plenty of experience with on-call work for government agencies, but no experience with the VA.

First, we contacted the subconsultants we worked with most frequently to see if they had VA experience. We invited those who did to join our team. Next, we reviewed the qualifications of other firms we had in our database to see if they had VA experience. We assembled a subconsultant team composed entirely of firms who had successfully worked for the VA.

Next, we interviewed each subconsultant to determine the VA's hot-button issues. Every subconsultant was happy to share with us the things that were most important on VA jobs on which they had previously worked. For example, noise abatement during construction was understandably a major concern at VA hospitals. We made sure to emphasize our understanding of and sensitivity to the issues that would be of concern to the VA on any project awarded under the on-call contract. We were short-listed, and subsequently won the contract.

The Mock-Up or Dummy Copy

A good practice throughout the proposal production process is to create a physical mock-up of the proposal. As the various elements are completed, insert them into the mock-up copy. Use colored paper to indicate outstanding items still to be inserted. This simple practice gives everyone a good idea of the status of the proposal. In addition, proofreading the printed page yields better results than proofreading on a computer screen.

While some clients request digital copies, multiple hard-copy submissions remain the norm. The mock-up copy can facilitate the actual, physical production of the proposal. As sections of the proposal inserted into the mock-up are judged final, copies can be printed and collated. For obvious reasons, it is preferable to print completed sections as they are finalized, rather than leave all printing to the end.

Crafting a Responsive Proposal

Of utmost importance is making sure that the proposal is responsive to all of the requirements. The RFP process is highly competitive, particularly in the institutional and public sectors. Clients who receive many responses to proposals start by looking for nonresponsive proposals in order to narrow down the field for serious consideration.

If the proposal is being prepared by one person working alone, the proposal must be read cover to cover, highlighting every item required by the client, even those that fall outside the "proposal format" section of the RFP. If there is a marketing staff, it is the responsibility of the proposal manager or marketing coordinator to make sure all required elements are on the checklist.

Additional Solicitation Requirements

Government forms, schedules, licensing, and insurance requirements should be gotten out of the way early. Lead time for obtaining certain certificates can be lengthy, so, as tempting as it is to let these go until the end, it is not advisable.

Writing Persuasive Proposal Content

In the case of proposals and requests for qualifications, there is a great deal of information provided by the client in the form of the RFP requirements. If the process begins by jumping to the proposal requirements section, the most important step in persuasive writing will be skipped—understanding the client that the proposal is trying persuade! Start looking at the RFP as the best source of information about the client.

Search the RFP for clues about the issues most important to the client. Do they want an iconic building that makes a statement about them and their business? Are they committed to sustainability and desirous of a building that will not adversely impact their environment? Are they concerned about neighborhood resistance to their facility? Do they want a new addition to blend seamlessly with adjacent buildings? Are they a government agency committed to design excellence for public buildings?

Next, verify how the firm will be evaluated. The criteria that will be used to judge proposals are almost always provided in client documents, and can be a key to client hot buttons. Consider changing the focus from the proposal requirements to the evaluation criteria. Make a thorough review of the criteria a significant part of the preparation process. Print it out, maybe even blow it up and pin it somewhere in view. While completing all of the required proposal elements is very important, paying equal attention to the evaluation criteria is just as important.

Suppose the evaluation criteria look like what are shown in Table 6.8.

Now let's jump ahead and suppose the RFP has been read thoroughly, questions have been answered by the point-of-contact, and the walk-through has been completed. Additionally, at the walk-through a subconsultant confides that the last project done for this client had huge cost overruns because the project manager was inexperienced. This warrants a look at the evaluation criteria one more time. Eighty points are devoted to the firm's experience, the experience of the project manager, and the management plan. This further confirms that effective management is a hot-button issue for the client.

The next step is to write a statement of purpose, indicating what must be communicated in this proposal. Don't overthink this and get into analysis paralysis. Just quickly either jot it down or type it. For the example above, the purpose statement may be as simple as: "In addition to our firm's experience with all the elements of the proposed project, we also need to show that our project manager has experience with all or most of the elements of this project and demonstrate that s/he has a track record for controlling costs and completing projects on or near original estimates."

TABLE 6.8 Proposal Element Evaluation Criteria

Evaluation Criteria	Points
Required experience	35
Quality of key personnel	35
Quality of management plan	10
Overall firm capability	20
TOTAL POSSIBLE SCORE	100

Once a statement of purpose is written, everything that goes into the proposal is there because it will help accomplish that purpose. Every project example, every staff resume, and every question answered must fulfill the purpose; otherwise it is at best filler and at worst a distraction. Remember, every word written must add to the argument.

Next, create a working outline or table of contents (TOC). The TOC may change throughout the proposal writing process, but it's best to start with a solid outline. In some instances, the client may have very specific guidelines for the TOC, and that makes the job easier. If not, consider organizing the proposal according to the evaluation criteria.

Proposal Content: Less Is More

In a letter to a friend, seventeenth-century French philosopher and mathematician Blaise Pascal wrote, "I have made this letter longer than usual, only because I have not had time to make it shorter." Proposal writers frequently make the mistake of thinking that, in order to be effective, proposals need to be lengthy. The fact is that reviewers of submissions spend approximately 18 minutes reviewing a proposal! That is the reason proposal advertisements often limit the number of pages, sometimes even cautioning that elaborate submissions will be rejected.

Clients want an RFP that tells them what they need to know in order to make a decision. They ask specific questions and they want succinct answers, not every piece of boilerplate ever written at a firm. In order to write a persuasive proposal, tailor the boilerplate to the client. Clearly and succinctly demonstrate that the audience is known and their special needs and requirements are understood—that there is sensitivity to their hot-button issues.

Avoiding Jargon

In his classic *Writing for Design Professionals*, Stephen Kliment, former editor in chief of *Architectural Record*, cautions writers to avoid technical jargon and "designer babble" that can actually make it more difficult for the reader or reviewer of the proposal. Technical professionals sometimes forget that even the most knowledgeable clients are not necessarily technical. If technical details are going to be included, make clear to the reader the *benefit* of the technical information. Here's a description that does this very well:

> Established to promote greater public understanding of the United States Constitution, the National Constitution Center is a structure of complex geometries articulated in limestone, granite, and glass. The architect's sophisticated design relies on an elaborate frame of interconnected steel systems designed to achieve the building's bold structural form. Long-span, column-free solutions and special connection details accommodate the building's vast, open spaces.

The last sentence does an especially good job of explaining the benefit of the technical design without jargon that loses the reader.

How Long Should *X* Be?

Once someone asked me how long the cover letter should be. When I said one page, the individual proceeded to tell me there was no executive summary in the RFP to which they were responding, and they felt they needed to put more of their persuasive argument in the letter. My response: "Then by all means, make your cover letter longer."

Remember, while there are general guidelines for writing proposals, there is no *one* right way to do this. I recall being asked to work on a proposal for a new branch office my firm had acquired. Our main office had significant experience in designing parking garages, and the branch office had tried two or three times to win parking projects at a local university hospital. A firm they were teaming with had spoken to the client contact at the university hospital and reported to us that the client said they just didn't know who we are. I asked to look at the previous proposals that had been sent and saw that our branch office had not really done a good job of explaining the "new identity."

Hence, my mission was to make it clear who this new firm was. If we didn't reach the short list, at least the client would know who we were going forward. I wrote a three-page letter describing our firm, the services we provided, the relationship of the branch office to the main office, and who from the main office would be working on the project. We got short-listed. The point is that I understood my client's hot button: They didn't know us, and nothing we had previously sent clearly explained how the experience from the main office was going to be tapped for their local work. Now they understood. I violated the one-page guideline, but I knew my audience and what was needed to persuade them to consider us.

STEPHEN KLIMENT'S PRINCIPLES FOR WRITING IMPACT

1. Write as you would talk.
2. Keep sentences short.
3. Shun jargon or "designer babble."
4. Be specific.
5. Keep it simple.
6. Use the active form or voice.
7. Don't forget people.
8. Know what you want to say.

THE NON-RFP PROPOSAL GUIDELINES

Not all clients have a formal RFP process. Residential clients and small businesses may ask for a proposal, providing little by way of guidelines or requirements. At a minimum, provide a fee proposal that includes the following elements:

1. *Description of the project*: This demonstrates understanding of the client's goals.
2. *Scope of services*: This explains to the client the services provided in order to achieve the client's goals.
3. *Additional services*: This explains services not provided within the basic fee, but that could be provided if desired by the client.
4. *Proposed schedule*: This provides the client with a description of the phases of the project, and an idea of how long the project will take.
5. *Fee*: This, of course, states the compensation for the services provided, and can include the costs of additional services.

Consider including some promotional materials, such as a brochure. Also provide a resume and a list of similar projects, and/or project sheets that include photo examples and key facts about the project.

BOILERPLATE CHECKLIST

The following standard items are often requested in standard proposals. Every firm should have these basic write-ups that can be edited for specific proposals:

- *Firm profile*: One-page overview of the firm
- *Computer capabilities*: Description of equipment, number of computers, programs used, CAD capabilities
- *Project management*: Step-by-step description of how the firm manages a project
- *Current workload*: List of projects and percentage complete or project completion dates
- *Quality assurance program*: Description of how the firm checks its designs and fosters the quality of its work
- *Project roles*: Description of the responsibilities of anyone working on a job, such as partner-in-charge, project manager, etc.
- *Design philosophy*
- *Project approach*
- *Resumes*
- *Project lists*: By type
- *References*
- *Awards list*
- *Affirmative action policy or EEO statement*: Usually for public projects only
- *Claims history*: Clients want to know a firm's errors and omissions exposure.

Quality Control: Assessing the Proposal

The schedule set in the strategy session should always include enough time for a thorough proofread and final edit. When all the checklist items are complete, and the proposal is assembled, ask the following questions:

- Does this proposal demonstrate an understanding of the project?
- Have we identified potential problems?
- Are our project examples truly relevant?
- Do resumes show relevant projects?
- Have we clearly established our technical expertise?
- Have we demonstrated that we have the capacity to handle the project and meet the schedule?
- Have we provided all of the information and documentation required?
- Is the proposal easy to read and easy for the client to locate the most important information?

Part of quality control is allowing enough time for proofing, printing, binding, production, and delivery of the final package. It doesn't matter how good the content is if there isn't enough time to create a high-quality deliverable. Just like a schedule for a project deadline needs to allow adequate time for drawing coordination and printing, so does a marketing proposal schedule. Be sure to factor this in to the original proposal schedule at the beginning of the process.

QUALIFICATIONS: ORGANIZING STANDARD PROPOSAL ELEMENTS AND BOILERPLATE

Ironically, this step really should precede the previous two, because an organized database of the firm's qualifications—that is, of the types of information and standard write-ups (boilerplate) asked for in a proposal—is the key to an efficient proposal effort.

The preceding sample proposal checklist contains the most commonly required elements in any RFP. While each client, project, and proposal is unique, most RFPs request some form of the same basic information. Many firms start each new proposal by using the last proposal submitted as a template. The limitations of that approach to proposal writing become clear when hours are wasted searching for a proposal that predates the most recent one because it contains a perfectly crafted response to the same question asked in a current RFP.

One of the keys to an efficient proposal process is the organization of the firm's qualifications—information that is asked for repeatedly. Designate a folder "Boilerplate Library." The Boilerplate Checklist (sidebar) contains a basic list of the standard documents that should be included. Create subfolders for items such as Project Approaches. While each project approach must be tailored to the project currently being pursued, previously written project approaches may contain introductions or paragraphs that can be incorporated into current proposals. For example, the approach to historic restoration will probably always start with a site visit and review of existing documents.

The time invested in developing a well-organized boilerplate library of the firm's qualifications will yield tremendous time savings in the future. The added benefit is that the time can be used to better research the client's needs and tailor the boilerplate to prepare a truly responsive proposal.

THE SHORT-LIST INTERVIEW

Every planning session, every market research question, every networking event, every cold call, every letter written, every trade show attended, every piece of communication sent, especially the proposal, is intended to get the firm in front of the client for a real opportunity to win a project. The joy of being short-listed is frequently short-lived, however, because the time frame is often less than a week, and the interviews never seem to be scheduled at a "good" time—that is, a time that is convenient for everyone who must participate. Particularly when there are project deadlines in-house, key staff members may be tempted to say, "I don't have time to participate in a strategy session or to practice or rehearse." All of the marketing hours and dollars expended thus far are wasted if the key players don't make preparation for the short-list interview a high priority. For small-firm practitioners working without a marketing department, this is no different. Remember, getting new work is as important as executing the work already acquired.

Begin by taking the same exact approach as the proposal. Let everyone who will participate, including consultants and those who will assist in preparation, know the time and date of the interview. Circulate copies of pertinent material, and hold a strategy session. Who needs to attend? The partner-in-charge, the project architect/manager, key consultants, the marketing coordinator, and/or manager.

Start by reviewing the proposal submitted—after all, it is what got the firm short-listed. Ask again: What does everyone know about the client? The project? What is not yet known? Why do the same questions need to asked? Because much could have changed since the RFP response was submitted, both with the client and with the firm. Everything needs to be seen with fresh eyes. Possibly someone in the firm or one of the consultants on the team may have new information that may be valuable. Perhaps the client, or the project, has been in the news, and this information provides additional insight into the client that can be used to prepare for the interview.

At a minimum, learn who is on the selection committee, who the competition is, and the physical conditions of the interview room. If this information is not provided by the client, a call should be made to the point-of-contact to ask questions. Not all clients are willing to provide the names of the selection committee or the other short-listed firms, but it is always worthwhile to ask. Subconsultants are often on more than one team and often are willing to share the names of the teams they are on, even if the client won't.

Why Us?

Review the key reasons in the proposal submission for why the client should select the firm's team. Have these changed? Has the intelligence and reconnaissance revealed information that requires an amendment to the original "why us" statement? Whether or not the statement changes, make sure that the key points being used to make advance the firm's argument are crystal clear to everyone going to the interview—everyone in-house and every subconsultant. Every individual's presentation should support the overall strategy.

At this point, in larger firms there should be a reassessment of principal-in-charge and project architect/manager designations. Sometimes there is a significant lag between submitting a proposal and making the short list. The workload of the individuals submitted in the proposal may have changed drastically, and they may no longer be available to work on the project. The number-one complaint of clients is that the individuals who attend the interview are not the ones assigned to work on the project. The short-list interview is the last opportunity to make a change to proposed project staffing.

The same holds true for subconsultants. Perhaps there have been performance problems with a subconsultant on a project since the proposal was submitted, and this has caused second thoughts about working with them again. In addition, there may be a need for a specialty consultant that was not originally on the team. This is the time to let the client know of any project team changes.

Once the team is finalized, especially for large projects, create an organization chart that clearly defines responsibilities. Clients want to know how team members will interact with them and with each other. Most important, they want to know who their day-to-day contact will be, whom they will contact when they have a question or problem—in other words, who's in charge?

Whoever is in charge of the project must also be in charge of the interview, and this needs to be completely clear to everyone attending the interview. Usually the partner-in-charge (PIC) from the architecture firm leads the interview, but it could also be handled by the project manager (PM). There may be good reasons why the PM is the right one to lead, particularly if project management is a client hot-button issue. Also, the PM may be the right person to lead the interview because of a previous working relationship with the client.

The interview is a good opportunity for the PIC or the PM to demonstrate leadership of the project team. The interview leader opens and closes the presentation. Questions not directed at individuals by the selection committee should be fielded by the PIC or PM, who will answer the question or direct the question to the appropriate individual on the team.

MESSAGES FOR ACQUIRING PROJECTS

Depending on the circumstances, the client may perceive you—or you may want the client to perceive you—as large or small, local or out-of-town, or expert or novice at the project type. Working within the bounds of honesty, of course, here are some of the messages firms use to relate their capabilities to the circumstances at hand.

SMALL FIRM

- Today's fast-breaking technology demands a generalist overview and one-point responsibility—that's me.
- We are not encumbered by in-house engineers who try to be experts on every project type. We assemble the best team we can from consultants who are truly expert for your unique project. Most of the nationally recognized designers agree with us—they don't have engineers in-house.
- Your project is a big one to us. It means a lot and will merit our day-to-day attention at the top. It won't be relegated to lower echelons. In our firm the same architect [me] personally controls [design, specs, other elements of the process].
- Just as in your business, in architecture it all comes down to people. You want to deal with the people who make the professional judgments—not with computers or technicians.
- Your job means so much to us, you can be assured we won't be shifting personnel.
- We are a close-knit office—overview and coordination of all aspects of a project are automatic. Everybody in the office overhears everything—there is no compartmentalization. It's all one-on-one.
- Like you, contractors want to deal with and tend to pay more attention to the head of the firm.
- There is a limit to the number of people who can effectively work on a project. Regardless of firm size, it always comes down to the project team. We are just that—a team—and plenty big enough.

LARGE FIRM

- To be a "master builder" is impossible in today's industry. A team of specialists is required.
- We have in-house capability and therefore have tested relationships and teamwork among well-qualified specialists. We stress coordination. We don't expect you to fund the organizational learning curve of our experts. You'll get a dedicated team to see your project through.

- There is a reason we are the size we are—we have to pay attention to service and responsiveness. You'll get a project manager assigned 100 percent to your project, with oversight by a partner.
- Technology is moving so fast, it takes a firm our size to afford [CAD, quality control systems, continuing education, and so on—if true].
- We have staff depth and plenty of second opinions to ensure the quality of professional judgments.
- We can ride out stop-and-go on a project when necessary.
- We don't depend on outside consultants, so coordination is built in—it's automatic.
- [Construction administration, specs, design, project management, etc.] is a discipline all its own—it deserves an expert such as ours.

LOCAL

- We are here for the long haul. We have a personal stake in the community as well as a professional one. We intend to live with the results just as you do.
- We are here whenever we are needed—we are only [xx] minutes from you, [xx] minutes from the site. We'll know when to be on the job, without you or the contractor having to call us.
- Fees spent locally get re-spent seven times locally. Keep the money in our own town.
- Even if we end up with an out-of-town contractor, most of the actual work will be done by local people. If they cheat you, they will have to work with us for years to come. We keep score—and they know it.

OUT-OF-TOWN

- We are purely professional—no local bias or pressures to use anything or anybody on your project other than what's best for it. If it meets your needs and wishes, we will fight to get it for you. You wouldn't be talking to us if we weren't specially qualified.
- In an information society, there's no such thing as "remote." Here is how we plan to manage project communication and coordination.
- The fee for architecture services is about one-tenth of 1 percent of the life cost of the project. Pick the best.
- We offer fresh eyes, new ideas, and objective evaluation of the performance of the contractor and all the subs. And we have a basis for comparing their work to the best work in other localities.

VERY LITTLE EXPERIENCE

- The late William W. Caudill, FAIA, said, "An architect who claims to have done ten schools may really have only done one school ten times." We have no preconceptions. We'll be working to answer your needs as you define them.
- We'll be looking for breakthroughs. Your project and site offer unique opportunities. You deserve more than a cookbook solution.
- Let's talk about what's unique about your project and how we would approach the design.
- No assembly line with us. We work hard at staying generalists. Similar but different project types keep us from getting stale. Here are examples of different projects we have done that had similar concerns—and how doing them has given us the diverse experience to qualify us to do well with your project.
- We do lots of different project types—which keeps us enthusiastic and growing professionally. Nothing is by rote or done without our full, professional attention. We *have* to pay attention.

A LOT OF EXPERIENCE

- Everybody likes a winner—which is why we are consistently selected for projects like yours. You have a lot at stake here. We have a demonstrated track record.
- We have no learning curve on this and won't ask you to pay our tuition. Instead of spending time learning the project type, we can focus on your specific needs.
- Let me show you all of the projects like yours that we have done. You'll want to talk to our other clients for this type of project. Here is a list of references.
- Because your project type is one we like and work with a lot, we naturally research it and continually stay abreast of the latest advances in design and technology relevant to it. We've got a head start on anybody else you'll talk to.
- Though we are proud of our design, it's still only 15 to 20 percent of the service we provide. You want experts on the technical aspects—people who've been there and have seen all the variations. We have a lot.

James R. Franklin, FAIA, Current Practices in Small Firm Management

PART 2: FIRM MANAGEMENT

The Agenda

Be sure to check whether or not the client already has an agenda for the interview, and be sure to share that agenda with all participants. Does the one-hour interview consist of a 45 minute presentation and a 15 minute Q&A, or are there 30 minutes for presenting and 30 for Q&A? The ability to present within the time frame provided is the client's first opportunity to observe how well directions are followed, as well as the leader's time management skills.

Prepare an outline with the name of each presenter that will be given to the client at the start of the interview. Prepare a second version with the number of minutes each participant has for his/her presentation. Distribute the second version to each participant. The principal-in-charge or the project manager should discuss with each participant his/her vision for the content of the individual's portion of the presentation. Everyone should be advised to prepare a bullet-point list that can be referred to at the actual presentation, not a document to be read. The goal is that the presentation be as conversational as possible.

The Checklist

Similar to the proposal preparation process, create a checklist and schedule for the short-list interview at the strategy session (see Table 6.9). For interviews for large projects, this may require air travel, models, video presentations, etc. There may also be a need to develop a budget. In addition to expenses, the hours spent by key staff can quickly add up, something often not considered at the proposal stage.

Deadlines are crucial because of the very tight turnaround time for short-list interview preparation. There is no margin for error. Similar to the proposal process, this interview process needs a manager or champion. This is the keeper of the checklist and the individual who monitors daily the status of all deliverables. Again, it is best if this individual is not a principal, but rather someone for whom the short-list interview becomes his/her short-term highest priority. Principals of smaller firms may want to assign an administrator or even a staff member to manage this process.

The Leave-Behind

There is no one answer to what should go into the leave-behind. Every presentation is unique, and the decision on what to include should be based on this particular project. Was the site visited and photos taken? Should they be included in a leave-behind? Is there a team member whose material was not in the original submission? Is the team especially complex? Perhaps the organization chart should be included.

There are two things, however, that most presentation coaches seem to agree on. First, creating a leave-behind that consists of what was already in the proposal is redundant and serves little purpose. Second, the leave-behind should be exactly that—something *left behind.* It should not be distributed to the selection committee during the presentation, because all eyes and attention should be on the presenters.

Planning the Presentation

Crafting an opener that grabs the selection committee's interest is key to getting the interview off to a good, memorable start. Most speakers begin the interview saying something like this: "Good afternoon. I'm John Doe, principal of Doe Enterprises.

TABLE 6.9 Sample Interview Checklist

Deliverables	Who's Responsible	Due Date
Agenda		
Visuals		
Key points for PPT or boards		
Leave-behind		
Schedule		
Fee proposal		
Travel arrangements/reservations		
Rehearsal scheduling		

We want to thank you for this opportunity to present to you this morning. Blah, blah, blah." Imagine if, instead of sounding just like everyone else, the interview started with an attention-getting opening such as: "Educating young people is your most important mission. Designing the buildings that make that possible is ours." That opener is far more likely to get the selection committee's attention than the generic opener.

Management consultant to the AEC industry and president of The Clayton Consulting Group, Dr. Janet A. Sanders, says: "Telling got you to the presentation; *selling* is what will win it. You're not giving the client a reason to select you if you're saying the same thing as everyone else."

Simply recounting credentials is not a good proposal strategy. Stress that what the team will design will serve the client's best interest. At the end of the interview, the client needs to feel that all their problems will be over if they select the firm. "Emphasize what you're going to do *for them*, rather than what you do in general," Sanders further advises.

Throughout the interview, focus on the strategic selling points—the "why us." Use a problem-solving approach, not a past performance review. The project examples shown at the interview should very specifically relate to the client's projects. They should be examples of how the team solved problems that were similar to the client's problem. The ultimate criterion for what is said in the presentation is: What does the client want and what will best advance the overall proposal strategy?

Rehearsal

Once the presentation outline is in place, and participants know their assignments, a rehearsal should be scheduled. For anyone who thinks this is an unnecessary use of otherwise billable time, consider the following words of former New York Knick and New Jersey senator Bill Bradley: "Just remember, when you're not practicing, someone, somewhere is. And when you meet them, they will win."

Rehearsals are an essential part of interview preparation, *and* the entire presentation team must rehearse together. The "I'll rehearse in the car" ploy is simply not an option. Every member of the team needs to hear what the others are saying. Otherwise, there is a risk of redundancies or contradictions during the interview that can make the team appear uncoordinated and unprepared.

The rehearsal session also allows everyone to get familiar with the "props." Have the subconsultants seen what will appear on the screen when they are speaking? If boards are being used, who is handling them? Who is handling the LCD projector? Are participants advancing their own slides? These are just a few of the questions the team does not want to face in the presentation venue minutes before the start. The natural nervousness that anyone about to make a presentation feels can be minimized if all of the physical logistics are worked out in advance through a rehearsal.

Finally, another key reason why the presentation team should rehearse together is to brainstorm possible questions in advance of the Q&A session. To a fault, most professionals know their weaknesses, and know the questions that would be difficult to answer. Don't go into the interview hoping the client will not ask the difficult questions. Go to the interview with prepared answers.

WHY PRESENTERS MUST REHEARSE TOGETHER!

When a newly acquired branch office got short-listed for a parking project in their hometown, they needed to rely heavily on their new parent company to prepare the presentation. While the parent company had extensive, relevant parking garage design experience, the branch office had none. The project manager from the home office took the lead in preparing the presentation. He conferred with the branch office principal by phone. Because the principal was well known by the client, the project manager suggested that the principal open the presentation with a brief firm overview.

The day of the interview, the project manager's flight arrived with only enough time to go directly to the presentation site. Much to his dismay, the principal began the interview by saying, "We don't really do parking garages." Needless to say, the firm was not awarded the project.

When the project manager asked the principal to provide the firm overview, he *assumed* that he would explain the new relationship between the branch office and the parent company. Even one rehearsal would have revealed that the principal was not really comfortable speaking on behalf of the parent company of which he was now a part.

Coaching the Presenters

The rehearsal should be observed by at least one individual not involved in the presentation. This individual should watch the clock to make sure everyone completes his/her assignment within the allotted time. The observer also should take notes of nervous habits and general observations.

As previously mentioned, presenters should refer to bullet-point outlines at the interview, and should have been already told that reading their portion of the presentation would not be permitted. Carol Doscher, presentation trainer and president of Graceworks, says, "It's the human connection that will put your presentation on top." Selection committee members are making a decision about whom they will be working with for the next few months, or even years. They do not want to be read to. The interview team needs to connect with the selection committee on both a professional and a personal level.

Not all professionals are good presenters. Preparation and rehearsal go a long way toward increasing the comfort level of all presenters, but, for some, that is not enough. Professional training may be the answer for individuals who are not good presenters, but who are key staff members whose participation in interviews is essential for success. Principals of small firms should also rehearse and seek feedback, perhaps from a staff member or someone from an office down the hall. When needed, coaching for a sole-proprietor principal is even more critical, since it will be the same person presenting the same capabilities at every interview.

After the Interview

A thank-you letter to the selection committee should be sent after the interview. The follow-up letter can serve several purposes: First, it is the last opportunity to restate interest in the project. Second, it allows a restatement of the team's strengths. Third, it affords a chance to address a point that may have inadvertently been omitted during the presentation, or that came up during the Q&A.

In the best of all possible worlds, the firm will be notified soon after the interview that the team has won the project. If, however, the firm did not get selected, call the point-of-contact to get a debrief. It is preferable for a person who did not attend the interview to make the call because s/he is more likely to get an honest response. The caller should ask for genuine candor and honesty from the client. This is especially important for sole proprietors, who, of course, will need to conduct the debrief themselves.

Some clients are experienced with debriefs and may already have a format they follow, which usually includes a review of the score sheet or selection committee comments. For the clients who do not, have a clear agenda for the call that includes four key areas: (1) technical competence, (2) communication, (3) the team organization and approach, and (4) future projects.

Be prepared with specific questions, such as the following:

- Did the selection committee feel that we clearly conveyed our technical ability to accomplish the project?
- Did we clearly communicate our project approach and our interest in the project?
- Was the selection committee satisfied with our team? With our proposed approach?

The caller should take notes and make no comments in response to the debriefer's answers. This is not the time to debate or refute the client's take on the interview. Doing so could cause the debriefer to stop being candid, or even terminate the call. Questions to clarify an unclear answer are acceptable. End the call by thanking the debriefer and by expressing interest in future opportunities.

CONCLUSION

On the topic of preparation, Abraham Lincoln said, "Give me six hours to chop down a tree, and I will spend the first four sharpening the axe." There really is no secret to the preparation of successful proposals and presentations. They simply require a strategic approach, a planned process, and a database of information organized for easy access—in other words, a sharp axe.

For More Information

Architect's Essentials of Presentation Skills (Wiley, 2002) by David Greusel, AIA.

Proposal Development Secrets: Win More, Work Smarter, and Get Home on Time (Amazon Kindle Edition, 2012) by Matt Handal.

Writing for Design Professionals: A Guide to Writing Successful Proposals, Letters, Brochures, Portfolios, Reports, Presentations, and Job Applications for Architects, Engineers, and Interior Designers, 2nd edition (Norton, 2006) by Stephen A. Kliment.

Marketing Handbook for the Design & Construction Professional (BNi Building News, 2009) by the Society for Marketing Professional Services.

Proposals: On Target, on Time (American Council of Engineering Companies, 2002) by Dan Safford.

CHAPTER 7

Financial Management

7.1 Navigating Economic Cycles

Kermit Baker, Ph.D., Hon. AIA

Architects serve an extremely cyclical sector of our economy. To thrive, therefore, they need to be able to adjust to the regular ups and downs of the construction industry.

THE IMPORTANCE OF UNDERSTANDING ECONOMIC CYCLES

Whether architects like it or not, they are extremely exposed to economic cycles. Since architects receive most of their revenue from services provided to the construction sector of the economy, and since the construction industry is one of the most cyclical industries in the economy, architects are vulnerable to the regular ebb and flow of activity in the economy.

The impact of the economy on architecture practice has been particularly apparent with recent cycles. The past national economic expansion that began in late 2001 reached a peak at the end of 2007. The tail end of that expansion saw healthy growth in the economy, and with it even stronger growth in most nonresidential construction sectors. However, at this phase of the upturn, the overall construction sector was seeing more modest growth. The housing market peaked much earlier in the cycle—the beginning of 2006 was the high-water mark of the cycle for home building—and declines after that offset gains in the nonresidential construction sector over the 2006–2008 period.

Kermit Baker is the chief economist for the American Institute of Architects in Washington, D.C. In this capacity, he analyzes business and construction trends for the U.S. economy and examines their impact on AIA members and the architecture profession.

Once the downturn hit in early 2008, the construction sector of the economy experienced steep declines. And even though overall economic output began recovering nationally by the middle of 2009, construction activity continued to spiral downward. Total construction spending levels, which exceeded $1 trillion in 2008, fell to under $800 billion by 2011.

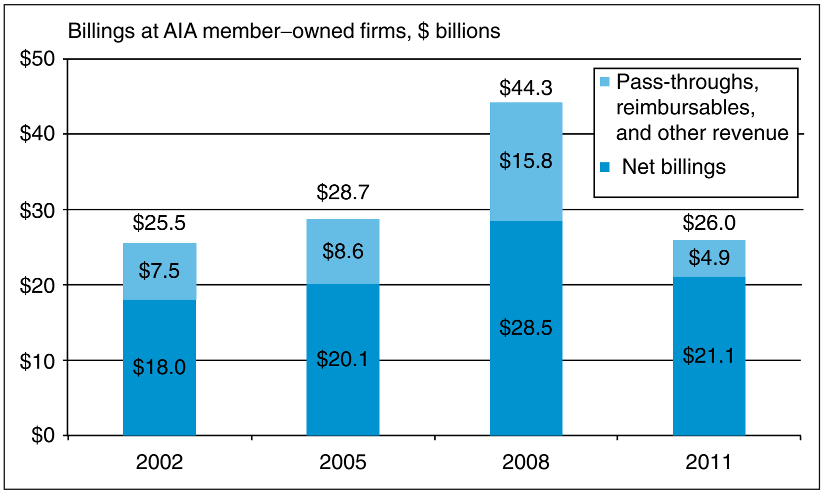
With less construction came less building design. In addition, there were efforts by owners and developers to more aggressively manage design and construction costs of the projects that were built, creating pressure on design fees and construction bids. As a result, gross revenue at architecture firms declined from over $44 billion in 2008 to $26 billion by 2011, a 40 percent decline over this three-year period (Figure 7.1).

This decline in revenue was also felt in employment—in the economy, in the broader construction sector, and at architecture firms. Such a significant reduction in firm revenue produced a comparable reduction in employment. Nationally, the decline in overall business payrolls throughout the economy over this period was one of the steepest since the Great Depression. From its high in early 2008 to its low in early 2010, almost 8.8 million payroll positions, or 6.4 percent of the workforce, disappeared. However, by the end of 2011, over a third of these losses had been recovered.

Construction, being a more cyclical sector of the economy, saw even steeper losses proportionately. Construction payrolls peaked in early 2007 due to the housing downturn, and steadily declined through midyear 2011. Since that time, there has been hardly any recovery. Between 2007 and 2011, payrolls in this industry declined by over 2.1 million—almost 28 percent—double the number of construction positions added during the 2003–2007 upturn.

Positions at architecture firms have generally followed the path of the broader construction industry. Due to the heavy reliance of architecture firm revenue on nonresidential construction activity, payroll positions continued to grow through midyear 2008. They then dropped sharply through early 2011, and have hardly recovered since that point. Between 2007 and 2011, over 28 percent of positions at architecture firms disappeared, a share that greatly exceeded the gains during the prior upturn (Figure 7.2).

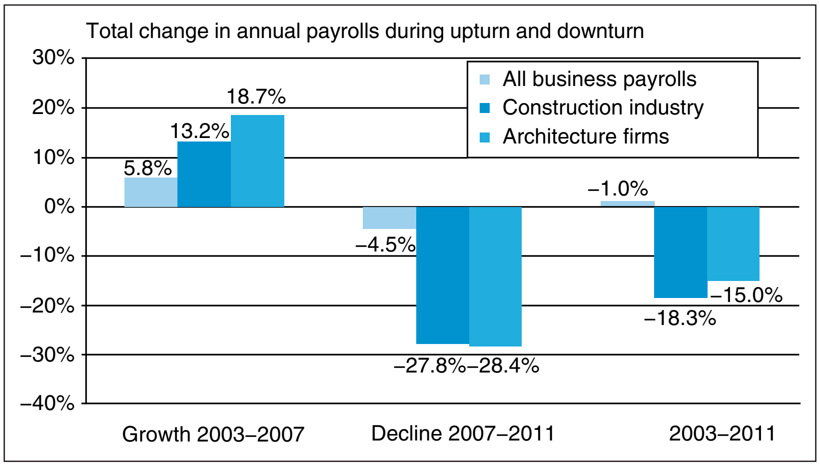
This dramatic upheaval at architecture firms has had dramatic implications on professional practice. One change is the mix of projects at firms. Surveys of architecture firm activity over the past decade show that there has been considerable fluctuation in



The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

FIGURE 7.1 Architecture Firms' Gross Billings Reflect the Cyclical Nature of Construction

PART 2: FIRM MANAGEMENT



U.S. Department of Labor

FIGURE 7.2 Employment at Architecture Firms Is Still Below Levels When Last Upturn Began

the share of project activity across the major construction sectors. Residential projects tend to increase early in a cycle, commercial/industrial projects in mid-cycle, and institutional projects later in the cycle.

Billings for residential projects averaged 14 percent of total firm billings over this past decade, commercial/industrial 27 percent, institutional 53 percent, with the remaining 6 percent divided between other construction and non-construction activities. By 2011, residential billings had returned to their decade average, having grown to 18 percent in 2005 during the peak of the housing market, and fallen to 11 percent in 2008 as the housing market was crashing while the nonresidential construction sector was just beginning to peak. Even though housing remained relatively weak through 2011, multifamily activity—a critical residential sector for architecture firms—was building momentum, and was a growing share of design activity for residential projects.

Commercial/industrial design activity tends to be extremely volatile over the cycle. Activity fell off sharply with the overall economic downturn, and was still near its bottom in 2011. As a result, the share of design billings from this sector was below its decade average that year. Institutional activity tends to be more stable over the cycle. This means that shares are generally a bit lower during upturns and higher during downturns. By 2011, the institutional share was near its decade high, mostly because other sectors had fallen off more dramatically (Figure 7.3).

The overall decline in project activity during the downturn, coupled with the changing mix of projects, produced an expansion of services that the typical firm offered to its clients. During upturns, larger firms typically continue to offer a full range of design services to clients, while smaller firms often niche their services in a smaller number of specialties. During downturns, firms of all sizes tend to investigate new areas in the process of looking for new work. So, even though firms had fewer employees on average in 2011 than during the boom years, higher shares responded that they offered such services as sustainable design, planning, interior design, and space planning than in prior years. A related secular trend is that a growing share of firms categorizes themselves as multiple-discipline design firms, up almost 10 percentage points over the past decade.

The share of payroll positions lost during this downturn has been proportionately greater than the share of architecture firms closed. As a result, architecture firms have shrunk: The average number of payroll employees at a typical firm declined from 10.3

Share of gross billings at architecture firms by type of construction

	2002	2005	2008	2011	Avg. over past decade
Residential *	12%	18%	11%	14%	14%
Commerical **	28%	27%	29%	24%	27%
Institutional ***	52%	49%	53%	58%	53%
Other construction	5%	4%	6%	2%	4%
Nonconstruction	3%	2%	1%	2%	2%

Notes:
* includes single-family and multifamily construction, and home improvements
** includes office, retail and other commercial, hotel/hospitality, manufacturing, and distribution facilities
*** includes education, health care, justice, other government, religious, cultural, recreational, and transportation facilities

The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

FIGURE 7.3 Depending on the Stage of the Cycle, Construction Shares Can Vary Significantly

in 2008 to 8.8 in 2011. Currently, according to AIA estimates, almost a quarter of architecture firms nationally are sole practitioners, and over 60 percent have fewer than 5 employees on their payrolls. In contrast, only 1.4 percent of offices have 100 or more employees. In 2008, 51 percent of firm offices had fewer than 5 employees, while 2 percent had 100 or more.

Even though firm counts are heavily weighted toward smaller businesses, a large share of design professionals works in a larger-firm environment. Firm locations with 100 or more employees account for over 20 percent of all staff at architecture firms nationally, and 50+ person firms account for over a third of all employment. Since revenue per employee tends to be higher at larger firms, 100+ person firms account for over one-quarter of professional fees generated nationally, while 50+ person firms account for well over 40 percent.

Net revenue per employee averages almost twice as much at larger firms than it does at smaller firms, in part reflecting the greater use of part-time staff at smaller firms, but also likely reflecting higher chargeability rates at larger firms, as well as higher levels of staff productivity due to generally greater levels of capital investments (Figure 7.4).

Like previous recessions, this downturn has produced greater fragmentation at architecture firms. Firm layoffs have pushed down average firm sizes, and unemployed architects are a common source of new start-ups. Due to the ongoing "feast or famine" in project revenue for architecture firms, there are unusually high shares of start-ups and failures in the profession, reflected in the low average age of firms.

According to *The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics*, over a third of firms nationally were founded since 2000, and 60 percent were founded since the last significant downturn in the profession in 1990. Only 10 percent of firms at present were in existence prior to 1970. In an era where access to credit is very difficult (particularly for businesses without a long track record), where repeat

Share of total firms, staff, and gross billings in the profession by firm size, 2012

Firm size (#emp.)	Share of Firms	Share of Staff	Share of Billings	Net Revenue per Employee
1	26%	3%	2%	$70,000
2 to 4	37%	12%	8%	$74,000
5 to 9	18%	13%	11%	$95,000
10 to 19	10%	15%	14%	$113,000
20 to 49	6%	20%	22%	$132,000
50 to 99	2%	15%	16%	$136,000
100 or more	1%	22%	27%	$138,000
All-firm average				$86,000

The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics

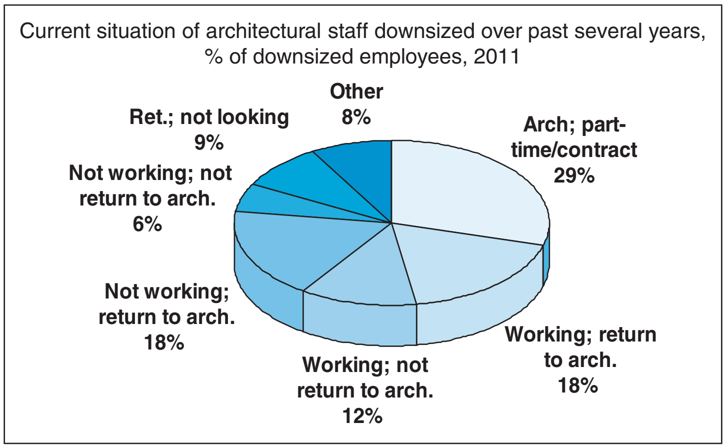
FIGURE 7.4 Even with Benefits to Scale in the Profession, Most Architecture Firms Remain Small

clients and established institutional relationships are important sources of new project activity, and where staff development (including formal intern development programs) extends for many years, high levels of staff turnover and business failures can have a devastating long-term effect on the profession.

The general downsizing of firms has also produced a change in their staff composition. In the AIA *Business of Architecture 2009* report (reflecting staff composition at the beginning of that year), 60 percent of payroll positions were architecture positions (including interns and students), 21 percent were other design professionals—with engineers and interior designers accounting for the largest shares—while the remaining 19 percent were technical and support staff. By the beginning of 2012, there were some significant changes to this composition. The largest share of losses was among the technical and nontechnical staff, positions that generally were not directly billable on projects. Architecture staff positions increased their share somewhat over this period, while the share of other design professionals remained essentially unchanged.

These summaries of payroll staff composition may somewhat overstate the actual changes in staff composition that occurred over this period. Many firms replaced or converted payroll positions to contract positions. Contract positions generally don't offer benefits and typically limit the number of hours worked to the immediate project needs. In other cases, full-time workers were cut back to part-time, or full-time positions were replaced with part-time positions. Many of these part-time and contract positions may be converted to full-time when workloads recover.

Regardless, many architecture positions were lost during the Great Recession beginning in early 2008, and many occupying these positions may never return to practice architecture. A survey conducted by the AIA in late 2011 asked architects their sense of what had happened to full-time architectural staff that had been downsized during the recession, and to speculate what would likely happen to these former employees in the future. Their sense was that about 30 percent of these former employees were still working at architecture firms on a part-time or contract basis, about 30 percent were working outside the profession, and the remaining 40 percent were not employed as of that point, including some who had retired or had returned for additional schooling. Looking to the future, this group estimated that about 40 percent of these downsized workers would never return to architecture practice (Figure 7.5).



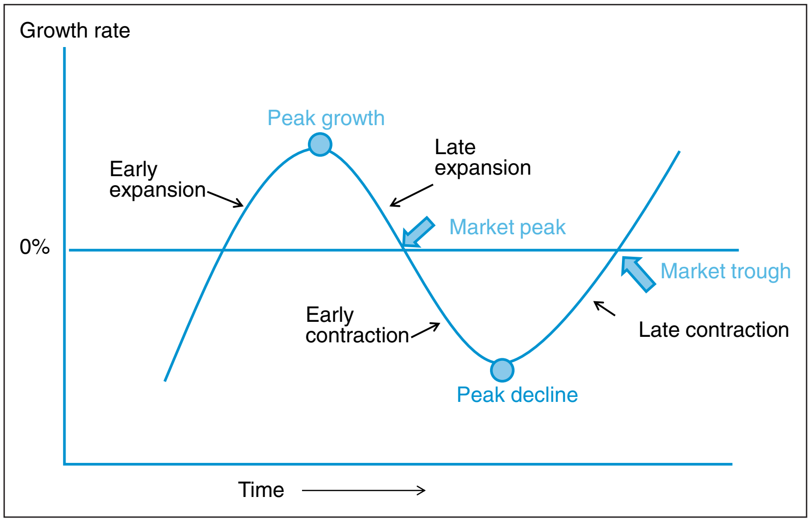
The American Institute of Architects Work-on-the-Boards Survey, October 2011

FIGURE 7.5 A Significant Share of Downsized Workers Are Not Likely to Return to Profession after Great Recession

UNDERSTANDING AND INTERPRETING ECONOMIC CYCLES

The business cycle comprises the up-and-down movements in activity in an economy. It generally is not a regular, predictable, or repeating phenomenon, and is commonly identified as a sequence of four phases with four distinctive points that serve as metrics for defining them (Figure 7.6):

- *Early expansion:* The period of acceleration in the pace of economic activity. This is the phase in the cycle when the economy is recovering from the last downturn and expanding into a period of new growth.
- *Peak growth:* The point where the rate of growth reaches its high point for that cycle.
- *Late expansion:* After the economy reaches a point of peak growth, growth begins to slow.
- *Market peak:* The time when actual economic output (not the rate of growth) is at its peak for that cycle.
- *Early contraction:* The phase immediately after the market peak when the slow growth transitions to a period of accelerating decline.
- *Peak decline:* The lower turning point of a business cycle, where the rate of decline is at its steepest.
- *Late contraction:* The period when the pace of decline begins to slow.
- *Market trough:* The time when economic output is at its lowest point for that cycle.



Kermit Baker, Ph.D., Hon. AIA

FIGURE 7.6 Phases of the Business Cycle

All industries are subject to business cycles, but some are more influenced by them than others. Consumer staples such as food and clothing or inexpensive consumer products tend to have fairly stable levels of activity across the business cycle. They are less influenced by changes in consumer income, or concern about future earnings.

Industries that rely on major expenditures (e.g., cars and homes) or involve large investments (e.g., buildings and public works projects) tend to have more pronounced business cycles. Households and businesses tend to put off these purchases if they are concerned about business conditions and move ahead with them with they are more comfortable with the economic outlook. This often creates a boom or bust in the production of these products, which contributes to the development of business cycles.

The construction industry is one of the most cyclical sectors in the economy. When economic conditions are unfavorable to some industries, they are often unfavorable to others, so fewer construction projects are undertaken. Conversely, when conditions are favorable to some, they are likely to be favorable to others, so a lot of projects that may have been on hold for a while are undertaken.

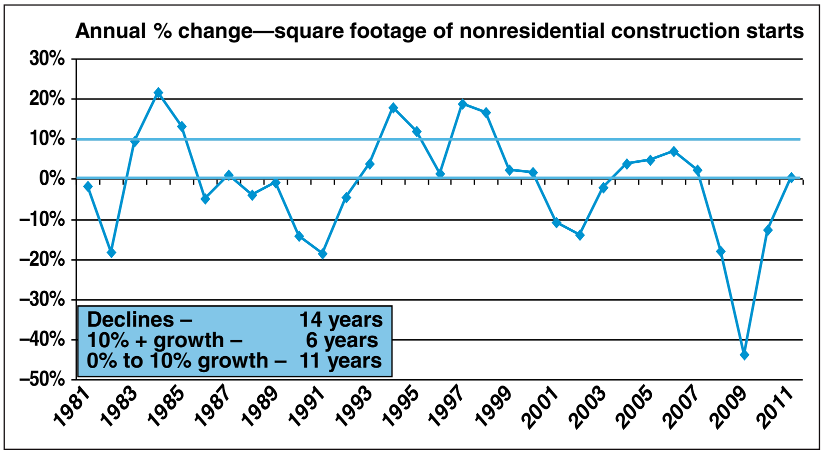
This pattern is easy to observe when looking at the change in construction activity over the past several decades. As shown in Figure 7.7, changes in the levels of construction activity from McGraw-Hill Construction data show the major cyclical upturns and downturns over the past several decades. There was a strong upturn in the early to mid-1980s, in part generated by tax code changes that encouraged business investment, including investment in structures. This period of healthy growth was followed by a fairly significant downturn in the early 1990s brought on in part by the collapse of the savings and loan system in the country. With weakness in these institutions, there were problems with financing residential and nonresidential construction, as well as with long-term loans to finance their acquisition.

The mid-1990s ushered in an extended period of strong growth in construction activity. A technology boom helped moderate the rate of inflation yet produce strong job growth, which provided a supportive economic environment for construction activity. As a result, there were eight straight years of gains in nonresidential construction activity, four of them at a double-digit pace. The 2001 to 2003 construction downturn that resulted from the bursting of the tech bubble was fairly mild, particularly in comparison with the magnitude of the preceding upturn.

Coming out of the early 2000s downturn was a fairly modest construction upturn from 2004 through 2007. No year over this period saw construction activity increase at a double-digit pace. The downturn following such a modest upturn would also be expected to be fairly restrained. Instead, with the rapid decline in house prices nationally, there was a near meltdown of the international financial system that produced the worst economic downturn since the 1930s Great Depression. It's fair to assume that had the nonresidential construction markets been more overbuilt leading into the downturn, the Great Recession would have been even more dire for the nonresidential construction industry.

This review of recent cycles in nonresidential construction activity underscores one of the critical challenges for architecture firms: namely the chronic volatility in project activity in the profession, typically producing very uneven revenue streams. Since changes in construction activity can be assumed to generate comparable changes in design activity at architecture firms, it's no surprise that managing an architecture firm is a terribly challenging undertaking. Looking over the 31 years of construction activity from 1980 through 2011, there are three major expansions and at least parts of four major contractions. Architecture firms are constantly managing through changes in business conditions, changes that create a number of challenges.

Declines in activity present obvious challenges: potential staffing reductions, overhead adjustments, increased marketing initiatives, and potential credit issues. These periods unfortunately are not rare. Over this 31-year period, there were 14 years where



McGraw-Hill Construction

FIGURE 7.7 Most Years, Nonresidential Construction Sees Either Strong Growth or Strong Declines

construction activity declined. Eight of these 14 yearly declines were 10 percent or greater, which present serious challenges for an architecture firm.

However, there are also challenges during the years where construction activity was increasing. For almost a third of these growth years, construction activity increased by 10 percent or more. Such rapid growth presents challenges for firms in terms of hiring and training staff and meeting project deadlines. Such challenges may be more desirable than those associated with downturns, but they remain challenges nonetheless. Combining the two categories—years with declines and years with strong growth—indicates that almost two-thirds of the years over this 31-year period presented challenges for architecture firms. Thus, for any architecture firm, being in a period with distinct challenges is significantly more likely than being in a period without them (Figure 7.7).

All of this points to the need for architecture firms to monitor business conditions closely, so that they can anticipate a movement in the business cycle and begin to implement adjustments in advance of conditions actually changing. Economic indicators to monitor business conditions should relate to the market area served by the firm; firms that serve a local market should monitor local indicators; regional firms should monitor regional indicators; and so forth. Some of the best economic indicators to monitor include the following:

- *Employment*. Changes in employment are probably the best single indicator of the economic health of an area. Job growth generates other forms of economic activity, including construction.
- *Consumer confidence*. How comfortable consumers are with the economic environment is critical to their willingness to spend, which in turn drives economic growth and construction activity.
- *Financial indicators*. Interest rates, lending standards, and the volume of construction and mortgage loans are key to determining whether an owner or developer will proceed on a construction project.
- *Housing indicators*. While directly important to many architects, the condition of the housing market is a key leading indicator for the broader economy as well as for the nonresidential construction sector.

However, an economic indicator that is closely connected to an industry will provide more precise information on likely future trends for that industry. For that reason, in 1995 the American Institute of Architects launched a monthly survey of design activity at architecture firms, now known as the Architecture Billings Index (ABI), to track business conditions across the profession.

Using the ABI to Anticipate and Interpret Cycles

Beginning in late 1995, the AIA assembled a national panel of architecture firms to participate in an ongoing survey to measure their business conditions. The principal purpose was to develop a database of national and regional business trends at architecture firms so that an individual firm would have a better sense of how business at that firm compared with its peers.

Architects are well positioned to report on the direction of the construction industry. Although decisions to build a nonresidential structure are made by hundreds of thousands of private businesses, nonprofit institutions, and government agencies, the first comprehensive indication of planned development typically shows up on an architect's drafting board. Surveys conducted by the AIA of its member firms, and information from McGraw-Hill Construction, indicate that about 75 percent of nonresidential buildings are designed by architects. A greater share of nonresidential activity is reviewed and approved by architects, but without complete design involvement.

The ABI survey is conducted monthly across a national panel of architecture firms. Currently, about 750 architecture firms actively participate in this program. Firms included in this survey provide architectural services as their principal design service offered. Firms may also provide engineering, interior design, landscape architecture, planning, urban design, or related services. Most firms additionally provide pre-design or construction-phase services (e.g., construction management) in addition to their architectural design services.

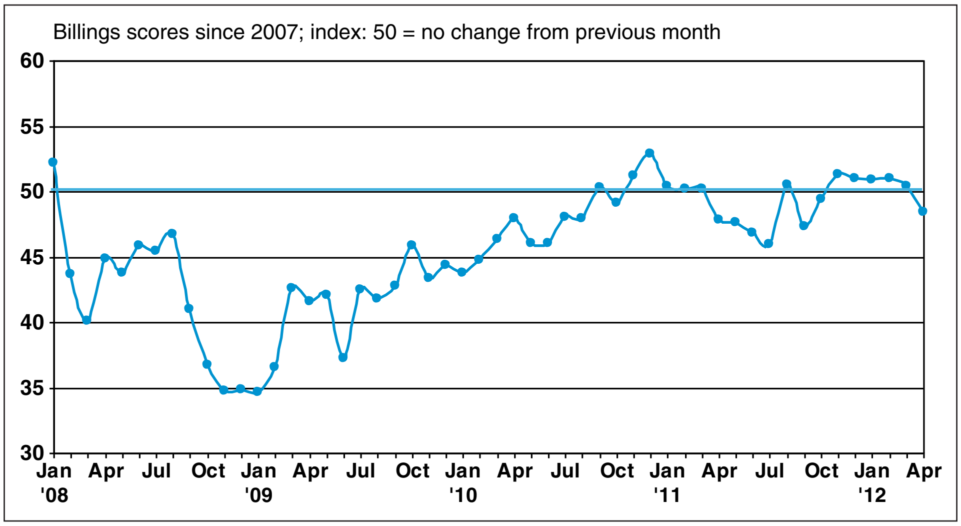
Firms that participate in the survey also provide the AIA with information on key firm characteristics, such as annual billings, construction sectors served, and number of employees. On the first business day of each month, participating firms are e-mailed a link to an electronic questionnaire. That questionnaire asks respondents to report firm billings for the just-completed month as compared to the previous month, as well as inquiries for new work over the same period. If a firm doesn't bill monthly, it is requested to estimate the work that will be billed for that period.

Firms are asked to report whether billings during the previous month significantly increased (5 percent or more), remained about the same, or significantly decreased (5 percent or more). The ABI is computed as a diffusion index, with the monthly score calculated as the percentage of firms reporting a significant increase plus half the percentage of firms reporting no change. Comparisons are always to the previous month. Diffusion indexes, centered at a score of 50, are frequently used to measure change in economic activity.

If an equal share of firms report an increase as report a decrease, the score for that month will be 50. A score above 50 indicates that firms in aggregate are reporting an increase in activity that month compared to the previous month, while a score below 50 indicates that firms are reporting a decrease in activity.

Certain months of the year—December is typically one of them—are slower at architecture firms due to holidays, weather, and other factors. Other months may show almost uniformly stronger business conditions for just the opposite reasons. To allow for meaningful comparisons among months, the monthly responses are seasonally adjusted using the Census Bureau's X-12 program. The seasonal adjustment process regulates the ABI score each month based on typical scores for that month in prior years. So, for example, even though December scores may be weaker than November scores, the seasonal adjustment process compares this weakness to prior years to determine if the decline is stronger or weaker than it has been previously.

Since architecture firms design the overwhelming majority of nonresidential buildings in the United States, we would expect a relatively consistent relationship between architectural design activities and nonresidential building construction. However, this relationship does vary from project to project. A recent AIA survey of architecture firms determined that the average time between the award of a design contract and the award of a construction contract for that facility was about a year.



AIA Architecture Billings Index

FIGURE 7.8 Architecture Billings Anticipate Future Construction Trends

However, there is considerable variation from project to project. According to the aforementioned survey, for commercial/industrial projects the design phase up through contract award was less than six months for 40 percent of the projects, while for more than a quarter of projects this period extended beyond a year. Size and complexity of a project are key reasons for variation in design time, but three other factors also influence design time. Client decision making—and whether these decisions need single or multiple approvals—frequently influences the length of the design phase. Financing and funding for the project also can be a factor. Finally, regulatory approvals—land entitlement, special use permits, zoning, environmental issues, and historical considerations—also influence the length of the design phase.

The ABI is designed to mimic the business cycle for design activity. The ABI scores are centered on 50, so a score above 50 indicates an increase in design activity, and a score below indicates a decrease. During the early phase of a recovery, we would expect to see scores accelerate to the mid-50s to even 60 range. During the late expansion, scores would likely settle back to the low 50 range. Moving into a contraction, scores would likely drop quite quickly to the mid-to-low 40s, before heading back up to the upper 40s as the market moved into the late contraction phase. This allows the user to anticipate the direction that scores are moving, and therefore the future direction of design activity (Figure 7.8).

IMPLICATIONS OF CYCLES ON THE FUTURE OF PRACTICE

Economic cycles are the most powerful business force facing the architecture profession. Successful firms learn how to manage their practice through cycles to minimize the long-term negative impact. Traditionally, diversification has been a strategy to allow firms to achieve more stable revenue across cycles. Firm diversification may take on one or more of the following three dimensions: geographic, building type, or services.

Geographic Diversification

Most small and midsize architecture firms serve a fairly focused geographic area. Urban firms may serve an entire metropolitan area, or a portion of the metropolitan area. Others may focus their practice in a single town or county, or portion of a state.

Typically, the economic base of the markets served is relatively homogeneous, meaning that the economic health of these markets rises or falls with the performance of a relatively small slice of the economy. Typically, the big industries in these areas, such as a college or university, a hospital, an insurance company, a manufacturing facility, a government installation, or something similar, will largely determine the health of the local economy. By serving a larger geographic area, a firm can broaden the economic base on which it is dependent. While one sector of the economy may be dealing with difficult issues, it is much less common for several sectors of the economy to be moving through the same stage of the economic cycle.

Some firms have taken geographic diversification one step further, into international markets. Even though the world economy is much more interconnected now than it was in the past—analysts refer to the world being "flat"—pursuing international projects does typically offer diversification opportunities for firms. For example, annual economic growth in China has been averaging close to double digits for many years, whereas growth for many developed countries has averaged in the low single digits annually. Countries with stronger growth would be expected to have a more vibrant construction industry to support that growth, and therefore diversifying a practice to include projects in rapidly developing areas should help to hedge against a domestic slowdown.

▶ Practicing in a Global Market (5.8) further discusses the context, methodologies, and rules of engagement involved in pursuing international design opportunities.

Building Type Diversification

As with geographical areas served, most small and midsize firms focus their practice on a few building types, such as single-family homes, offices, hotels, schools, or medical facilities. Generally, building cycles for major construction sectors occur at different phases of the broader economic cycle. Housing cycles generally unfold early in an economic cycle, followed 12 to 18 months later by commercial/industrial cycles, followed in turn 6 to 9 months later by institutional cycles.

The risks of concentrating a practice on a limited number of building types can be almost as great as geographical concentration; weakness in certain sectors of the economy can affect demand for some facilities more than others. High mortgage rates can limit demand for new homes. High energy costs can limit travel, and therefore demand for hotels. Diversification can provide design opportunities in a sector of the economy when another sector is weak.

Service Diversification

While most architecture firms offer standard architectural design services, fewer offer related design services or expanded design services. According to *The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics*, only about one-half of architecture firms offered interior design, space planning, planning, or sustainable design services. About a quarter offered historic preservation, design-build, or construction management services. Fewer yet offered landscape architecture or engineering services.

A broader service package generally opens up more design opportunities and allows a firm to compete for a broader range of projects. Also, a broader service package—or a concentration in more specialized services—allows a firm to partner with other firms on a broader range of projects.

The historical concentration of architecture firms generally means that firms need to grow more than may be desirable during upturns, and go through a painful downsizing process during downturns. For example, between the beginning of 2009 and 2012, the AIA estimates that there was a net loss of about 6 percent of all AIA member–owned architecture firms nationally. While this marks a fairly significant decline in the number of firms, it marks an even more significant decline in the distribution of firms. The number of 100+ person firms declined by over 20 percent, while the number of other midsize and larger firms declined by more than 10 percent. Conversely, the number of sole practitioners increased, accounting for over a quarter of all firms (Figure 7.9).

While most firms downsized during the construction downturn precipitated by the 2008–2009 Great Recession, others went out of business. Some architects who were

Number of AIA member firms

Firm size (# employees)	Number of firms 2009	Number of firms 2012	Change: 2009 to 2012
1	4,501	4,636	135
2 to 4	6,867	6,450	–417
5 to 9	3,475	3,115	–360
10 to 19	2,011	1,727	–284
20 to 49	1,167	1,018	–149
50 to 99	396	348	–48
100 or more	312	237	–75
Total	18,729	17,532	–1,197

The Business of Architecture: AIA Survey Report on Firm Characteristics, *2009 and 2012*

FIGURE 7.9 During This Downturn, Firms That Have Survived Have Gotten Smaller

laid off started their own practices. The net result is that some older firms ceased operations, while some new firms started up. This process reduces the age of the average architecture firm in the United States. By early 2012, well over a third of all architecture firms in the United States had been founded since 2000, and over 60 percent had been founded since 1990, according to *The Business of Architecture: 2012 AIA Survey Report on Firm Characteristics*. Only about one in five firms—mostly larger firms—had been in existence since 1970.

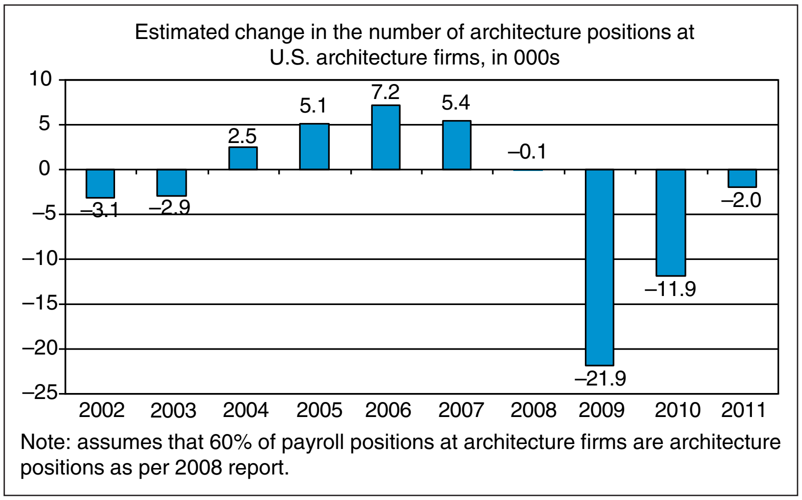
IMPACT ON ARCHITECTS

The dynamic of architecture firm structure during downturns—most firms reducing staff, some firms disappearing, and new firms starting up—is even more dramatic for architecture staff positions. The AIA estimates that there were almost 110,000 architecture positions nationally (licensed and unlicensed graduates) in 2003 at the end of the construction downturn following the 2001 economic recession, growing to almost 130,000 positions at the peak of the construction expansion in 2007–2008, and then falling to almost 90,000 at the low point of the construction cycle following the 2008–2009 national economic recession.

These figures suggest very rapid growth in the number of architecture positions during construction expansions and very steep losses during downturns. During the mid-decade upturn, the AIA estimates that there were over 20,000 architectural positions added nationally, generating close to a 20 percent increase in architectural positions. During the construction downturn following the Great Recession, however, between 35,000 and 40,000 payroll architecture positions were eliminated (Figure 7.10).

While recent cycles have been more extreme, even normal cycles overwhelm the ability of the profession to adjust to changes in workloads. During upturns, there generally are not enough recent graduates of architecture programs to meet the growing staffing needs. Some firms outsource design work in an effort to meet project deadlines. Other firms may provide incentives to keep staff in the workforce, including older staff who may have been considering retirement. During downturns, in addition to staff layoffs, firms may freeze or even reduce compensation, furlough employees through unpaid time off, or convert some full-time employees to part-time status. Firms may convert some payroll employees to contract status, so that they only work when there is billable project activity.

Historically, less-experienced architecture staff has disproportionately served as a balance wheel during periods of expansion as well as downsizing. These are the



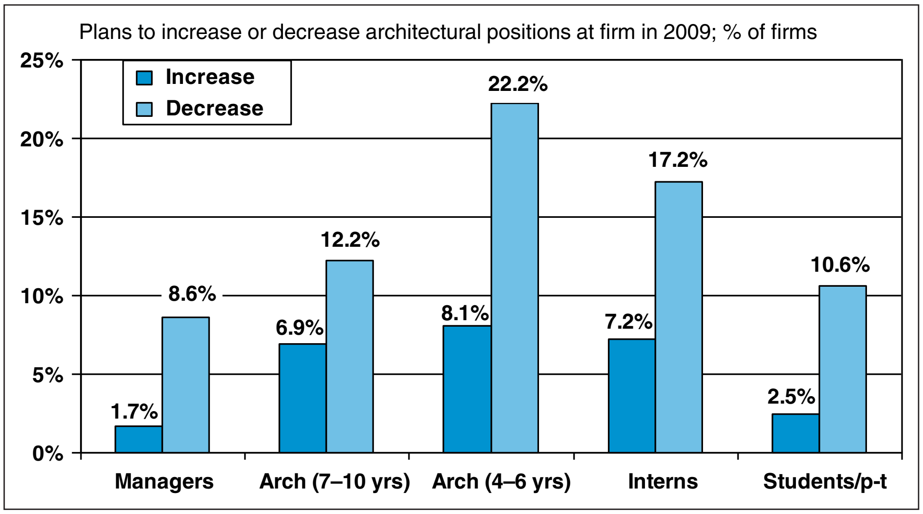
AIA estimates from U.S. Department of Labor and AIA Business of Architecture *report, 2009*

FIGURE 7.10 During Upturns, There Is Insufficient Architecture Staff; During Downturns, an Excess

positions that may be easier and more affordable to fill during upturns, and candidates may be easier to train in the firm's area of specialization. They also may have more current technical skills to operate the newest design software.

By the same token, less-experienced staff has often been the first to get laid off during business downturns. More-experienced staff may have more ability to generate new project revenue during lean times. Also, experienced staff is likely to be more familiar with firm operations, and therefore more difficult to replace during the next upturn.

A survey of architecture firms conducted by the AIA in early 2009 demonstrates the volatility of less-experienced positions at architecture firms. This survey was conducted during the heart of the downturn, and asked firms about positions that they would be adding or eliminating over the coming year. Many firms were expecting to reduce their staff size during the year, and less-experienced architectural positions (4–6 years) and interns were the most commonly selected as targets for downsizing. However, a few firms were planning on adding staff that year, and again the positions most commonly mentioned for addition were less-experienced staff and interns (Figure 7.11).



AIA Work-on-the-Boards Survey, January 2009

FIGURE 7.11 Younger Architectural Staff Are Most Likely To Be Added and Eliminated During Cycles

CONCLUSION

Economic cycles dramatically influence the financial condition of architecture firms and the staff employed by them. However, the ultimate health of the industry will be determined by the underlying growth of the construction industry, rather than merely how design activity cycles around that underlying growth trend. Here the outlook is more positive. According to information from McGraw-Hill Construction, the U.S. construction industry has added an average of 1.3 billion square feet of nonresidential building per year since 1980. Current construction levels in 2010 and 2011 were less than half this pace, so the prospects for strong growth in the years ahead—even during cyclical downturns—are very promising.

For More Information

"Architecture Billings as a Leading Indicator of Construction: Analysis of the Relationship Between a Billings Index and Construction Spending," *Business Economics* (October 2005), pp. 31–37, by Kermit Baker and Diego Saltes.

"Postwar U.S. Business Cycles: An Empirical Investigation," *Journal of Money, Credit and Banking* 29 (1): 1–16 (February 1997) by Robert J. Hodrick and Edward C. Prescott.

Business Cycles: Theory and Evidence (Wiley-Blackwell, 1993) by Andy Mullineux, David G. Dickinson, and Wensheng Peng.

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"Recent Work on Business Cycles in Historical Perspective: Review of Theories and Evidence," National Bureau of Economic Research Working Paper 1503 (1985) by Victor Zarnowitz.

7.2 Financial Management Overview

Steve L. Wintner, AIA Emeritus

Financial Management involves the ongoing monitoring of a firm's financial resources to allow firm principal(s) to exercise sound business judgment in response to developing trends.

INTRODUCTION

The basic knowledge needed for the financial management of a professional design firm includes a clear understanding of the component parts of each of the two primary financial reports—the Profit-Loss Statement and the Balance Sheet—and how to interpret these reports. Knowing how to calculate the seven key financial performance indicators of the profit-loss statement and the four key financial performance indicators of the balance sheet will facilitate a firm leader's response to developing trends, whether positive or negative. An in-depth knowledge of accounting is not required to develop the skills to learn any of the above.

Two essential components of a financial management system are the Annual Budget and the Profit Plan. These two components are closely interrelated, and decisions

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Steve L. Wintner is the founder and principal of Management Consulting Services, a Houston-based firm specializing in design firm management. Wintner has more than 35 years of experience in design firm management and is the coauthor of Financial Management for Design Professionals: The Path to Profitability (Kaplan Publishing, 2006).

▶ Developing Annual Budgets and Profit Planning (7.4) covers budgeting as integral to the strategic planning process.

about elements of one component will likely have an impact on the other component. For example, overhead projections made for the profit plan will play a key role in the development of the annual budget. Therefore, it is important that these two components be developed concurrently.

Since these two components are developed for each new coming year, it would be advantageous for their development to begin before the coming year commences. Even if the final results of the current year are not yet available, it is acceptable, as a place to begin, to use the data from the latest of a firm's 4th-quarter accrual-basis financial reports and their calculated key indicators. Once the final, previous year-end data is available, adjustments for the coming year can be made to the budget and profit plan and their key indicators. Getting an early start will enable firm leaders to respond more effectively to new opportunities using the most current data. These two components, when fully developed, provide a basis for comparing the anticipated financial performance of a firm with its actual financial performance in the periodic monitoring of its accrual-basis profit-loss statement.

Distinctions Between Accounting Reports and Financial Management Reports

A comprehensive financial management system is based on a firm's accounting system, but there are distinctions between their respective reports.

Accounting reports and their generated data are the responsibility and realm of a firm's accounting personnel and its outside tax consultant. Financial management

GLOSSARY OF KEY ACCOUNTING TERMINOLOGY

- **Accrual-basis accounting (modified):** Revenue earned and billed from fees and expenses, including outside project consultant fees and expenses, plus all other direct and indirect expenses *incurred*. This means revenue is based only on invoiced fee and expense amounts sent and/or received. Most firms use this modified accrual-basis for their profit-loss statement and balance sheet development.
- **Cash-basis accounting:** Income *received* and all salaries and expenses *paid* (a checkbook approach). This is the basis most commonly used for filing and paying quarterly and year-end taxes.
- **Net operating revenue (NOR; aka "net revenue"):** Represents the net dollars remaining after deducting the invoiced consultant's fees and expenses, and all reimbursable and non-reimbursable project-related expenses.
- **Direct labor:** Same as direct salary. Represents time *charged* to projects, whether invoiced or not (by everyone, including principals).
- **Indirect labor:** Same as indirect salary. Time charged to non-project-related activities (by everyone, including principals). Note: Indirect labor is included in the calculation of total indirect expenses.
- **Reimbursable expenses:** Project-related expenses that are invoiced to the client in addition to fees. These would also include a markup percentage on those expenses. The markup dollars are a form of revenue and are included in net operating revenue.
- **Direct expense:** Project-related expenses for a firm and its outside consultants that are not reimbursable, plus project-related expenses included in all lump sum fee contracts.
- **Indirect expense:** General and administrative non-project-related operating expenses (total indirect expenses includes indirect labor).
- **Overhead rate:** The ratio of total indirect expenses to total direct labor.
- **Break-even rate:** The overhead rate plus the unit cost of 1.00 for an hour of salary (example: overhead rate of 1.30 + 1.00 = break-even rate of 2.30). This means for every $1.00 of salary the firm must recapture $2.30 just to break even.
- **Utilization rate:** Direct labor expressed as a percentage of total labor. (For individual rates, use hours; for a firm rate, use dollars.)
- **Hourly billing rate:** The dollar amount charged to a client relative to one hour of direct labor.
- **Net multiplier:** The net multiplier is the ratio of net operating revenue (NOR) to total direct labor. The measure of return on every dollar of direct labor.
- **Net profit:** The dollars remaining after deducting all direct and indirect labor and indirect expenses, before any distributions are made or tax is paid.
- **Current earnings:** The net dollar amount after all distributions are made and all applicable taxes have been deducted.

reports are the responsibility and realm of firm leaders, even though others might develop and compile these reports. While the basis (timesheets, incoming payments, and outgoing invoices) of the financial data is essentially the same for the accounting and financial reports, each report type is formatted differently to suit their respective purposes and use by each party.

Accounting reports focus primarily on cash-flow management, accounts payable, and defining the firm's quarterly and annual tax liability, which are identified in the *cash-basis* reports. A firm leader's focus will be on reviewing and monitoring the key indicators from the financial data provided in the *accrual-basis* reports. Both reports facilitate making sound business decisions to enhance a firm's effectiveness, efficiency, profitability, and the achievement of its professional goals.

An understanding of the following basic accounting terms is also necessary for skillful financial management.

FINANCIAL PLANNING

Applications of the Cash-Basis and Accrual-Basis Reports

Depending on the size of a firm, one or both types of reports may be used. The accounting process for most sole proprietors (those without any paid staff) would be on a checkbook-like basis (dollars received, dollars paid) and therefore would likely use only the cash-basis report. Almost all other size firms with employees would use both types of reports.

The cash-basis profit-loss statement indicates only the income received and the amounts paid out for expenses to others within a specific accounting period. Because certain expenses, such as salaries and most vendor invoices, are paid shortly after the obligation is incurred, and income from invoices may not be received for 30 to 120 calendar days, or more, after the work is actually done, there is no timing correlation between income received and expenses paid. The cash-basis profit-loss statement establishes a firm's cash-flow management effectiveness and its tax liability, not its net profit.

Nonpayment of invoices in excess of 30 days is problematic and needs to be resolved as quickly as possible. Payment on invoiced project amounts ideally should be received from the client within 30 days from the date of the invoice and certainly not later than 60 days.

Unlike the cash-basis profit-loss statement, the accrual-basis profit-loss statement does not consider the actual receipt or payment of any money. Rather, the accrual report reflects the invoices sent to clients for monthly revenue earnings, based on hours worked and expenses incurred to complete that work, in a given accounting period. The accrual basis profit-loss statement establishes the net profit for a firm and the calculation of its seven relevant key financial performance indicators.

These two reports do, however, have a connection. For example, consider the relationship between cash available on-hand and the distribution of any net profit. Ultimately, the availability of cash-on-hand will have a significant impact on the decisions made about the size and timing of net profit distributions.

Since the accrual-basis profit-loss statement defines net profit and the cash-basis profit-loss statement (aka the "income statement") defines available cash, both types of reports will need to be consulted before any decision about the distribution of net profit can be made. With this in mind, it is easy to understand the importance of maintaining a "healthy" cash-on-hand balance throughout the year.

For the sake of this article and in general, the "modified" accrual-basis is the industry-accepted method employed for the accrual-basis profit-loss statement. The modified version records only the revenue from fees and expenses that have been invoiced to clients. It would also include the fee and expense amounts invoiced to the firm by outside project consultants and other vendor and general expense amounts that were incurred in a specific accounting period. It does not include the value of earned fees unbilled ("work-in-progress").

Introduction to the Mattox Format

The use of conventional accounting formats, while perfectly acceptable, nevertheless do not allow for an easy calculation of the seven key financial performance indicators for the profit-loss statement. As an alternative to conventional accounting formats, there is a unique format that was developed by Robert F. Mattox, FAIA, (retired) designed to facilitate easy understanding of financial performance indicators.

CASH-BASIS AND ACCRUAL-BASIS REPORT DIFFERENCES

This example illustrates the differences between the cash-basis and the accrual-basis reports.

The cash-basis accounting for this firm recorded a net cash income of $21,000 for the current month. However, much of this income comes from the collection of months of previous invoices that were not paid until the current month. The accrual-basis accounting for this same firm indicates a net profit of $18,000, on the current month's invoices of $100,000.

Since net cash income and net profit are generated by different monetary resources, it is not appropriate or realistic to compare the actual income ($ received) in the cash-basis report to the earned "net profit" (based on dollars invoiced) in the accrual-basis report.

The cash-basis report indicates income received and payments made. For this reason, only the cash-basis profit-loss report is to be used to determine the firm's quarterly and annual tax liability.

The modified accrual-basis report provides an accurate snapshot of a given accounting period, generally one month and the year-to-date. It records only the invoiced amounts sent to clients for the firm. This report does not indicate any actual income received or payments made.

Current Month—Cash Basis	
Income received for previous invoices (for fees and expenses):	$70,000.00
Current month invoices (for fees and expenses):	$5,000.00
Total Current Month Income:	**$75,000.00**
Total salaries paid:	–$45,000.00
Total expenses paid:	–$9,000.00
Current Month Net Cash Income:	**$21,000.00**
Current Month—Modified Accrual Basis	
Net operating revenue earned (for invoices sent):	$100,000.00
Direct labor expenses incurred:	$32,000.00
Indirect expenses incurred (labor and expenses):	$50,000.00
Total labor and expenses incurred:	$82,000.00
Current Month Net Profit:	**$18,000.00**

While conventional accounting systems are capable of providing these same performance indicators, the results will be more laborious to calculate and will not necessarily provide as accurate a result for some of these key indicators. The reason for this is that conventional accounting systems are set up with certain data shown in portions of the report that make it necessary to extrapolate and reorganize these data to allow for the calculation of these seven key financial performance indicators.

AN INTRODUCTION TO THE MATTOX FORMAT

In the late 1970s, Robert F. Mattox, FAIA, (retired) developed an alternative to conventional accounting formats, particularly designed for use by professional design firms. The AIA Press first published this format in 1978 and 1980 in the two manuals authored by Mattox, titled "Standardized Accounting for Architects" and "Financial Management for Architects." Identified herein as the Mattox Format, this system was developed to enable design professionals to quickly ascertain firm profitability and measure its performance with key financial indicators. While the Mattox Format differs somewhat from a conventional accounting format, it is entirely consistent with generally accepted accounting principles (GAAP).

The significant difference between the Mattox Format and a conventional accounting system is the structure of its chart of accounts and the format of the major components of the profit-loss statement and the balance sheet, based on their respective chart of accounts.

For the profit-loss statement, the Mattox Format comprises four major components: revenue, direct labor, indirect expenses, and miscellaneous revenue and expenses. Together, these four components will provide a firm's true overhead rate, net profit, and five other key financial performance indicators.

Although the Maddox Format is not widely known or recognized by accounting professionals, the method has proven to be beneficial to many professional design firms. The Mattox Format is currently only available in one of the three integrated accounting software systems developed for professional design firms.

Performance Goals

Every professional design firm would do well to establish specific goals for its financial performance for each coming year. In order to provide a realistic set of performance goals, these goals need to be reviewed and modified to suit the current status of the firm's finances and the current and anticipated condition of the market for the firm's services.

Because each firm is unique, these goals will vary from firm to firm. For many firms these goals are based on established mission and vision statements.

Among the financial performance goals to consider are the following:

- Projected net billing and revenue
- Project consultant fees (as a percentage of total billing)
- Project-related expenses
- Staff size and salary expense
- Overhead expense and break-even rates (as a percentage of direct labor)
- Net profit (as a percentage of net operating revenue)

Included in these goals will also be the development of a competitive hourly billing rate for every member of the firm and their respective, targeted utilization rates for the coming year.

It is recommended that every firm establish these performance goals before the start of the coming year. Once established, these performance goals will provide firm members with an opportunity to be as efficient and effective as possible through regular monitoring of daily project activities and the accurate tracking of time spent each day on projects.

▶ See the backgrounder accompanying this article, Key Financial Performance Indicators, for more on financial ratios.

Projected Net Billing and Revenue

Financial planning begins with the projection of what the firm principal(s) believe to be a reasonable expectation of how much net billing (fees billed exclusive of expenses and consultants) and revenue the firm can create for the coming year. This would entail identifying current projects under contract that will carry over into the coming year and the balance of fees remaining to be billed on those projects in the coming year. This is commonly referred to as "backlog." Most firms maintain an ongoing backlog report to facilitate this process. Then, taking into consideration all outstanding project proposals and categorizing them as either a "prospect" (better than a 50 percent chance of being awarded) or a "suspect" (less than a 50 percent chance of being awarded) it is possible to assign a percentage of them being awarded to the firm and calculating their respective projected fee values. In addition, a firm's marketing plan will identify potential new prospects and suspects, based on the current and anticipated market conditions and the opportunities to submit future proposals for these yet to be identified new projects. With these resources identified, a realistic, conservative net billing and revenue projection goal for the coming year can be established within the profit plan.

Project Consultant Fees (as a Percentage of Total Billing)

A firm's total revenue generally also includes other fees to be billed in addition to their own. Most common among these are the fees for project consultants.

Refer to industry guidelines for what would be an appropriate percentage of a firm's total billings allocated to the fees of their project consultants. It is also advisable for each new prospective project, prior to submitting a fee proposal, to send a comprehensive request for proposal (RFP) to each of the required project consultants to be retained. Then, adding the project consultant's proposed fees to the firm's calculated net fee, the total fee can be established and the actual percentage of the total fee allocated to the project consultants can be determined. This percentage would then be compared to what the industry guidelines suggest to be reasonable and fair.

This process will enhance a firm's ability to be more responsive to an existing or new client's request for a fee proposal for future work and result in the potential for increased profitability.

Project-Related Expenses

Each project, based on the fee basis stipulated in the contract, will have expenses that can be invoiced and subsequently reimbursed or expenses that will be a part of the total fee, as in a lump sum fee basis and not individually reimbursed. In addition, even for those projects that have reimbursable expenses, there likely will be other expenses that will be non-reimbursable (e.g., in-house reproduction expenses for coordination, local mileage, unauthorized overtime, etc.). Because these common, project-related, non-reimbursable expenses reduce a project's profitability, they should be identified as a part of the fee-setting process and a unit cost established for each such expense. Doing so will result in establishing a more accurate net operating revenue and net profit for the prospective project.

Staff Size and Salary Expense

One of the performance goals to consider is a strategic plan for the staff size of a firm. The impact of the market and its economic condition will almost always play a role in establishing the number of employees in a firm. The great majority of firms in the United States are considered to be small firms. "Small," in this reference, is defined as fewer than 10 people, including the principal(s).

Regardless of a firm's staff size, it is still important to plan for the annual cost of its employees and principals. Proportionally, annual salaries are the single largest expense for any firm. For most firms, approximately two-thirds of their total annual salaries will be project-related and will be the primary source of a firm's generated revenue and income.

Of critical importance is the balance between staff size and the available project work. This balance is reflected in one of the seven P-L statement indicators: the ratio of the total direct labor expense to net operating revenue (net multiplier). To best reflect this balance, the total direct labor should be in the range of 28 to 32 percent of net operating revenue. If the ratio is considerably lower than 28 percent, it is a possible indication that there are insufficient hours being charged to project-related assignments. This might be the result of a reduction in project workload caused by a client stop-work order, or something affecting the entire industry like an economic slow-down. Whatever the reason, there will be times when the project workload is insufficient to allow staff to charge their "normal" number of direct hours (based on their respective, targeted utilization rates) and this will reduce the percentage of direct hours to NOR.

If the ratio is considerably higher than 32 percent, there are several possible explanations:

1. Hours in excess of those budgeted or allocated are being charged to project-related activities. Potential negative impact is that a project's total fee is being used too quickly and profit is being consumed to cover these additional hours.
2. A large volume of overtime hours are being charged to project-related activities. This would be added to the project fee if the client authorized and was paying for these overtime hours at regular or premium billing rates. If not, since firms usually do not pay overtime for salaried professional staff, these overtime hours, while still charged to the project, would not have any cost related to them. They are charged as hours with a zero-cost impact on the project budget or overhead burden. While these hours do not increase direct labor expense (in dollars), they should be recorded for an accurate measure of direct hours required for project completion. This is important for establishing reliable historical data on how many hours it actually takes to complete a certain project type.
3. A business decision was made to spend the hours to "catch up" with the project schedule. If no compensation is made for these hours, it is the same as the situation described in number 2 above: zero-cost. If compensation is being provided, it is similar to number 1 above: potential fee drain and profit loss.

For any and all of these above reasons, it is essential that the project hours charged are accurately and timely entered on each respective employee's daily timesheet.

▶ For related information, see "Recording Direct and Indirect Time" in Financial Management Systems (7.3).

Overhead Rate and Break-Even Rate (as a Percentage of Direct Labor)

The overhead rate and the break-even rate are inextricably related:

- *The overhead rate* comprises two components: indirect labor and general and administrative (G&A) expenses. Even though many G&A expenses are common to most firms, what these expenses specifically include will be a reflection of a firm's uniqueness in its operations and the types of discretionary benefits it offers its employees. Refer to the sample accrual profit-loss statement and the most common G&A expenses.
- *The break-even rate* is equal to the overhead rate plus an assigned unit cost of 1.0 for hourly salaries. A firm with an overhead rate of 1.30 would have a corresponding break-even rate of 2.30 (1.30 + 1.0).

Once a firm's overhead rate has been established, the break-even rate for every employee can also be calculated, based on their respective hourly salary rate.

> *Example:* For an employee who is paid a salary equal to $20 per hour ($41,600/2,080 hours) in a firm with an overhead rate of 1.30, the break-even rate for such an employee would be: $20.00 × 2.30 = $46.00 per hour.

That means for the firm to break even on this particular employee's hourly salary and their respective portion of the firm's overhead cost, the hourly billing rate for their direct labor can be no less than $46.00 per hour. To include profit at a targeted percentage of 20 percent, divide the break-even rate by 80 percent (the complement of 20%). This will establish an hourly billing rate of $57.50 ($46.00 ÷ 80% = $57.50; to check: $57.50 × 20% = $11.50 + $46.00 = $57.50).

Net Profit

On the accrual profit-loss statement, the net profit is considered to be a firm's "bottom line." It is the total dollars earned after all salaries and expenses have been deducted (regardless of payment) from the net operating revenue. The only thing remaining at this point, if a profit was earned, is the decision about its distribution to the staff and principal(s).

The need to define the actual available cash-on-hand that would cover such distributions was previously discussed. There are examples of firms that, in spite of having earned a net profit, did not have adequate available cash-on-hand to make the distributions they deemed appropriate. To supplement their available cash-on-hand and pay for these distributions, the principal(s) sometimes decide to tap into the firm's line of credit. In the case of firms that do not have a line of credit, some have been known to apply for a loan. While these are individual business decisions, they need to be considered carefully as to the wisdom and soundness of this course of action. If the firm is extremely well-managed, the repercussion of such decisions might never be negatively experienced, but for most, taking on debt to pay bonuses is a decision laden with risk.

Sometimes a firm has available cash-on-hand, but does not have any earned net profit at the end of the year. In this scenario, some may decide to go ahead and make modest distributions. Again, this is a business decision, but not necessarily a prudent one.

Planning for profitability and its eventual distribution is a process to engage in before the start of each coming year to provide a firm with the best advantage to succeed.

PROJECT CONTRACT–RELATED FINANCIAL MANAGEMENT ISSUES

Most project contracts contain information that will require a keen awareness of its impact on potential project profitability and the periodic monitoring of a project's progress. Among the information to review and monitor carefully is the fee basis type, the basic scope of services, scheduled invoices, and other opportunities that might lead to supplemental/additional services, revenue, and income.

Fee Basis Types

Every project will have a designated type of fee basis. There are several types, and each basis has its own nuances and financial management implications. The following are the most common types:

- Stipulated lump sum
- Fixed fee + expenses (with or without a cap limit on expenses)
- Percentage of construction cost
- Hourly to a maximum + expenses
- Hourly—open-ended (no established maximum) + expenses
- Fee per unit/sf (mostly used on residential projects) + expenses

▶ Services and Compensation (15.2) covers the variables to be considered when determining the amount to charge for architectural services as well as methods of compensation and strategies for getting paid.

▶ For more information on the go/no-go decision process, see Qualifications, Proposals, and Interviews (6.5).

For most project contracts the client will stipulate the type of fee basis. Public sector (government, institutional) projects will almost always be on a stipulated lump sum or a percentage of construction cost fee basis. Private sector projects could be any one of the above types, depending on the client and the project type.

Regardless of the fee basis type stipulated, each type affords a certain number of benefits and disadvantages, all of which need to be considered as one part of a "go/no-go" decision to respond to a RFP.

Scope of Services

The scope of services is a portion of the project contract that bears careful scrutiny. The scope of services in many project contracts is not clearly defined, which leaves too much to interpretation by the reader. This can lead to disastrous results for the architect, primarily in the area of lost revenue and subsequent lost income.

▶ Defining Project Services (15.1) addresses the centrality of scope definition to developing effective agreements for professional design services.

▶ See Risk Management Strategies (16.1), Insurance Coverage for Business and Professional Liability (16.2), and Owner-Generated Agreements (17.3) for related information concerning risk management.

To keep this from happening, it is advisable to have at least two senior members of the firm read and review the scope of services requirements to ascertain if any portions are unclear. There may be a need to stipulate the number included of a certain kind of meeting or the number of design scenarios per design phase to be prepared for client approval. Anything that is left open-ended and subject to interpretation may lead to a "bottomless pit" of expectations by a client.

In addition to the above, certain words that are used in contracts with owners are likely to result in a difference of interpretation of what the client was requiring, or what the legal implications might be, and/or how the requirement might affect the professional liability insurance carried by the firm. The most detrimental example is the words used in the indemnification clause of the contract. It is advisable to have a firm's legal counsel and their professional liability insurance carrier's representative review the contract to avoid any potentially expensive surprises.

CONCLUSION

Since each professional design firm is unique, so will be its respective operational policies and procedures. Therefore, prior to adopting any of the contents of this article, it is recommended that firm leaders seek professional input from trusted outside sources familiar with the firm. At a minimum, firm leaders are urged to review and discuss this article with accounting advisers, both in-house and outside. Once discussed, any decisions to adopt specific changes to their current accounting system should be implemented by the accounting staff and as much outside professional guidance as is available.

As a summation, the following are the main points of each of the major subtopics in this article:

- *Accounting and financial management reports:* The essential distinction between accounting reports and financial management reports relates to the parties for whom these reports are created. Accounting reports serve to identify the external realm of a firm's financial performance as it relates to tax liability. Financial management reports serve to facilitate the internal decision-making process by a firm's leader(s).

- *Cash-basis and accrual-basis reports:* The two types of financial reports—cash basis and accrual basis—respectively serve a firm's accounting and financial management needs. These reports are interrelated in that they share the same data for time and money, but organize these data in different formats and with a different focus and purpose. In accounting parlance, the use of these two types of reports is referred to as "double-entry bookkeeping."
- *The Mattox Format:* This article introduces a different approach to the accounting process and the concepts of financial management for professional service firms. The Mattox Format is a proven viable alternative methodology to what is generally commercially available for AE financial software systems. The Mattox Format has a 30-plus-year legacy since its introduction in the late 1970s and early 1980s by its designer and developer, Robert F. Mattox, FAIA (retired).
- *Performance goals:* With planning and monitoring as two critical elements in any successful business operation, it is essential that a set of performance goals be established and reevaluated on an annual basis to allow for developing trends, operational and policy changes, and to remain competitive and profitable.

For More Information

"Financial Management for Architects" (American Institute of Architects, 1980) by Robert F. Mattox, FAIA, (retired).

"Standardized Accounting for Architects" (American Institute of Architects, 1982) by Robert F. Mattox, FAIA, (retired).

Financial Management for Design Professionals: The Path to Profitability (Kaplan AEC Education, 2006) by Steve L. Wintner, AIA Emeritus, and Michael Tardif, Assoc. AIA.

BACKGROUNDER

KEY FINANCIAL PERFORMANCE INDICATORS (METRICS)

Steve L. Wintner, AIA Emeritus

The profit-loss statement and the balance sheet each have a relevant number of key financial performance indicators that provide firm leaders with valuable metrics to assist them in understanding their firm's financial condition and guide them in making sound business decisions.

THE PROFIT-LOSS STATEMENT

The profit-loss statement includes the following seven indicators to calculate from each month's financial report (in no particular order):

1. ***Utilization rate:*** Measures the overall efficiency and effective use of labor, not a measure of productivity. This also is not a measure of the number of hours billed, only hours charged to projects.

   Formula: direct labor hours ÷ total labor hours × 100 (as a %)
   Example: 32 hours ÷ 40 hours = 80%
   Target: Entire firm: 60–65%
   Professional-technical staff, including principals: 75–85%

2. ***Overhead rate:*** Measures the cost of operations not directly attributed to projects.

   Formula: total indirect expenses ÷ total direct labor (in $$$)
   Example: $308,241 ÷ $200,914 = 1.53 (for an hourly salary of $10/hr., the overhead cost would be 1.53 × $10 = $15.30)
   Target: 1.30 to 1.50 of total direct labor

3. ***Break-even rate:*** Measures the total cost of operations for every dollar spent on direct labor.

   Formula: overhead rate + 1.00 (represents the unit of cost for an hour of salary)
   Example: 1.53 + 1.00 = 2.53 (for an hourly salary of $10, the break-even cost would be 2.53 × $10 = $25.30)
   Target: 2.30 to 2.50 of total direct labor

4. ***Net multiplier:*** Measures the revenue generated for every dollar spent on direct labor. This indicator must be greater than break-even rate for a net profit to be realized.

   Formula: net operating revenue ÷ total direct labor (in $$$)
   Example: $622,207 ÷ 200,914 = 3.1
   Target: Greater than break-even rate (industry benchmark: 3.0+)

(continued)

5. ***Profit-to-earnings ratio:*** Measures the firm's effectiveness in generating a net profit (as a %).

   Formula: net profit (before distributions and tax) ÷ net operating revenue
   Example: $108,817 ÷ $622,207 = 17.49%
   Target: Equal to or greater than the anticipated net profit in the annual profit plan (20% or greater)
6. ***Net revenue per employee:*** Measures the revenue earnings for each employee. Based on targeted net profit, this indicator contributes to the establishing of the net operating revenue in the coming year's annual budget.

   Formula: annual net operating revenue ÷ total number of employees
   Example: $622,207 ÷ 6 employees = $103,701 per employee
   Target: In excess of $100,000.00 per employee
7. ***Aged accounts receivable:*** Measures the average time interval in days between the date of outstanding invoices and the date payment is received.

   Formula: average annual accounts receivable ÷ (net operating revenue ÷ 365 days) = calendar days before payment is received
   Example: $245,090 ÷ ($622,207 ÷ 365 = 1,705) = 144 calendar days
   Target: 60–90 calendar days (Anything over 90 days means the firm is "lending" money to client at zero cost.)

THE BALANCE SHEET

The balance sheet includes the following four indicators to calculate from each month's financial report (in no particular order):

1. ***Solvency:*** Measures a firm's ability to pay current debt. This is also known as the "current ratio."

   Formula: total current assets ÷ total current liabilities
   Example: $521,667 ÷ $218,658 = 2.39
   Target ratio: Min. 1.5 to 1.0
2. ***Liquidity:*** Measures a firm's ability to convert assets to cash. This is also known as the "quick ratio."

   Formula: (cash + accounts receivable + revenue earned, not billed ["work in progress"]) ÷ total current liabilities
   Example: $518,194 ÷ $218,658 = 2.37
   Target ratio: Min. 1.0 to 1.0
3. ***Leverage:*** Measures a firm's ability to manage debt effectively. This is also known as "debt–to-equity" (as a %).

   Formula: total liabilities ÷ total equity × 100 (as a %)
   Example: $280,738 ÷ $949,451 = 29.57%
   Target: Less than 35%
4. ***Return on equity:*** Measures the accumulated amount of money returned on a stockholder's investment for their risk and efforts.

   Formula: (total net operating revenue – total expenses) ÷ total equity × 100 (as a %)
   Example: ($622,207 – $509,156) ÷ $949,451 × 100 = 11.9%
   Target: Equal to or greater than the anticipated net profit in the annual profit plan (20% or greater)

7.3 Financial Management Systems

Steve L. Wintner, AIA Emeritus

The primary function of financial management systems is to provide firms with numerous effective financial and project reports and supporting techniques to enhance the achievement of a firm's long-term financial goals.

INTRODUCTION

To ensure the financial success of any firm with at least one or more employees, it is essential to have a comprehensive financial management system that includes a number of types of reports and resources. These reports and resources will facilitate a firm leader's ability to manage the financial operations of the firm. Every firm leader needs to understand and be responsible for this process of management. This is one responsibility that is not to be delegated to anyone lacking this understanding and knowledge.

Steve L. Wintner is the founder and principal of Management Consulting Services, a Houston-based firm specializing in design firm management. Wintner has more than 35 years of experience in design firm management and is the coauthor of *Financial Management for Design Professionals: The Path to Profitability* (Kaplan Publishing, December 2006).

The reports and resources providing basic information as a part of this financial system include the chart of accounts, the annual budget, the profit plan, daily timesheets, project contracts, financial management reports, key financial performance indicators, and project reports.

CHART OF ACCOUNTS

The development of a chart of accounts is the foundation of every accounting system and its means of organizing a firm's financial data. The chart of accounts, reflecting the Mattox Format, represents sets of properly organized, multi-tiered, interrelated, numeric codes and/or account numbers. Each one serves as the repository and record for every dollar received, paid, and billed by a firm as shown on a profit-loss statement and balance sheet.

▶ Financial Management Overview (7.2) further describes the Mattox Format.

The hierarchy of the numeric codes and/or account numbers starts with a "major" code or account and then is further defined by a series of sub-codes or accounts. Most comprehensive AE accounting software systems provide for a four-digit numeric code and/or account number. Each account number and designation will match a firm's general ledger listing of the income, expense, and asset accounts. It is recommended to seek the guidance of an outside consultant (management, software representative, and accounting) to assist with establishing these numeric codes and/or account numbers, especially if applying the Mattox Format (see Table 7.1).

A "master" chart of accounts is developed for the profit-loss statement and the balance sheet. The accounting software will provide a means for switching between the cash-basis and accrual-basis reports for these two documents and their respective numeric codes and/or account numbers.

MATTOX FORMAT FOR THE CHART OF ACCOUNTS

The following is a sample of the structure for the chart of accounts in the Mattox Format for the accrual-basis profit-loss statement and the balance sheet. Only major headings are shown in most accounts; for more detailed information, see "7.4 Developing Annual Budgets and Profit Planning."

TABLE 7.1 Chart of Accounts

Account ID	Account Description	Account Group	Notes
4100	Fees Billed	Fees Billed	Positive dollars
4110	Architect Fees Billed	Fees Billed	
4120	Consultants Fees Billed	Fees Billed	
4130	Markup on consultant fees billed	Fees billed	
4150	Reimbursable Expenses Billed	Reimbursable Expenses Billed	Positive dollars
4170	Outside Consultants' fee invoices rec'd	Outside Consultants	Negative dollars
4190	Project-Related Expenses (reimb.+ non-r.)	Project-Related Expense	Negative dollars
A.	Total Net Operating Revenue (NOR)		Baseline at 100%
5110	Direct Labor: Principal	Direct Labor Expense	
5120	Direct Labor: Professional-Technical	Direct Labor Expense	
5130	Direct Labor: Administrative	Direct Labor Expense	
5140	Direct Labor: Contract	Direct Labor Expense	

(continued)

TABLE 7.1 (continued)

Account ID	Account Description	Account Group	Notes
B.	Total Direct Labor Expense (TDL)		
6110	Indirect Labor: Principal	Indirect Labor Expense	
6120	Indirect Labor: Professional/Technical	Indirect Labor Expense	
6130	Indirect Labor: Administrative	Indirect Labor Expense	
6140	Indirect Labor: Temporary	Indirect Labor Expense	
6200	Payroll Taxes & Nondiscretionary Benefits	Payroll Taxes & Nondiscretionary Benefits	
6300	Discretionary Benefits & Professional Development	Discretionary Benefits & Professional Development	
6400	Office Lease & Facility Expense	Lease & Facility Expense	
6500	General Office Expenses	General Office Expenses	
6600	Business Insurance	Business Insurance	
6700	Auto Expense	Auto Expense	
6800	Bank Charges	Bank Charges	
6900	Professional Services	Professional Services	
7100	Depreciation/Amortization Expense	Depreciation/Amortization Expense	
7300	Tax Expense	Tax Expense	
7400	Marketing & Business Development	Marketing & Business Development	
C.	Total Indirect Expenses		
D.	Total Expenses (Direct + Indirect) (B + C)		
E.	Profit or <Loss> from Operations (A – D)		
8100	Miscellaneous Revenue	Misc. revenue	
8500	Miscellaneous <Expense>	Misc. <expense>	
F.	Total Miscellaneous Revenue/<Expense>		
G.	Net Profit (before distributions & taxes) (E – F)		The "bottom line"
9110	Principal: Accrued Bonus	Distributions	
9120	Professional/Technical: Accrued Bonus	Distributions	
9130	Administrative: Accrued Bonus	Distributions	
9140	Temporary Accrued Bonus	Distributions	
9210	Principal: Paid Bonus/Draw	Distributions	
9220	Professional/Technical: Paid Bonus	Distributions	
9230	Administrative: Paid Bonus	Distributions	
9240	Temporary Paid Bonus	Distributions	
H.	Total <Distributions>		
I.	Current Earnings (G – H)		

Note: Only Account Descriptions with shaded background will print on the P-L statement.

ANNUAL BUDGET

The chart of accounts and the annual budget are interrelated resources. Each chart of accounts numeric code and/or account number represents a specific type of financial data that corresponds to a specific annual budget line item.

▶ Developing Annual Budgets and Profit Planning (7.5) covers budgeting as an integral part of a firm's strategic planning process.

PROFIT PLAN

The "bottom line" of the accrual-basis profit-loss statement is the line item identified as "net profit." In order to arrive at a desired net profit at the end of each year, it would be a sound business decision to plan in advance for that to happen. The profit planning process entails a number of significant components, each one having an impact on establishing a certain number of parameters to be achieved. The achievement of each of these parameters helps to enhance the chances that a year-end, targeted net profit would be realized.

RECORDING DIRECT AND INDIRECT TIME

Are timesheets generally treated as though they are *one of the most important financial resources of every professional design firm*? Sadly, the answer is a resounding "No!" Yet this is the only "commodity" that firms "sell" to their clients. Unfortunately, timesheets are seen by many employees as some form of diabolical, arbitrary ritual created by their bosses. At the same time, principals are often the worst offenders in terms of not filling out their timesheets in a timely and accurate manner.

Clearly, few firm leaders and staff recognize that the timesheet is, in fact, *one of the most important financial resources of every professional design firm*. Here are some facts that confirm this assertion.

The time reflected on a timesheet becomes the single most significant component of the accounting data-entry process. This is true because the hours charged to projects become the basis for the decision of how much to invoice for each project and subsequently, affect a project's eventual profit or loss. The amount invoiced and payment received is the lifeblood of every firm. In addition, timesheets allow for tracking of effort spent on each project, which is critical to comparing project progress to the project budget and to allow timely adjustments as appropriate.

Time spent on every project should be aligned with the allocated number of hours budgeted for each phase and task. Without timely, accurately completed timesheets, there is a real possibility of a disparity between the time spent and the dollars billed. Ideally, the fee amount value of each project invoice will be determined by the hours spent on each project each month. With untimely, inaccurate timesheets, there is a potential for a reduction of the targeted project profit.

On a firm-wide basis, the total hours charged to projects is the denominator used in the calculation of a firm's net multiplier and overhead rate. The calculated overhead rate can then be extended to reflect the corresponding break-even rate, both of which are essential elements of developing hourly break-even rates for every employee. Further, this data provides historical information for project fee budgets during the fee-setting process, in response to a client's request for proposal (RFP).

If the time entered on a timesheet is at best just an approximation, then the data-entry process compounds the problem by the incorporation of this unfortunate estimate of hours in the development of project, accounting, and financial management reports.

The resulting totals and indicators will then provide misleading, erroneous information to the project managers and firm leaders. This is further compounded and harmful to the financial well-being of a firm when multiples of these guessed-at hours charged to projects on numerous timesheets become the basis of future overhead rates used in the fee-setting process for new projects. Measured over multiple active projects for a firm, it is easy to comprehend the increased magnitude of the problem and its potentially negative impact on each project and, overall, on a firm's annual profitability.

Obviously, none of this is done with malice, just a lack of understanding about the true nature of what a timesheet represents in the total process of the financial management of a firm. With less than an hour's worth of training, every member of the firm can develop a better daily timesheet completion discipline. This would go a long way to enhancing a firm's efficiency, effectiveness, and profitability. These kinds of "savings" in lost revenue could mean the difference of a year-end net profit vs. a net loss. As such, it might also mean the difference in whether or not there will be a distribution of year-end bonuses and/or salary increases. All this exposure to undesirable outcomes results from a lack of understanding about the true nature of a timesheet and its critical role in every professional design firm's long-term success.

The following are some simple techniques to adopt as a discipline for the completion of a timely and accurate timesheet.

- Develop a personal log and record the time spent before you start a different task, or phase.
- Record time in not less than 15-minute increments.
- Twice a day, enter on the timesheet the time spent in the morning, just before taking a lunch break, and again in the afternoon (evening), just before leaving the office for the day.
- All authorized overtime hours spent are to be recorded. The local or state agency that governs the state labor standards and the terms of the project contract will be the determining factors in the hours having any cost to the project. Regardless of any cost impact, the hours must be reflected on the project reports. In any scenario, overtime hours do not incur the cost of any overhead burden. The overhead burden is only applied to the first 40 hours per week. Therefore, any overtime to be charged to a client, in accordance with the state labor standards and the project contract, will likely be at a lower hourly rate than the regular hourly billing rate, due to the absence of the overhead cost burden.

FINANCIAL REPORTS

The focus of this portion of the article will be an overview of the two most common financial reports: the profit-loss statement and the balance sheet. For the purposes of this discussion, the reference to the profit-loss statement and the balance sheet is to the accrual-basis report for each.

The profit-loss statement and the balance sheet reports are developed at least once on a monthly basis. Each report provides firm leaders with different types of financial information for uniquely different purposes.

The P-L statement reflects the results of a firm's operations in terms of its revenue, direct labor, indirect labor, indirect expenses, and net profit for a given accounting period (generally the current month and the year to date).

The balance sheet provides a description of a firm's current financial condition for any given accounting period, even as short as a single day, of its assets, liabilities, and equity.

In the review of each report, there are specific line items that are more significant than others and will provide tell-tale trends of how the firm is doing financially. Together, these two reports describe a complete picture of a firm's current financial status.

Profit-Loss Statement (P-L)

The P-L statement is the financial management report that will provide firm leaders with 7 of the 11 total key financial performance indicators.

On the P-L, the four most significant line items are these:

- Net operating revenue (dollars available for supporting daily operations and the baseline 100 percent value of the rest of every line item in the report)
- Total direct labor, as a percentage of net operating revenue

- Total expenses
- Net profit (before distributions and tax and referred to as the "bottom line")

Developing an annual budget for these line items and their respective subcategories is advisable.

The Key Financial Performance Indicators backgrounder article explains what to look for and how to interpret the implications of the developing trends for each of these line items. This understanding is essential to making sound business decisions to offset negative trends and to repeat activities that produce positive trends.

▶ For more information on financial ratios useful to financial management, see the backgrounder Key Financial Performance Indicators that accompanies Financial Management Overview (7.1).

"Executive Summary" Format

The P-L statement that is provided to a firm leader needs to incorporate the same three "Cs" that are taught regarding the quality of construction documents: information that is "clear, concise, correct"—for all the same reasons and then some.

A firm leader's time is of the highest value to the firm and its clients and therefore needs to be spent doing only the things that only they can do. As stated early on in this section, the management of a firm's financial operations should not be delegated to just anyone. The reading, review, and interpretation of the P-L are the first and most important aspects of managing a firm's financial operations.

To make this process as effective and efficient as possible for the firm leaders, it is essential to create a single-page "executive summary" of the P-L. This condensed version includes every part of the full P-L, but not in detail. The chart of accounts numeric codes or account names should be condensed into a limited number of relevant line items for each of the four component sections of the statement. This will allow for the report to fit on just one page.

Mattox Format P-L Statement

The Mattox Format for the P-L statement includes the following four vertical component (row) sections (see Table 7.2):

- Revenue
- Direct Labor (Salary) Expense
- Indirect Expenses
- Miscellaneous Revenue and Expense

Each of these four components has a group of line items that serve as a major description for its respective component. Each of these line items has, in turn, a limited number of subcategory line items for each description. The subcategory line items are up to the discretion of the firm leader(s), who can decide what line items they want to review for each major category. Awareness is required to maintain the single-page format. In the event that any subcategory line item comes into question, all of the supporting financial details are available from the firm's accounting system.

The Mattox Format also includes six columns for component sections:

- Current Month
- Percent for Current Month
- Year-to-Date (YTD)
- Percent for YTD
- YTD Annual Budget
- Percent for YTD Annual Budget

Each of these six columns reveals a specific detail about the firm's current and cumulative (YTD) quantitative data in dollars and percentages.

Together, these horizontal and vertical components provide a very comprehensive summary of the firm's financial activity for the current month, the year-to-date, and a comparison to the corresponding year-to-date annual budget.

MATTOX FORMAT FOR THE PROFIT-LOSS STATEMENT

TABLE 7.2 Sample Profit-Loss Statement in the Mattox Format

Sample/Example—Accrual Basis, Actuals

	Profit-Loss Statement	**Current Month**	**%**	**Year-to-Date**	**%**	**Year-to-Date Budget**	**%**
	Revenue						
	Fees Billed (incl. consultants + markup)	93,599	142.22	1,113,654	141.02	1,184,738	142.28
	Reimbursable Billed (incl. markup)	13,248	20.13	164,981	20.89	177,399	21.31
	Outside Consultants	(25,417)	(38.62)	(305,007)	(38.62)	(327,964)	(39.39)
	Project-Related Expenses (non-reimb. exp.+ reimb. exp.)	(15,618)	(23.73)	(187,411)	(23.73)	(201,517)	(24.20)
A	Net Operating Revenue	65,812	100.0	789,738	100.0	832,656	100.0
	Direct Labor (Salary) Expense						
	Direct Labor: Principal(S)	7,950	12.08	96,760	12.51	95,000	11.41
	Direct Labor: Professional/Technical Staff	9,996	15.19	125,022	15.83	126,834	15.23
	Direct labor: admin. Staff	724	1.10	9,988	1.26	10,920	1.31
	Direct Labor: Contract	2,100	3.19	28,000	3.55	30,000	3.60
B	Total Direct Labor (Salary) Expense	20,770	31.56	259,770	32.89	262,754	31.55
	Indirect Expenses						
	Admin. Labor: Principal(S)	7,590	11.53	93,240	11.81	95,000	11.41
	Admin. Labor: Professional/Technical Staff	2,740	4.16	31,623	4.00	29,811	3.58
	Admin. Labor: Admin. Staff	1,690	2.56	21,212	2.69	20,280	2.44
	Admin Labor: Temporary Help	0	0.00	6,017	1.10	4,330	0.52
	Paid Time Off (total or by staff type)*	1,830	2.78	20,533	2.60	20,816	2.50
	Payroll Benefits (FICA/Medicare, medical and life insurance, etc.)	8,062	12.25	96,742	12.25	91,811	11.03
	Discretionary Benefits	395	0.60	4,355	0.55	4,746	0.57
	Office Lease	3,325	5.05	39,900	5.05	39,900	4.79
	Office Expense	2,120	3.22	26,498	3.40	24,980	3.00
	Professional Liability/General Office Insurance	0	0.00	9,040	1.14	10,655	1.28
	Interest Expense	0	0.00	7,477	0.95	9,322	1.20
	Professional Business Consultants	1,000	1.52	10,891	1.38	12,736	1.53
	Taxes: Local Property/Franchise	0	0.00	8,325	1.05	9,940	1.19
	Depreciation/Amortization	6,372	9.68	6,372	0.81	7,987	0.96
	Marketing/Business Development	974	1.48	19,679	2.49	21,524	2.58
C	**Total Indirect Expenses**	36,098	54.85	401,904	50.89	403,838	48.50
D	**Total Expenses (B + C)**	56,868	86.41	661,674	83.78	666,592	80.06
E	**Profit – Loss (A – D)**	8,944	13.59	128,064	16.22	166,064	19.94
	Miscellaneous Revenue/Expense						
	Miscellaneous Revenue						
	Interest Earned	613	0.93	9,675	1.23	11,300	1.35
	Gain on Assets	0	0.00	0	0.00	0	0.00
	Retained Bid Deposits	0	0.00	750	0.09	0	0.00
	Total Miscellaneous Revenue	613	0.93	10,425	1.32	11,300	1.35

	Profit-Loss Statement	Current Month	%	Year-to-Date	%	Year-to-Date Budget	%
	Miscellaneous Expense						
	Bad Debt (Write-Off) Allowance	0	0.00	(2,415)	(0.31)	(3,000)	(0.36)
	Loss on Assets	0	0.00	0	0.00	0	0.00
	Miscellaneous (Expense)	0	0.00	(545)	(0.07)	(188)	(0.02)
	Total Miscellaneous Expense	0	0.00	(2,970)	(0.38)	(3,188)	(0.38)
F	**Net Total Miscellaneous Revenue/Expense**	613	0.93	7,465	0.95	8,112	0.97
G	**Net Profit/(Loss) Before Tax** and Distributions (E + F)**	9,557	14.52	135,529	17.16	174,176	20.92
	Distributions						
	Principal: Accrued Bonus	9,167	13.93	110,000	13.93	140,000	16.81
	Professional/Technical: Accrued Bonus	1,250	1.90	15,000	1.90	20,000	2.40
	Administrative: Accrued Bonus	250	0.38	3,000	0.38	4,000	0.48
	Temporary: Accrued Bonus	0	0.00	0	0.00	0	0.00
	Total Accrued Bonus	10,667	16.21	128,000	16.21	164,000	19.70
	Principal: Paid Bonus & Draws	(50,000)	(9.53)	(110,000)	(13.93)	(140,000)	(16.81)
	Professional/Technical: Paid Bonus	(7,500)	(2.38)	(15,000)	(1.90)	(20,000)	(2.40)
	Administrative: Paid Bonus	(1,500)	(0.48)	(3,000)	(0.38)	–4,000	(0.48)
	Temporary: Paid Bonus	(500)	0.00	(500)	0.78	0	0.00
H	**Total Distributions**	(59,500)	(12.4)	(128,500)	(16.21)	(164,000)	(16.81)
	Provision for Income Tax***	0	0.00	(1,054)	(0.13)	(1,526)	(0.18)
I	**Current Earnings (G – H)**			5,975	0.76	8,650	1.04

**This is an optional line item. If used, it must be added to both the direct and indirect labor line items to calculate total salaries.*

***This does not apply to S-corps, LLPs, partnerships, or sole proprietors. Discuss with your tax consultant.*

****The provision for income tax is determined by the cash-basis income statement. The numbers are entered here only after being determined by the firm's accounting person.*

Revenue Component of P-L

The Revenue component establishes the baseline value for the net operating revenue (NOR) at 100 percent. Every other line item in the P-L is a corresponding percentage of the NOR.

The Revenue section is further divided into four sub-major line items: Fees Billed, Reimbursable Expenses Billed, Outside (Project) Consultants (O-C), and Project-Related Expenses. Each of these sub-major line items is further defined by a number of sub-categories.

1. Fees Billed for:
   a. Architect
   b. Outside Consultants
   c. Markup on O-C fees to be billed
   Fees Billed are shown as positive dollar amounts.
2. Reimbursable Expenses Billed for:
   a. Architect
   b. Outside Consultants (equal to the invoice amounts received from the O-C for the billing period)
   c. Markup on all expenses to be billed
   Reimbursable expenses billed are shown as positive dollar amounts.

3. Outside Consultants:
   Equal to the fee invoice amounts received from the O-C for the billing period
   Outside Consultants is shown as a negative dollar amount (debit to Net Operating Revenue).
4. Project-Related Expenses (for the following five types):
   a. Architect's reimbursable expenses, markup not included
   b. O-C reimbursable expenses (amount invoiced to architect), markup not included
   c. Project-related expenses included in all of the lump sum fee projects billed
   d. Project-related non-reimbursable expenses for the firm that are not allowed by clients, per the contracts
   e. Project-related reimbursable expenses that exceed any contract-stipulated maximum

   Project-Related Expenses are shown as negative dollar amounts (debit to Net Operating Revenue).

Notes:

Items 4a + 4b equal items 2a + 2b less markup.

Items 3 and 4b represent the dollar values of the invoiced amounts received from the O-C for the billing period.

Balance Sheet

The balance sheet is the second of the two primary financial management reports and represents an opportunity to look at the firm's financial condition at any time. Because the report is updated every time financial data is entered into the accounting system, it is capable of providing an "instant snapshot" of the firm's financial condition.

On the balance sheet, the four most significant line items are these:

- *Current Assets:* Those easily converted to real dollars
- *Current Liabilities:* Items that must be paid within the current 12-month period, irrespective of the calendar year, that diminish the value of a firm's retained earnings and thereby reduce equity
- *Long-term Liabilities:* Items that must be paid beyond the current 12-month period and diminish the impact of the value of a firm's retained earnings (and thereby reduce equity)
- *Equity:* The value of shares of stock, invested capital by shareholders, and the firm's cumulative retained earnings (or loss)
- Current Assets (Cash-on-Hand, Accounts Receivable, and Fees Earned Unbilled [Work-in-Progress, or WIP]) are line items that need careful, regular scrutiny to ensure that the firm is maintaining a proper margin over its liabilities. The Current Liabilities to monitor and manage are Accounts Payables and Short-Term Notes Payable. Equity will reflect the cumulative Earnings (or Loss) over the life of a firm, based on each year's Current Earnings (or Loss) from the year-end P-L reports.

The term "Balance" reflects that Total Liabilities and Total Equity always equal the Total Assets. This report will provide the remaining 4 of the 11 total key financial performance indicators.

"Executive Summary" Format

The balance sheet is less complex in its format than the P-L statement. Because this report is in a state of almost constant change, only a single column of figures is required. If a firm leader desires, the subtotals and totals for each section can be offset from the body of line item figures. Like the P-L, maintaining the single-page Executive Summary format is also an important consideration.

The balance sheet and the profit-loss statement share certain financial data. Among these are:

- *From the profit-loss statement to the balance sheet:* Bad Debt, Current Earnings, and Accrued Bonus
- *From the balance sheet to the profit-loss statement:* Accumulated Depreciation/Amortization

Balance Sheet Components and Line Items

There are two key words on the balance sheet that require a definition to clearly understand their respective meanings. The words "current" and "long-term" are referred to in connection with all three of the major components: assets, liabilities, and equity. These words occur throughout the balance sheet, both as major components as well as a number of different line items.

Each time these words occur, they carry the same meaning. "Current" is the current 12-month period, irrespective of the calendar year, and "long-term" is any time frame beyond the current 12-month period.

Specific examples:

- "Notes Payable—Current Portion" in Current Liabilities
- "Notes Payable—Long-Term Portion" in Long-Term Liabilities

Mattox Format Balance Sheet

The Mattox Format for the balance sheet consists of five vertical component (row) sections, which include: two groups of Assets (Current and Long-Term), two groups of Liabilities (Current and Long-Term), and a single Equity component (see Table 7.3). The differences between the Mattox Format and a conventional balance sheet are related to subcategory line items and are minimal.

Like the P-L Statement, each of these five component sections is further divided into a group of line items that serve as a major description for the component. Each of these major descriptions has a limited number of subcategory line items for each description. These subcategory line items, unlike the P-L statement subcategory line items, are not discretionary. They represent essential data that need to be shown to allow the report to be effectively reviewed and understood. In the event that any subcategory line item comes into question, all of the supporting financial details are available from the firm's accounting system.

FREQUENCY OF DISTRIBUTION FOR FINANCIAL REPORTS

The frequency of distribution for the Executive Summaries of the two financial reports is a decision to be made by the firm leaders and, in many situations, is a function of the size and complexity of the firm. In general, however, even in small firms, most firm leaders will expect to receive an updated set of financial reports on a monthly (30-day)

MATTOX FORMAT FOR THE BALANCE SHEET

The following is a sample of the balance sheet in the Mattox Format.

TABLE 7.3 Balance Sheet

	Current Assets	
	Cash (Checking, MMF, CDs, etc.)	$56,768
	Accounts Receivable	245,090
	Allowance for Bad Debt	**(3,115)**
	Fees Earned Unbilled (Work-In-Progress)	16,336
	Prepaid Expenses/Insurance	4,588
	Other Current Assets (Lease Security Deposit, etc.)	2,000
A.	**Total Current Assets**	**$321,667**
	Fixed Assets	
	Furniture & Equipment	$68,058
	Leasehold Improvements	20,465
	Company-Owned Autos	28,788
	Property and Buildings	103,436
	Accumulated Depreciation/Amortization	**(12,225)**
B.	**Total Fixed Assets**	**$208,522**
C.	**Total Assets (A + B)**	**$530,189**
	Current Liabilities	
	Notes Payable—Current 12 Months	$16,140
	Accounts Payable	49,788
	Fees Billed Unearned	15,750
	Retainers/Initial Payments Unearned	7,500
	Accrued Payroll Taxes (Employer's Portion)	4,128
	Federal Income Taxes—Withheld	3,644
	Accrued Vacation	4,663
	Accrued Bonus	107,500
	Other Current Liabilities	$9,545
D.	**Total Current Liabilities**	**$218,658**
	Long-Term Liabilities	
	Balance of Notes Payable (not incl. Current Installments)	$51,340
	Other Long-Term Liabilities (Beyond Current 12 Months)	10,740
E.	**Total Long-Term Liabilities**	**$62,080**
F.	**Total Liabilities (D + E)**	**$280,738**
	Stockholder's Equity	
	Common Stock (Par Value)	$1,000
	Additional Paid-In Capital	80,000
	Current Earnings (at end of Current Yr.)	9,619
	Previous Cumulative Retained Earnings	158,832
G.	**Total Stockholder's Equity**	**$249,451**
H.	**Total Liabilities & Equity (F + G)**	**$530,189**
	Note: Total Liabilities & Equity always equals Total Assets (H = C)	

basis, if not more frequently. This timing rarely occurs at the end of a calendar month. Rather, it is related to the completion of the accurate entry of all of the relevant, current financial data into the accounting system. Firm leaders need these data as quickly as possible to allow them to have the best opportunity to respond in a timely manner to developing trends. Obviously, those firms with an integrated, computerized accounting system will have a distinct advantage over those using less-sophisticated software.

In addition to the firm leader(s), there may also be a need to provide a current report to governmental agencies, insurance companies, banks, and perhaps even new prospective clients.

Having accurately completed daily timesheets once again becomes a key factor in the efficiency and accuracy of the accounting systems data-entry process and its final, monthly distributed reports.

CONCLUSION

In general, any well-designed and properly integrated financial management system will enhance a firm's opportunities for financial success. To do so requires the development of a number of properly formatted reports and data-tracking components for use in these reports. The regular, periodic monitoring of these reports will facilitate the necessary adjustments to maintain a firm's financial success.

Prior to adopting any of the contents of this article it is recommended that each firm seek professional input from trusted outside sources familiar with the firm. At a minimum, firm leaders are urged to review and discuss this article with accounting advisers, both in-house and outside. Once discussed, any decisions to adopt specific changes to their current accounting system will need to be implemented with its accounting staff and as much outside professional guidance as is available.

7.4 Developing Annual Budgets and Profit Planning

Steve L. Wintner, AIA Emeritus

Developing an annual budget is an integral part of a firm's strategic planning process. When developed in concert with the profit plan, an annual budget is an essential resource that will allow firm leaders to compare a firm's actual year-to-date (YTD) financial performance to its YTD annual budget.

DEVELOPING ANNUAL BUDGETS

Introduction

The annual budget, developed concurrently with the profit plan, affords firm leaders the best possible method of establishing guidelines for the firm's operations and financial effectiveness over the course of the coming year.

The annual budget utilizes numerous financial components that are developed by the profit plan. For this reason, among many others, it is important that these

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two financial "tools" be developed concurrently to ensure the seamless sharing of essential data needed by both.

The chart of accounts provides a foundational format for the annual budget, in that the budget will, in its most detailed form, utilize most, if not all, of the established major and subaccount line items. In fact, it would be advisable to use the chart of accounts as the primary organizing element for the annual budget. A detailed explanation and example follows.

Because the development of the annual budget, like the profit plan, is an annually recurring process, it is advisable to begin its development in the latter stages of the fourth quarter of the preceding year. Mid-October, for those who have never developed an annual budget before, would not be too early to start the process. Starting early will allow sufficient time to thoroughly and methodically go through each step without the pressure of the coming year commencing before the budget is completed and can be approved.

▶ For details of the chart of accounts, see Financial Management Systems (7.3).

Annual Budget

The annual budget, when properly developed, will include the chart of account numbers and data from the profit plan. In its initial format, the annual budget will resemble an expanded version of the profit-loss statement (P-L). This expanded version (Tables 7.4–7.7) includes both fixed and variable expenses. This format allows for every known or anticipated expense to be included. This level of detail ensures a greater possibility of capturing the expenditures for the coming year. Once this level of budget is as complete as possible, it would be reviewed by the appropriate firm leaders to make any final adjustments and to reach consensus on its approval.

Once approved, the fixed and variable indirect expenses for the same major account numbers can then be combined in a "collapsed" version (Table 7.8) of the completed, expanded version.

The major accounts shown in this collapsed version would then be used to develop the approved final annual budget version (Table 7.9). The approved final annual budget would also be used as the basis for a third set of figures (dollars and percentages) being added to the monthly P-L format, representing the YTD annual budget for each of the respective P-L line items. The purpose and benefit of including a YTD budget in the monthly P-L is to provide a comparison with the firm's actual YTD financial performance.

Refer to the Financial Management Systems article (7.3) to see an example for the Profit-Loss statement with the YTD budget included.

The annual budget, combined with the projections for revenue, direct expenses, and indirect expenses developed in the profit plan, creates a strategic financial plan illustrating the optimum results anticipated for the coming year. Reviewing the P-L every month on a line-by-line basis will indicate how the firm is doing compared to the respective YTD budget. This will help firm leaders become better stewards of their financial resources. It will also facilitate sound business decisions in response to negative or positive trends that develop over the course of each succeeding month.

Without the budget in the P-L, the YTD actual figures represent only numbers and percentages "in a vacuum." There isn't any relevant basis for evaluating these results, other than how they might compare to the empirical standards of the design industry. That will not provide greater relevance, meaning, and impact than seeing the actual results side-by-side with its respective YTD budget.

Annual Budget Format and Components

The annual budget is formatted in four primary sections: Revenue, Fixed Expenses, Variable Expenses, and Miscellaneous Revenue and Expense. Each section, with its own components, is similar to Mattox Format of the profit-loss statement.

- *Section One: Revenue*. Includes the exact same four components as the P-L: Fees Billed, Reimbursable Expenses Billed, Outside Consultants, and Project-Related Expenses

PART 2: FIRM MANAGEMENT

- *Section Two: Fixed Expenses*. Includes Direct Labor Expenses and certain fixed Indirect Expenses
- *Section Three: Variable Expenses*. Includes only variable Indirect Expenses
- *Section Four: Miscellaneous Revenue and Expense*. Includes line items for each of the above two categories

The accumulation of all of these line items will culminate in the determination of the projected net profit/(loss).

Initially, the annual budget is best formatted as a 13-column document, with one column per month and the last column as the Total for the year. This allows the designation of expenses to be shown for each line item, in respective months, rather than just a single total amount for the year. This will accommodate certain expenses that occur periodically, rather than monthly.

Section One: Revenue

In Section One, the four Revenue line items (Fees Billed, Reimbursable Expenses Billed, Outside Consultants, and Project-Related Expenses) will be determined by the projections developed in the Profit Plan. Also, refer to the "Revenue Component of the P-L" section of the Financial Management Systems article (7.3) to see the breakdown for each of these four major account items.

In budgeting for revenue, keep in mind that some of this revenue will come from available backlog remaining at the end of the year. This is revenue that has already been "captured" by signed contracts for existing, active projects and will likely be billed to clients in the coming year. Therefore, the projected revenue needed for the coming year, anticipated to be generated by new project contracts, will be reduced by the amount of the applicable backlog. Once the revenue amount is determined, it could also serve as a minimum target for the coming year's marketing plan.

Section Two: Fixed Expenses

In Section Two, the Fixed Expenses, consisting of Direct Labor Expense and the fixed portion of Indirect Expenses, are also determined by the projections developed in the profit plan.

Fixed expenses will obviously be easier to determine than variable expenses (see Table 7.5). Generally, these will include

- Direct and Indirect Labor (as established in the profit plan)
- Payroll Benefits (mandatory and customary)
- Nondiscretionary Benefits (pensions, IRAs, professional dues, and licenses)

TABLE 7.4 Annual Budget Revenue Component

Account No.	Revenue	January	February	March	April	May	June	July	August	September	October	November	December	Totals	Percentage
4100	**Revenue**														
4110	Fees Billed	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
4150	Reimbursable Expenses Billed	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
4170	Outside Consultants	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	**–$0.**	
4190	Project-Related Expenses	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	**–$0.**	
A.	**Total Net Operating Revenue**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	**100%**

- Office Lease & Facility Expense (rent, utilities, security, and maintenance service)
- Office Expenses (telephone systems, Internet, website hosting)
- Business Insurance (professional liability, general liability, auto liability)
- Auto Expenses (lease payments, registration, licenses)
- Tax Expenses (franchise, business margin, local property)

Every firm is unique, and it is advisable to discuss all possible qualified expenses in this category with the firm's legal, tax, and management consultants. Respectively, they would identify the impact created on some of these expenses by the firm's legal structure, its geographic location, and any local, state, and federal governmental regulations imposed by these jurisdictions.

It is important to be aware that some of the above expenses might also include a variable component.

TABLE 7.5 Annual Budget–Fixed Expenses Component

Account No.	Fixed Expenses	January	February	March	April	May	June	July	August	September	October	November	December	Totals	Percentage
5100	**Direct Labor (Salary)**														
5110	Principal(s)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
5120	Professional/Technical	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
5130	Administrative Staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
5140	Contract Labor	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
B.	**Direct Labor (Salary) Subtotal**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	**28–32%**
	Indirect Expenses														
6100	**Indirect Labor**														
6110	Admin. Labor (Salary): Principal(s)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6120	Admin. Labor (Salary): Professional/Technical Staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6130	Admin. Labor (Salary): Admin. Staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6140	Admin Labor (Salary): Temporary Help	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Indirect Labor Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6200	**Payroll Benefits & Nondiscretionary Benefits**														
6210	Payroll Taxes (FICA, FUTA, SUTA)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6220	Workers Compensation	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6230	Medical Insurance	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6240	Dental/Life/AD&D Insurance	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6300	**Discretionary Benefits & Professional Development**														
6310	Pension Plan Contribution	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6320	IRA/401k Employer Matching Contribution & Fees	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6350	Officer's Life Insurance	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6360	Professional Dues & Licenses	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	

(continued)

TABLE 7.5 *(continued)*

Account No.	Fixed Expenses	January	February	March	April	May	June	July	August	September	October	November	December	Totals	Percentage
6400	**Office Lease & Facility Expense**														
6410	Office Lease	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6430	Utilities	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6440	Parking	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6450	Security Systems	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6460	Maintenance Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6500	**General Office Expense**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6540	Telephone System	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6545	Cellular Telephone	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6550	Internet Access	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6555	Website & E-mail Hosting	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6600	**Business Insurance**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6610	General Comprehensive Liability	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6620	Auto Liability	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6630	Professional Liability	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6700	**Auto Expense**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6710	Auto Payment/Lease	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6740	Registration/License	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
7300	**Tax Expense**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
7310	Property Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
7320	Franchise Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
7330	Business Margins Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
C.1	**Fixed Indirect Expenses Subtotal**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
	Total Fixed Expenses (B + C.1)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	

Section Three: Variable Expenses

In Section Three, the Variable Expenses consist of a firm's remaining Indirect Expenses. Some of these variable expenses will also have a fixed component to them, as noted in Section Two above. Only the variable portions of such expenses are to be included in this section. However, the total budgeted line item for these expenses will need to include its respective fixed component. (See Table 7.6.)

It will likely be more difficult to determine the dollar value of some of these variable expenses. Using the average of the prior three years of expenses in each of the line item categories will help to identify an appropriate amount to budget.

For start-up firms without any past history, it will be even more difficult. Initially, a "best guess" might have to suffice for some line items. Careful monitoring each month would be advisable to observe any significant trending upward or downward to determine any effect these best-guess budgeted amounts might have on the firm's net profit-loss.

TABLE 7.6 Annual Budget—Variable Expenses Component

Account No.	Variable Expenses	January	February	March	April	May	June	July	August	September	October	November	December	Totals	Percentage
6300	**Discretionary Benefits & Professional Development**														
6365	Professional Exams & Training Materials	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6370	Professional Seminars & Conferences: Professional/Travel	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6400	**Office Lease & Facility Expense**														
6420	Facility Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6500	**General Office Expense**														
6510	Office Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6520	Equipment & Software	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6525	Equipment Repairs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6530	Equipment Rentals	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6560	Postage/Shipping/Delivery	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6570	Printing & Reproduction	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6580	Technical Library Resources	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6590	Office Event Meals	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6700	**Auto Expense**														
6720	Gasoline/Oil Changes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6730	Repairs/Maintenance	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6750	Mileage/Tolls/Parking	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6800	**Bank Charges**														
6810	Banking Fees/Penalties	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6820	Interest Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6830	Line of Credit Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6840	Credit Card Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
6900	**Professional Services**														
6910	Accounting	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6920	Legal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6930	Marketing/PR	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6940	IT	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
6950	Management Consulting	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	

(continued)

TABLE 7.6 *(continued)*

Account No.	Variable Expenses	January	February	March	April	May	June	July	August	September	October	November	December	Totals	Percentage
7100	**Depreciation/Amortization**														
7110	Depreciation Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
7120	Amortization Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
7300	**Tax Expense**														
7340	Penalties and Fines	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
7400	**Marketing & Business Development**														
7410	Travel: Auto	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
7415	Travel: Air/Other	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
7420	Meals/Entertainment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
7430	Advertising	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
7440	Promotional Printing/Delivery	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
7445	Promotional Events	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
7450	Photography	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
7460	Subscriptions	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
7470	Contributions	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
7480	Marketing Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
C.2	**Variable Indirect Expenses Subtotal:**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
C.	**Total Indirect Expenses (C.1 + C.2)**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	**44–48%**
D.	**Total Expenses (B + C)**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
E.	**Profit or (Loss) from Operations (A – D)**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	

Section Four: Miscellaneous Revenue and Expense

In Section Four, each of the two components, Miscellaneous Revenue and Expense, will comprise line items that relate to the daily operations of the firm. Some of them are project-related while others are not. (See Table 7.7.)

Miscellaneous Revenue might include any interest earned on funds placed in financial instruments, investments, or other such accounts. This component would also include any gain on assets, as established by the firm's accounting people. On occasion, this could also include amounts collected and not refunded for unreturned and/or damaged, distributed project bid documents. There might also be other, small incidental revenue items that are not specifically included in any of the usual P-L revenue line items.

Miscellaneous Expense might include the write-off as bad debt of any invoiced project amount that is likely to be unpaid. This component would also include any loss on assets, as established by the firm's accounting people. There might also be other, small incidental expenses that are not specifically included in any of the usual P-L Indirect Expense line items.

TABLE 7.7 Annual Budget—Miscellaneous Revenue/Expense Component

Account No.	Miscellaneous Revenue/Expense	January	February	March	April	May	June	July	August	September	October	November	December	Totals	Percentage
8100	**Miscellaneous Revenue**														
	Interest earned	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Gain on Assets	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Retained Bid deposits	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
	Subtotal	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	
8500	**Miscellaneous Expenses**														
	Bad Debt (Write-Off) Allowance	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	
	Loss on Assets	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	
	Miscellaneous (Expenses)	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	
	Subtotal	**–$0**	**$0**	**–$0**	**–$0**	**–$0**	**–$0**	**–$0**	**–$0**	**–$0**	**–$0**	**–$0**	**–$0**	**–$0**	**–$0**
F.	**Total Miscellaneous Revenue (+)/ Expense (–)**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	**4–6%**
G.	**Net Profit/(Loss) Before Distributions & Taxes (E + or – F)**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	**18–20%**

Table 7.8 illustrates a Collapsed Version of the completed, expanded Annual Budget that merges the fixed and variable expenses of the major account numbers. This collapsed version will then be the basis for developing the Final Annual Budget (Table 7.9).

TABLE 7.8 Annual Budget—Collapsed Version

		Budget Totals	Percentage
Revenue			
4100	Revenue		
4110	Fees Billed	$0	
4150	Reimbursable Billed	$0	
4170	Outside Consultants	–$0	
4190	Project Related Expenses	–$0	
A. Net Operating Revenue		**$0**	**100%**
Direct Labor Expense			
5100	Direct Labor (Salary)		
5110	Principal(s)	$0	
5120	Professional/Technical	$0	
5130	Administrative Staff	$0	
5140	Contract Labor	$0	
B.	**Direct Labor (Salary) Subtotal**	**$0**	**28–32%**
INDIRECT EXPENSES			
6100	**Indirect Labor**		
6110	Admin. Labor (Salary): Principal(s)	$0	
6120	Admin. Labor (Salary); Professional/Technical Staff	$0	
6130	Admin. Labor (Salary): Admin. Staff	$0	
6140	Admin Labor (Salary): Temporary Help	$0	
	Indirect Labor Subtotal	**$0**	

(continued)

TABLE 7.8 *(continued)*

		Budget Totals	Percentage
6200	Payroll Benefits & Nondiscretionary Benefits (Fixed)	$0	
6300	Discretionary Benefits & Professional Development (Fixed & Variable)	$0	
6400	Office Lease & Facility Expense (Fixed & Variable)	$0	
6500	General Office Expense (Fixed & Variable)	$0	
6600	Business Insurance (Fixed)	$0	
6700	Auto Expense (Fixed & Variable)	$0	
6800	Bank Charges (Fixed & Variable)	$0	
6900	Professional Services (Variable)	$0	
7100	Depreciation/Amortization (Fixed & Variable)	$0	
7300	Tax Expense (Fixed & Variable)	$0	
7400	Marketing & Business Development (Variable)	$0	
C.	Indirect Expenses Subtotal (C.1 Fixed + C.2 Variable)	$0	44–48%
D.	Total Expenses (B + C)	$0	
E.	Profit or (Loss) from Operations (A – D)	$0	
F.	Total Miscellaneous Revenue/Expense (+ or –)	$0	4–6%
G.	Net Profit/(Loss) Before Distributions & Tax (E + or – F)	$0	18–20%

Table 7.9 illustrates the approved, final version of the annual budget, including the major accounts and the desired and/or appropriate subaccounts from the collapsed version of the combined fixed and variable expenses in each of their respective major accounts.

Once the approved final annual budget has been developed, it would then be used to create a monthly year-to-date (YTD) pair of columns (for $ and %) in the monthly P-L format, representing the YTD annual budget for each of the respective P-L line items.

TABLE 7.9 Annual Budget—Approved Final Version

Account No.	Major Account and Subcomponent	January	February	March	April	May	June	July	August	September	October	November	December	Totals	Percentage
4100	**Revenue**														
4110	Fees Billed	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
4150	Reimbursable Expenses Billed	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
4170	Outside Consultant's	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	**–$0.**	
4190	Project Related Expenses	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	**–$0.**	
A.	**Net Operating Revenue**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.**	**100%**
	Direct Expenses														
5100	**Direct Labor (Salary)**														
5110	Principal(s)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
5120	Professional/Technical	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
5130	Administrative Staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	
5140	Contract Labor	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0.**	

Account No.	Major Account and Subcomponent	January	February	March	April	May	June	July	August	September	October	November	December	Totals	Percentage
B.	Direct Labor (Salary) Subtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	28–32%
	Indirect Expenses														
6100	Indirect Labor														
6110	Admin. Labor (Salary): Principal(s)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
6120	Admin. Labor (Salary): Professional/Technical Staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
6130	Admin. Labor (Salary): Admin. Staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
6140	Admin Labor (Salary): Temporary Help	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
	Indirect Labor Subtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
6200	Payroll Benefits & Nondiscretionary Benefits	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
6300	Discretionary Benefits & Professional Development	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
6400	Office Lease & Facility Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
6500	General Office Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
6600	Business Insurance	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
6700	Auto Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
6800	Bank Charges	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
6900	Professional Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
7100	Depreciation/Amortization	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
7300	Tax Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
7400	Marketing & Business Development	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
C.	Total Indirect Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	44–48%
D.	Total Expenses (B + C)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
E.	Profit or (Loss) from Operations (A – D)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
	Miscellaneous Revenue/Expense														
8100	Miscellaneous Revenue														
	Interest Earned	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
	Gain on Assets	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
	Retained Bid Deposits	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
	Subtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
8500	Miscellaneous Expense														
	Bad Debt (Write-Off) Allowance	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	
	Loss on Assets	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	
	Miscellaneous (Expense)	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	
	Subtotal	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	–$0	
F.	Total Miscellaneous Revenue/ Expense (+ or –)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	
G.	Net Profit/ (Loss) Before Distribution & Tax (E + or – F)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.	18–20%

Conclusion: Annual Budgets

Once all of the budgeted line items for the coming year have been identified and the expanded format completed it should be reviewed by the appropriate firm leaders and approved. The collapsed version can then be developed, as shown above in Table 7.8, which will then facilitate creating the final format of the approved annual budget.

It is important to note that the annual budget, once it has been approved for the coming year, should never be altered in any way. This would destroy the integrity of the budget and eliminate the comparison benefit mentioned earlier.

However, during the course of the year, certain unforeseen situations could develop that would alter some of the budgeted line items. If that were to occur, a separate, new document will need to be developed to reflect these changes. This document can be created by copying the approved budget, making the new, forecasted changes, and then saving it with a different title.

This new document could be referred to as the "forecast plan." The forecast plan and the annual budget could then be compared each month to see the variances of both to the YTD actuals.

PROFIT PLANNING

Introduction to Profit Planning

Profit planning for every architecture firm is essential in providing a forecast of a firm's revenue-generating capability and the net profit it can anticipate earning from that revenue.

▶ For definitions of terms used in this article, see "Key Accounting Terminology" in Financial Management Overview (7.2).

Developing a profit plan is a firm's best approach to understanding what is financially possible for the coming year. Because the profit plan is a form of budgeting, it shares many of the same considerations as the annual budget. The profit plan, like the annual budget, needs to be developed in advance of the coming year. The current year's activity for revenues and expenses are important to consider in developing the projected new revenue and expense amounts. Also taken into account are any known future events, market conditions, or other situations that might impact these amounts. In addition, other important factors to consider include the firm's backlog and the anticipated award of any new projects and fees for the coming year.

Backlog, which is defined as current project revenue not yet earned or invoiced, will affect the firm's projected revenue. For example, imagine that a firm's profit plan for the coming year indicates the potential for generating net operating revenue of $1.1 million, based on a target net profit of 20 percent. If the firm's backlog is $350,000.00 total, the firm will need to assess if it has the capability to secure the additional $750,000 in net operating revenue in order to meet its revenue and net profit projections.

Once established, the projected Revenue and Expenses (Direct and Indirect) will also be used in the development of the annual budget.

Profit Plan

The profit plan, when fully developed, provides critical data essential for many decisions related to the firm's operations and projects.

Because the profit plan is a projection of what might be, the process of developing this data will entail a certain amount of "educated" guesswork. Nevertheless, there are a number of component parts of the profit plan that can be developed based on known factors. Among these are the annual salary adjustments often given to every employee of the firm. In addition, adjusted utilization rates can be established for each employee, using the current year's performance as a guideline and taking into consideration any anticipated changes in an employee's duties and responsibilities for the coming year.

The projected direct and indirect expenses will allow for the calculation of the overhead rate and the break-even multiplier. With these metrics an hourly billing rate for every employee can be calculated. These metrics in turn would be used to develop new project fee budgets, their estimated fee billings, and potential profitability.

Profit Plan Format, Components, and Applications

The profit plan presented below is formatted in three primary sections, each one with its own components:

- *Top section*. "Revenue Projection" identifies the Utilization Rate and the Total Labor and its two components: Direct and Indirect Labor. Finally, the "Projected Billing" for each employee can be calculated.
- *Middle section*. "Projected P-L Summary" calculates the projected Net Operating Revenue and Net Profit Dollars and Percent.
- *Bottom section*. "Alternate Method to Check Net Operating Revenue and Profit Goal." This section also includes "Calculating Multipliers" and the "Development of Hourly Billing Rates" for every employee. The reference to Top, Middle, and Bottom is from the arrangement on a spreadsheet, where results from one section can be linked to cells in other sections. For ease of understanding and readability, the three sections are shown separately.

Profit Plan—Top Section

In the top section, the projected billing for each employee is determined by factoring each employee's anticipated utilization rate and calculated hourly billing rate. (See Table 7.10.) Arriving at a realistic utilization rate for each employee will require defining their roles, responsibilities and duties for the coming year and relevant historical data related to their respective, past performances. Generally, the less experienced staff will have the highest utilization rates, while the opposite is true for the more experienced staff and principals. Once defined, the utilization rate will establish each employee's direct labor and indirect labor, from which the total direct and indirect labor costs can be calculated. Using total direct labor and total labor costs, the firm's utilization rate can also be calculated:

Total Direct Labor ($262,754) ÷ Total Labor ($407,845) = 64.42%

TABLE 7.10 Profit Plan—Top Section

Revenue Projection							
Employee	**Hourly Rate**	**Util. Rate**	**Total Labor**	**Direct Labor**	**Indirect Labor**	**Billing Rate**	**Projected Billing**
Principal							
D. Dowright	$45.67	35%	$95,000	$33,250	$61,750	$140	$101,920
S. Taypositive	$45.67	65%	$95,000	$61,750	$33,250	$140	$189,280
Subtotal			**$190,000**	**$95,000**	**$95,000**		**$291,200**
Professional/ Technical Staff							
N. Desmond	$32.75	75%	$68,120	$51,090	$17,030	$105	$163,800
T. Rex	$24.38	83%	$50,710	$42,089	$8,621	$85	$146,744
E. Zeduzit	$18.18	89%	$37,815	$33,655	$4,160	$70	$129,584
Subtotal			**$156,645**	**$126,834**	**$29,810**		**$440,128**
Admin. Staff							
M. Adonna	$15.00	35%	$31,200	$10,920	$20,280	$50	$ 36,400
Subtotal			**$31,200**	**$10,920**	**$20,280**		**$ 36,400**
Contract Labor							
Outsource Tech.	$40.00	100%	$30,000	$30,000	$0	$75	$56,250
Subtotal			**$30,000**	**$30,000**	**$0**		**$56,250**
Totals			**$407,845**	**$262,754**	**$145,090**		**$823,978**

PART 2: FIRM MANAGEMENT

The projected billing for each employee is achieved only after the hourly billing rates are calculated in the bottom section. Then, using the respective hourly billing rate and multiplying it by the respective total number of direct labor hours (2,080 hours × Utilization Rate), the projected billing amounts can be determined.

Example (from the profit plan) using the data for employee "T. Rex":

Hourly Billing Rate ($85.00) × 1,726.4 (2,080 hours × 83%) = $146,744

Profit Plan—Middle Section

The middle section components can then be developed using the data in the top section. (See Table 7.11.) Perhaps the most difficult items to develop in this section are projections for the outside consultant's fees to be billed, as a percentage of total fees billed. Some of the indirect expenses (marketing, repair and maintenance, legal, accounting, management, and other business consultant fees) will also have to be estimated. Refer to the sidebar on indirect operating and general and administrative expenses at the end of this article.

A reasonable approach for beginning the process of developing some of these projections is to use an average of expenditures over the last three years and factoring up or down to suit based on anticipated market conditions.

Industry guidelines to consider:

- Outside Consultant Fees in the range of 26 to 35 percent of the Total Fees Billed
- Marketing Expenses in the range of 3 to 5 percent of Net Operating Revenue

With the figures shown in the profit plan, the outside consultant fees were calculated to be approximately 27 percent of the total fees billed ($1,184,738), shown as –$327,964. If the mark-up were not considered, $1,184,738 – $32,796 = $1,151,942, it

TABLE 7.11 Profit Plan—Middle Section

Projected Revenue (from Top Section)	**Architect**		**Consultants**		**Total**
Fees Billed (incl. consultants + markup)	$823,978	+	$360,760	=	**$1,184,738**
Reimbursable Expenses (incl. markup)	$161,272	+	$ 16,127 (mark-up)	=	**$177,399**
Outside Consultants (not incl. markup)	($360,760)	–	($ 32,796)	=	**($327,964)**
Project-Related Expenses (reimb.+ non-reimb.)	$161,272 (reimbursable)	+	$ 40,245 (direct [n-r])	=	**($201,517)**
Net Operating Revenue (NOR)					**$832,656**
Projected Direct Labor Expense					**($262,754)**
Total Direct Labor (Salary) Expenses: Approx. 28–32% × Net Operating Revenue					
Projected Indirect Labor & Expenses					**($403,838)**
Total Indirect Expenses: Approx. 48–52% × Net Operating Revenue					
Total Miscellaneous Revenue/Expenses (est. allowance)					**$8,112**
Net Profit Before Distribution & Tax					**$174,176**
Approx. 20% × Net Operating Revenue					

would be approximately 28 percent. The amount is shown as a negative number (as a debit to revenue) because these fees are to be paid to the consultants and are not included in the net operating revenue.

Project-Related Expenses is a combination of the total value of five possible subcategories of expenses:

1. Reimbursable expenses for Architect, not including markup
2. Reimbursable expenses for Outside Consultants, not including markup
3. Project expenses for the architect included in all lump sum fees billed by Architect
4. Non-reimbursable project expenses for Architect, per contract
5. Reimbursable project expenses for Architect that exceed any contract stipulated maximum

The total amount shown is also a negative number (as a debit to revenue), as the majority of these expenses will be paid to a consultant and/or vendor.

With all of the components of net operating revenue identified, the projected net profit can be calculated.

NOR – Total Direct Labor – Total Indirect Expenses
+ (or –) Total Miscellaneous Revenue or Expense = Net Profit

$832,656 – $262,754 – $403,838 + $8,112 = $174,176

Once net operating revenue (NOR) and total direct labor (TDL) are calculated, two other critically important key financial performance indicators can then be calculated:

1. Net multiplier (measures the return on every dollar of direct labor)

   NOR ($832,656) ÷ TDL ($262,754) = Net Multiplier (3.17)

2. Percentage of TDL to NOR (measures the balance between workload and number of staff (target range: 28–32%)

   TDL ($262,754) ÷ NOR ($832,656) = 31.6%

► For more information about these ratios, see the backgrounder Key Financial Performance Indicators accompanying Financial Management Overview (7.2).

Profit Plan—Bottom Section

The bottom section provides an alternate method of calculating a targeted set of goals for the NOR and net profit to compare with the above projected NOR and net profit goals. These alternate calculations for the targeted break-even and net multipliers are based on a different set of parameters, except for the three projected labor values (total, direct, and indirect) from Table 7.4.

The value shown below for total indirect expenses ($394,130) is based on an overhead rate estimated at 1.5 × TDL, resulting in the targeted break-even multiplier of 2.5 × TDL. Adding the targeted net profit results in the targeted net multiplier.

Total Direct Labor (TDL) Multiple:

TDL ÷ TDL: $262,754 ÷ $262,754 = 1.00

Targeted Indirect Expense Multiple (Overhead Rate):

Total Indirect Expense ÷ TDL: $394,130 ÷ $262,754 = 1.50

Targeted Break-Even Multiplier (B-E Multiplier):

1.50 + 1.00 = 2.50

Targeted Net Profit (20%) Multiplier:

B-E Multiplier ÷ .80* – B-E Multiplier

2.50 ÷ .80 – 2.50 = 0.63

* = To calculate the Targeted Net Profit Multiplier, divide using the complement (.80) of the Targeted Net Profit percentage (20%).

Targeted Net Multiplier:

$$2.50 + 0.63 = 3.13$$

The Direct Labor (Salary) Expense dollars shown in Table 7.12 are the same dollars as in the top section from Table 7.10. The $262,754 is arrived at by multiplying the Total Labor ($407,845) by the average Utilization Rate (0.6442), resulting in the Total Direct (Salary) expense. Similarly, the Indirect Labor (Salary) Expense is the top-section Total Labor from Table 7.10, minus the Total Direct Labor (Salary) Expense. The Office Expenses value is the remaining amount in the calculated $394,130 Indirect Expenses line item.

Using the targeted net multiplier, each employee's hourly billing rate can then be calculated (hourly salary × 3.13).

Example: for an hourly salary of $20.00:

$20 × 3.13 = Hourly Billing Rate of $62.60,
including profit of $12.50 ($62.50 × 0.20)

To check using an alternate approach:

Hourly Salary ($20) × B-E Multiplier (2.50) ÷ 0.80* = $62.50 (Hourly Billing Rate)

* = Divide, using the complement of the Targeted Net Profit percentage (0.80) to calculate the Hourly Billing Rate.

If you multiplied by 0.20, that would be a markup of only $10 and reduce the profit percentage, as shown in the following calculations:

Hourly Salary ($20) × B-E Multiplier (2.50) × 0.20
= $10 ($2.50, or 20% less profit on the targeted 20% profit)

Looking at the calculated hourly billing rates, there is a potential for developing an incremental increase in the profit percentage for each non-principal employee's hourly billing rate. In general, the non-principal employees spend a greater percentage of the total charged project hours than do principals. It is therefore possible to take each of

TABLE 7.12 Profit Plan—Bottom Section

Alternate Method (to check Projected NOR & Profit Goal)				
Direct Labor (Salary) Expense	$407,845 × 0.6442		$262,754	
Indirect Expenses				
Indirect Labor (Salary)	$407,845 × 0.3558	$145,090		
Payroll Taxes & Benefits	Est. at 25% × Total Salary	$101,961		
Office Expenses		$147,079		
Total Indirect Expenses	Est. at 1.5 × Direct Labor		$394,130	
Miscellaneous Revenue/Expense	From Table 7.11	$8,112		
Total Indirect Expenses			$656,884	
Profit Goal @ 20%	Total Expenses ÷ 80% – Total Expenses		$164,221	
Net Operating Revenue Goal			$821,105	
Calculating Multipliers				
To Pay For Direct Labor (Salary) Expense				1.00
To Pay For Indirect Expenses: (Indirect Expense ÷ Total Direct Labor)				1.50
Equals Break-Even Multiplier (B-E Multiplier)				**2.50**
To include 20% Profit: (B-E Multiplier ÷ .80 – B-E Multiplier)				0.63
Equals Planned Net Multiplier (with 20% Profit):				**3.13**

TABLE 7.13 Determine Minimum Billing Rates

	Hourly Salary		Planned Net Multiplier		Billing Rate	To Increase Profit	Adjusted Billing Rates
Use Planned Net Multiplier × Hourly Salaries to Set Minimum Hourly Billing Rates							
D. Dowright	$45.67	×	3.13	=	$142.95	Round down to:	$140
S. Taypositive	$45.67	×	3.13	=	$142.95	Round down to:	$140
N. Desmond	$32.75	×	3.13	=	$102.51	Round up to:	$105
T. Rex	$24.38	×	3.13	=	$76.31	Round up to:	$85
E. Zeduzit	$18.18	×	3.13	=	$56.90	Round up to:	$70
M. Adonna	$15.00	×	3.13	=	$46.95	Round up to:	$50

these employee hourly billing rates and raise them to a higher amount and still maintain a competitive set of billing rates, all with more than a 20 percent profit.

Example (from the profit plan) using the data for employee T. Rex (Table 7.13):

Hourly Salary ($24.38) × Net Multiplier (3.13) = Hourly Billing Rate ($76.31)

If the $76.31 were rounded up to an hourly billing rate of $85.00, the profit would be increased by $8.69 to $24.05, for a profit percentage of 28.29 percent.

Conversely, if the principal's rates were rounded down, the firm's net profit percentage could be increased considerably without any additional cost to the firm or loss of competitive edge.

Conclusion: Profit Planning

The responsibility for earning a profit belongs to every employee of a firm. The most advantageous method for ensuring this will happen is to develop some form of profit planning at, or before, the start of each new calendar year. The most effective tool for this type of planning is the profit plan. The profit plan develops a projection for each of the four primary components that affect profitability: revenue, direct labor, indirect labor, and indirect expenses.

The development of each these primary components requires a review of a firm's past performance for the previous three years and an understanding of developing trends in the market for the coming year.

Projected revenue is best developed using current and/or projected salaries, targeted utilization rates, and the hourly billing rates for each employee and principal.

Projected direct and indirect labor are calculated using the same current and/or projected salaries and the targeted utilization rates for each employee and principal.

The projected indirect expenses are the most challenging of the four components to develop because this component contains so many different fixed and variable subcategories. In general, if direct labor is 28–32 percent of the NOR and the targeted total net profit is approximately 20 percent of NOR, then the total indirect expenses (including indirect labor) would be approximately 48–52 percent. This is a reasonable basis for establishing a projected value for this component. This projection can then be compared with the value calculated for a targeted overhead rate of no more than 1.5 times total direct labor.

With each of these four components projected, a targeted net profit can be established. This targeted profit value is then applied to the fee budget for every new project started in the coming year and communicated to every employee as a focus for their project activities.

CHAPTER 8

Human Resources

8.1 Human Resources Management Overview

Barbara Irwin

This overview provides a snapshot of the most important characteristics of human resources management in an architecture firm. Whether a sole proprietorship or a firm of 5, 10, or 50 employees, it is important to have a human resources infrastructure in place that aligns with the firm's business philosophy, vision, and values.

THE FUNCTION OF HUMAN RESOURCES IN ARCHITECTURAL PRACTICE

To best use a firm's talent, it is necessary to understand the function of human resources (HR) within architectural practice. While architects focus most of their energy on being creative, productive, and serving the clients' needs, success does not happen without giving attention to the people doing the work. It is necessary to have infrastructure in place to ensure that the HR details of a successful operation are implemented. Even in a firm with only one employee, HR issues must be given attention. From the basics of personnel selection to more complex HR programs that are aligned with the firm's strategic goals, a clear understanding of what is involved in attending to people is critical.

A well-defined and developed understanding of the HR function will help firm leaders select the individuals that will contribute fully to the firm, be aligned with

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its culture and mission, and potentially lead the organization into the future. Recruiting talent, completing reference checks on potential candidates, and preparing clear offer letters are all necessary steps to building a strong staff. In addition, HR processes include identifying programs that ensure the talent selected continues to develop professionally and establishes a commitment to the firm and its vision.

In a perfect world, once the talent is in place there is a successful relationship between employee and employer. However, this is not always the case. Much like creating a design for a client, handling people can require adjustments to make a perfect fit. A well-operated HR function will develop performance management measures that protect the firm's investment in talent, support the employer and the employee when a sensitive situation occurs, and prepare an exit strategy addressing any type of employee separation from the organization. Developing an HR toolkit will assist in creating and implementing the appropriate programs for firm staff.

Value of Human Resource Management

As the U.S. workforce continues to change, focusing on future leaders, generational differences, baby boomers retiring, and many other similar issues, architecture firms will increasingly depend on human resources knowledge and processes. Whether in a small firm or a firm with 20+, 50+, or 100+ employees, human resource management is critical to the success of the firm. HR adds value to an organization by creating programs that meet the needs of all staff, such as benefit programs, training and development, and onboarding processes. These programs will help the organization retain its most talented and effective people, and keep in-house the firm's investment in their development.

Focusing on tactical human resources means putting together the appropriate processes and procedures. An example of tactical HR is the creation of a process that can assist in orienting new staff in a consistent manner. Transactional human resources refer to all of the various administrative tasks related to a particular process. For instance, when a firm hires a new employee, there are insurance documents, tax documents, enrollment forms, etc., that need to be completed.

WORLD-CLASS HUMAN RESOURCE FUNCTION

- View the transactional aspects of HR as important, but not a core competency.
- Outsource administrative and transactional HR work to focus on strategic HR work and reduce costs.
- Make significant investments to attract and retain top talent using effective employee recruitment and training programs.
- Use emerging technologies to facilitate integration with employees, customers, and suppliers.
- Install web-based self-service for greater personalization and more efficient integration.
- Recognize the importance of consistent data availability for faster, more informed decision making and improved service levels.

Source: Society of Human Resources Management (SHRM), 2011

With changing laws and regulations, a firm's HR management processes must continue to provide transactional and tactical support, in addition to continuously staying abreast with guidelines that affect a firm's legal obligations. However, knowledge about human resources can provide much more to the success and growth of an organization. Just as the people charged with the responsibility for finance and marketing provide insight to an organization, those responsible for HR bring their own unique and necessary perspective to the organization.

Human Resource Management as a Strategic Issue

As a strategic component in architecture firms, HR can provide input on the growth of an organization in terms of the people that power it. Strategic input means, for example, determining whether the right programs are in place, understanding HR trends in the industry, and identifying firm capabilities that need to be strengthened. A strategic HR function will foster a true understanding in the firm of what employees are looking for in a professional environment. Conducting employee surveys and addressing issues identified in the results lets employees know that the organization is truly listening and working to provide an environment conducive to creative

TABLE 8.1 HR Responsibilities

HR Component	0–20 Employees	50+ Employees	100+ Employees
Recruitment & Selection	Owner/Managing Principal and/or Hiring Manager, External Recruiter	Hiring Managers, Principals, External Recruiters	HR and Department Manager
Onboarding	Owner/Managing Principal and/or Office Administrator (complete forms, etc.)	Office Administrator (complete forms, etc.)	HR and Department Manager
Performance Management	Individual Managers (may be formal or informal)	Individual Managers (formal)	HR and Department Manager
HR & Legal Compliance (Policies and Procedures)	Owner and/or Managing Principal, legal counsel	Office Administrator and Owner/President/CEO, legal counsel	HR, legal counsel
Employee Relations	Individual Manager	Individual Manager, Managing Principal, CEO/President	HR
Rewards and Recognition: Compensation, Benefits, Incentive Compensation Plan	Owner/Managing Principal and Benefits Broker	Owner/President/CEO, Benefits Broker	HR and Owner/Managing Principal and Benefits Broker
Training & Development	Principals, informal, on as-needed or requested basis	Owner/Managing Principals, informal and/or formal (internal and external resources)	HR, Owner/Managing Principals, (internal and external resources)
Leadership Development	Owner/Managing Principal	Owner/Managing Principal, other Principals, external consultants	HR, Owner/Managing Principals, (internal and external resources)

engagement. Providing employees with the most up-to-date technology available to enhance innovation in design is an example of the kinds of actions that help prevent talented employees from looking elsewhere for opportunities.

Many firms go through a strategic planning process. It is advisable to include HR management as an important component of the strategy. Strategic issues such as looking at new market sectors, for example, may involve hiring new talent and a number of other human resource–related issues. In larger firms, involving the HR director during strategic business planning increases the likelihood that there will be consideration of the investment needed to attract the best and brightest as workload increases. Similarly, if those responsible for researching possible hires know when staff demands are expected to increase, early identification of the most talented prospects can be accomplished. Offers can then be made quickly, so that there is little lag time between an identified need and the start date of a new hire. Positioning the HR function as a strategic partner helps firms plan their business strategy and sees that they have the right personnel infrastructure in place to move forward.

▶ Strategic Planning for the Design Firm (5.3) addresses how firm leaders can envision the future of their firms and implement strategies and action plans for positive results.

Responsibility for the various components of HR can shift according to the size of the firm as demonstrated in the HR responsibilities chart (Table 8.1).

THE MAJOR COMPONENTS OF HUMAN RESOURCE MANAGEMENT

The following are nine major components in a strategic and operational human resources function. Each component affects the success of a firm. Administration of the necessary requirements and regulations for each and seeing that they align with the strategic plan for the firm will be handled by the individual responsible for human resources (human resources manager, managing principal, CEO, etc.).

- Recruitment and Selection
- Onboarding

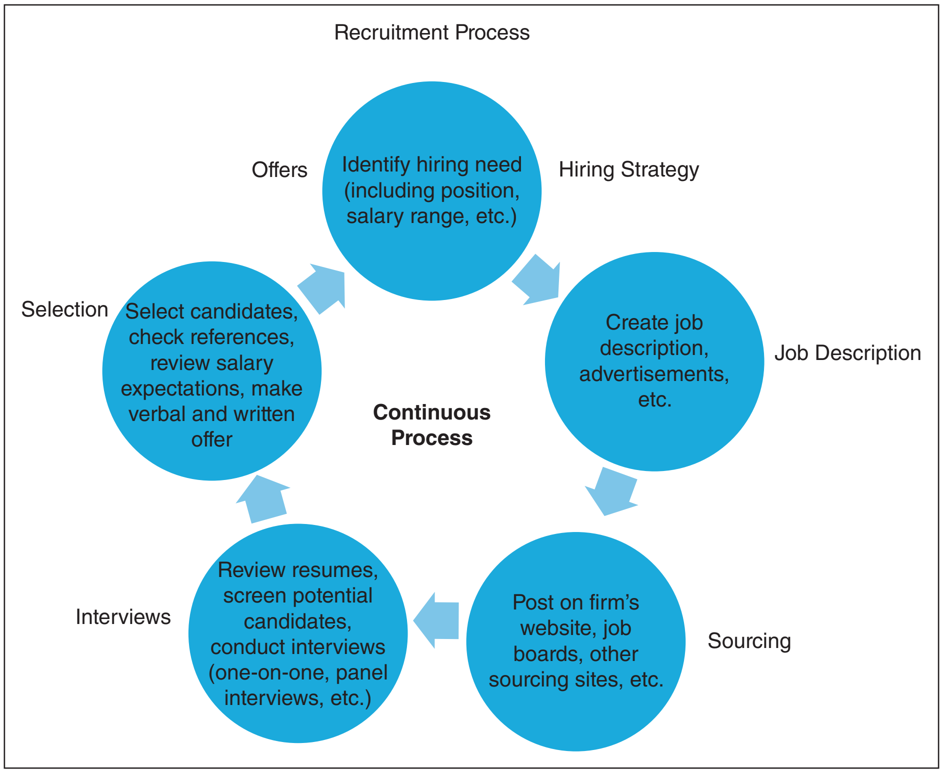
- Performance Management
- Legal Compliance
- Employee Relations
- Rewards and Recognition
- Training and Professional Development
- Leadership Development
- Retention Programs

Recruitment and Selection

Recruitment activities are cyclical in the design industry, as is the need for talent. When the economy is booming, so is the demand for talent; when the economy is slow or stagnant, recruitment tends to decrease. However, slow economic times are good for recruiting strategically. By examining what other market sectors or business models a firm is exploring, it is possible to identify what type of talent will be needed as the business changes. A solid recruitment and selection program will assist the firm as it ramps up for new projects and economic shifts.

Any firm, regardless of purpose, is only as good as its people. As leadership works with clients to deliver the creativity and quality of the firm's services, the need for additional creative and talented staff may grow. A strategic HR leader will make certain that the recruitment and selection of additional staff lives up to the reputation of the firm (hopefully, stellar) and the reputation of its people. In larger firms, HR will handle the details of the recruitment and selection process to the point where leadership makes the final selection. This removes the burden of finding the right people from firm leadership so that they may focus on excellent client service and project delivery, thereby continuing to expand the reputation of the firm. Even in smaller firms, administrative assistance in the recruiting and hiring process is advisable. (See Figure 8.1.)

▶ Recruiting and Hiring: Strategies and Methodology (8.3) discusses how to attract and retain top talent by combining effective research and strategies with technological and social media tools.



Barbara Irwin

FIGURE 8.1 **Recruiting Process**

Onboarding

Many studies have shown that when an employee establishes a connection with the people, work, and culture within the first six months, the chances of long-term retention improve. According to Shawn Abraham, Corporate Recruiter from The Structural Group, an individual's first impression can be lasting, so it is critical for companies to take a proactive approach toward easing their transition. A correct onboarding can make this outcome more likely, and senior management, in conjunction with HR leadership, should be involved in the design of an effective program.

Although an onboarding program in larger firms is typically coordinated by HR, it involves the entire organization. The following components and timeline are critical to any successful onboarding program (see Table 8.2):

- Preparation prior to new employee start:
  - Identify workspace
  - Provide necessary supplies
  - Provide computer and phone
  - Prepare onboarding packet
- Welcome and greeting by top leadership
- History of the firm
- Sharing of the organizational mission and vision
- Tour of the facility
- Transactional activities associated with new hire and benefits
- Introduce a peer partner (aka buddy) to assist new employee in assimilation into the organization
- Lunch with a member of organization (should be established prior to start date)

Performance Management

Performance management encompasses every aspect of the manager/employee relationship with respect to job performance. It entails discussions with a firm leader to help guide an employee's performance and encourage ongoing communications between the employee and supervisor. It also includes a structured performance appraisal/assessment program that is applied consistently throughout the organization.

Performance management programs usually involve periodic feedback (both formally and informally) throughout the year. Most architecture firms, big or small, have some type of communication mechanism in place to see that supervisors and/or managers are providing feedback on the employee's work performance. A typical performance management program would include an annual performance appraisal program. (See Table 8.3.) This provides an opportunity for the manager to assess the employee's performance, identify strengths and opportunities, and create goals and objectives for the upcoming year.

TABLE 8.2 Sample Onboarding Program

Prior to First Day	First Day	First Week	60–90 Days	6 Months & Ongoing
Identify workspace	Welcome and greeting	History of firm	Supervisor "check-in"	Identify training opportunities
Provide supplies	Tour of facilities	Partner with mentor or buddy (peer)	Encourage job shadowing	Seek feedback on onboarding process
Prepare new-hire packet	Lunch with supervisor	Benefits orientation Establish employee goals		

TABLE 8.3 Sample: Components of a Performance Appraisal

Name:
Department:

I. Work Attributes	**Employee Rating**	**Supervisor Rating**
Displays drive and energy in accomplishing tasks		
Exhibits professional demeanor at all times with clients, employees, and vendors		
Handles several responsibilities concurrently and comfortably		
Does what it takes to get the job done well		
Displays enthusiasm in completing work assignments and interfacing with others		
Maintains a constant desire to improve		
Prepares high-quality work products and deliverables		
Dependable/reliable		

Employee Comments:

Supervisor Comments:

Hire Date:

Date of Review Period:

Performance Factor/Core Competency (Example—Work Attributes)

Key Accomplishments—Project/Work & Training and Development

A. Key Project/Work Accomplishments	**Date Finalized**
1.	Date:
2.	Date:
3.	Date:
4.	Date:
5.	Date:

Comments:

List some of your key accomplishments that have had a measurable impact on the business during this past reviewing period.

Project Goals and Objectives

Goals and Objectives	**Timetable to Complete**
1.	Date:
2.	Date:
3.	Date:
4.	Date:
5.	Date:

Comments:

Employee Name/Signature: **Supervisor Name/Signature:**

Date: **Date:**

List the project/work goals and objectives that you and your supervisor agree should be accomplished over the next reviewing period. These goals and objectives should be specific, measurable, attainable, relevant, and timely ("SMART").

A comprehensive performance appraisal will include input from the manager, the employee, and peers or coworkers of the employee. This 360-degree program provides the employee with the necessary information to analyze their performance with an eye toward career advancement and contribution to the organization. This wide-ranging form of appraisal will also help managers identify areas in need of performance coaching and career development coaching.

The manager appraisal gives an opportunity to formalize the observations that the manager has made on the employee's performance throughout the year. Although this may be the first time that this information has been officially recorded, it should not be the first time that the employee is hearing input from the manager. It is important to remember that effective "performance management" does not happen with input just at review time. Timely input from a manager allows employees to plan for and to gauge their own professional growth and development.

This informal input of information from the manager helps the employee recognize what the firm's expectations are and how they are meeting those expectations. This information is then the foundation for the goals that the employee will set for professional development and the goals that are set by the firm for performance management. A performance review appraisal typically consists of evaluating performance on core competencies or areas of an individual's work attributes, key accomplishments, and goals and objectives.

Setting the goals is only the first step in planning for professional development and identifying career development opportunities. It is the shared responsibility of both the manager and the employee to explore the opportunities that will assist the employee in continuing in their professional development and assist the firm in identifying career opportunities for the employee that will fit with the strategic plan of the organization. (See Table 8.4.)

Legal Compliance

Human resource management requires staying up to date in the area of employment laws, legislation, and compliance. Employers need to ensure that they are following the various federal, state, and local laws, which depend on many factors, including the size

TABLE 8.4 Performance Management Steps

Supervisor's Appraisal	• Supervisor provides constructive feedback on employee's performance during previous review period • Identifies strengths and opportunities in employee's work • Provides recommendations on improvements • Recognizes employee's contributions to the overall success of the project, department, firm
Self-Appraisal	• Employee objectively assesses his/her performance during the previous review period • Identifies strengths and opportunities in his/her work • Identifies ways in which to change performance deficiencies and areas where improvement is needed
Goal Setting and Development	• Employee and supervisor identify work objectives/goals for the upcoming review period (specific task, initiative, work product, project, etc.) • Establish SMART goals (Specific, Manageable, Attainable, Realistic, Timely) • Assess goals during next review period to determine success • Employee and supervisor identify professional development opportunities for the upcoming review period (seminar, workshop, project opportunity, etc.)
Performance Coaching	• Supervisor coaches employee on his/her career in respect to work performance • Uses coaching as a communication vehicle for continuous development for staff • Identifies performance deficiencies (if any) and provides recommendations for improvement • Uses performance coaching throughout the year

of the firm. There are different laws or variations of the laws for firms with fewer than 20 employees, over 50 employees, etc. In addition, if a firm is a federal contractor, there are further laws that need to be adhered to if the contract is over $50,000 and over 50 employees. Table 8.5 provides a breakdown of some of the most critical laws with which firms need to comply.

TABLE 8.5 General Compliance

Regulation	Definition	Compliance
All Employers		
Equal Pay Act	Prohibits wage discrimination by requiring equal pay for equal work	All employers
OSHA	Requires employers to provide a workplace free of recognized hazards	All employers
I-9 Employee Eligibility Verification	Verifies: Identity Right to work in the United States	All employers Must be completed within three days of hire Employer must retain I-9 for at least three years (and at least one year after termination)
Fair Labor Standards Act (FLSA)	Regulates: Employee overtime status and overtime pay Minimum wage Record keeping Child labor	All private sector employers with $500,000+ annual volume of sales and/or All federal, state, and local government personnel (except for military)
Personnel Files	Employment records maintained for each employee of the company. May include application, resume, performance management documentation, agreements, and acknowledgment forms	Any personnel or employment record must be preserved for two years. If the contractor has fewer than 150 employees or does not have a federal contract for at least $150,000, then the retention period is one year
Health Insurance Portability and Accountability Act (HIPAA)	Privacy regulation governing individually identifiable health information	All health plans, health care providers, and health care clearinghouses
American Recovery and Reinvestment Act (ARRA) of 2009	Provides: Tax cuts for families and businesses Funding for entitlement programs, such as unemployment benefits Funding for federal contracts, grants, and loans	Strict reporting on use of ARRA funds
Employee Retirement Income Security Act (ERISA)	Sets minimum standards for pension plans to include participation, vesting, benefit accrual, and funding	All private employers with a pension plan program
Employers with 15+ Employees		
Consolidated Omnibus Budget Reconciliation Act of 1986 (COBRA)	Requires employers to continue group medical coverage if employment is terminated or hours are reduced	All private employers, state and local government, and education institutes with 15+ employees
Civil Rights Act, Title VII	Prohibits discrimination or segregation based on race, color, national origin, religion, and gender in all terms of employment	All private employers, state, local, and federal local government, and education institutes with 15+ employees
Americans with Disabilities Act (ADA)	Prohibits discrimination against a qualified individual with a disability	All private employers, state, local, and federal government, and education institutes with 15+ employees
Employers with 20+ Employees		
Age Discrimination in Employment Act (ADEA)	Prohibits discrimination in employment for persons age 40 and over	All private employers with 20+ employees, unions with 25+ members, state, local and federal governments, and employment agencies

(continued)

TABLE 8.5 ***(Continued)***

Regulation	Definition	Compliance
Employers with 50+ Employees Family Medical Leave Act (FMLA)	Allows employees to take up to 12 weeks of unpaid leave during any 12-month period to care for family members or because of a serious health condition of the employee	50+ employees Public agencies, including state, local, and federal employers, and local education agencies Private sector employers who employ 50+ employees for at least 20 workweeks in the current or preceding calendar year
Affirmative Action Plan	Program in which employers take positive steps to correct underrepresentation of protected groups	All government contractors with 50+ employees and $50,000+ in federal government contracts
EEO Reporting	Requires employers to maintain EEO records	100+ employees and federal contractors with 50+ employees and federal contracts of $50,000+
Annual Report (Form 5500)	Annual report detailing financial records of benefit plans	Pension, welfare, and fringe benefit plans with 100+ participants Must be filed with IRS seven months after the end of plan year and retained for six years

► For related information, see the backgrounder accompanying this article, Architects as Employers: Legal Requirements.

Employee Relations

Employee relations are an important aspect of HR. This entails providing consistent messages to staff, which is imperative to see that all employees are treated in an equitable manner. Sensitive issues arise in the workforce on a regular basis. An example might be one in which an employee approaches a member of the management team about another manager who is making inappropriate comments, either directly to the employee or in the office at large. Because in most firms all members of the management team are in close working relationships, this can be an awkward situation for all parties involved.

To provide every employee with a comfortable working environment, it is critical that the manager who is approached knows how to deal with this situation in a confidential and efficient manner. Because the decision on this issue will have an immediate impact not only on this employee but also on other members of the firm, it is important to handle a situation such as this in a professional and unbiased manner. Such issues must be handled with a consistent and compassionate process so that if such a situation occurs in the future, management has a clear process in place that assures equitable and fair treatment.

The first step in equitably dealing with employee relations is to put in place the right policies and procedures to communicate and enforce expected and acceptable behaviors at work. The best way to guarantee this unbiased treatment and to provide employees with a clear understanding of the policies and procedures is to produce a comprehensive employee handbook. See the sidebar for an example of a table of contents from a standard employee handbook. This document outlines management's expectations and employee and management responsibilities. Creating a comprehensive handbook will eliminate any uncertainty among staff and provide management with a "go to" resource to explain to staff why one policy or another is in place.

Even with the necessary tools in place to ensure equity, problems will still arise. An employee may not be happy with management's decision on a specific situation, and this may lead the employee to take legal action against the firm. HR input into such sensitive matters as discrimination or sexual harassment will help leadership keep the

SAMPLE: EMPLOYEE HANDBOOK—TABLE OF CONTENTS

Section 1: Introduction
- Preface/welcome
- About this handbook/purpose of the handbook
- Mission and values
- Brief history of the company
- At-will employment
- Changes in policy statement

Section 2: Equal Employment Opportunity
- EEO policy

Section 3: Employment Status
- Definitions of employee classifications
  - Exempt
  - Nonexempt
- Employment categories
  - Regular full-time
  - Regular part-time
  - Temporary
  - Contractor status

Section 4: Employee Policies
- Employment applications
- Personnel data changes
- Disability accommodation
- Immigration law compliance
- Employment termination
- Exit interviews
- Return of company property
- Outside employment
- Confidentiality and nondisclosure
- Proprietary information
- Employment of relatives
- Personnel file
- Medical records
- Disclosure or release of employee information
- Employee reference requests
- Credit investigation
- Criminal background investigation
- Driver's license and driving record
- Health examinations
- Unauthorized copying of computer software

Section 5: Scheduling
- Attendance/punctuality
- Job abandonment
- Inclement weather/emergency closings
- Company and department meetings
- Meal periods
- Alternate work schedules
- Telecommuting

Section 6: Standards of Conduct
- Professional conduct
- Personal appearance
- Nondiscrimination and anti-harassment
- Possession of weapons in the workplace
- Workplace violence prevention
- Drug and alcohol use

Section 7: Performance Management
- Performance management
- Philosophy of company
- Employee performance review/promotions
- Employee development
- New hire orientation

Section 8: Compensation
- Your salary
- Bonus opportunities
- Timekeeping
- Overtime
- Paydays
- Deductions from paycheck
- Administrative pay corrections
- Wage garnishments
- Work performed on company holidays

Section 9: Employee Benefits
- Listing of benefits
- Group insurance
- Health Insurance Portability and Accountability Act (HIPAA)
- Social Security/Medicare
- Worker's compensation
- Paid leave benefits
- Retirement plans
- Professional membership dues
- Tuition reimbursement
- Educational assistance
- Leave without pay
- Jury duty
- Witness duty
- Voting
- Military leave
- Bereavement

Section 10: Workplace Policies
- Telephone use
- Voicemail and electronic mail usage
- Use of company property
- Internet policy

Section 11: Company Expenses
- Supplies, expenditures, and obligating the company
- Expense reimbursement
- Travel/entertainment procedures

Section 12: Communication
- Philosophy on employee communication
- Regular staff meetings
- Bulletin boards
- Procedure for handling complaints/open door policy
- Suggestions
- Customer relations

Section 13: Workplace Environment
- General employee safety
- Premises security
- Smoke-free environment
- Monitoring and searches

Section 14: Closing
- Acknowledgment and receipt of handbook

response to such issues fair and consistent. Therefore, if a firm does not have an HR professional, hiring an external HR or legal consultant for guidance on how to proceed will assist the firm in minimizing the risk to the organization.

Rewards and Recognition

When most individuals see the words "rewards and recognition," the quantitative awards come to mind. However, rewards and recognition take many forms, such as an annual firm retreat acknowledging staff for a job well done, team and individual awards for projects and/or client successes, and various communication vehicles acknowledging individuals' hard work and effort going into a project.

There are many qualitative and quantitative examples of how firms acknowledge their staffs for successful performance. Spot awards, pay-for-performance awards, annual bonuses, employee-of-the-month awards, and team awards are just a few examples of how firms can provide recognition for a job well done. There are also many external awards that firms can receive as recognition for these efforts, such as the AIA Firm of the Year Award and Best Firms Contests that many areas conduct.

▶ Compensation Strategy and Philosophy (8.2) explores a holistic compensation approach encompassing a firm's strategy, values, goals, firm culture, and market position.

Every firm has a compensation philosophy, whether formal or informal. The establishment of base pay salaries, incentive plans (bonuses), and awards is common in the professional services industries. The challenge for any firm is finding a formula that works for a particular firm, based on variables such as firm location, culture, and management approach.

For example, a firm may have a compensation plan for new-hire salaries in the form of salary ranges within each position and level. Some firms may have a more informal plan that will focus on the market demand for individual positions and salaries.

Bonus or incentive compensation plans are another example of a quantitative award program. This type of program identifies and rewards individuals in the firm who have performed above and beyond the typical duties of their positions. Many firms identify a specific time of year for this program (end of the year or the end of a quarter). Some firms provide measurable expectations such as meeting utilization rate target or client's tangible satisfaction on a project. Other firms identify and reward individuals based on the performance of a department or studio, or the profitability of the firm as a whole.

The most important issues with any recognition and reward program are that it is communicated in advance, is fair, is clearly understood, is meaningful to employees, and is challenging, yet attainable.

For an effective compensation program, employees need to understand that in any given year, bonuses and salary increases may be nonexistent because of low profitability of the firm, due to economic conditions, or other reasons. This area is an opportunity for management to continually improve their communications and, ultimately, relationship to staff.

Training and Development

▶ Professional Development and Mentoring (8.4) covers training, mentoring, and appraisal programs that can support a firm's strategic plan.

An effective training and development program that focuses on the development of staff serves a twofold purpose in a successful architecture firm: It ensures that employees are kept abreast of the changing trends and regulations in the field of architecture, and it attracts and retains the high-quality talent who strive to keep their skills finely tuned. Employees look for continuous development to enhance their careers, as cited in the 2007 Future Leaders Survey conducted by HR Advisors Group. A strategic HR function will work with leadership to find external training opportunities for staff and develop internal, less formal training programs that are supported by the in-house talent. Human resources will also keep abreast of certification and licensure issues pertinent to the members of the firm and help individuals track the renewal requirements necessary to remain in compliance with state licenses. For instance, HR can help identify opportunities to complete the HSW and SD continuing education hours required of AIA members and sometimes mandated by state licensing boards.

Leadership Development

As a firm's leaders transition from practice to retirement, it is critical for the firm to focus on developing both technical and leadership skills in their staff. Many firms have informal practices for focusing on leadership development and on mentoring potential talent for the future of their firms. Other firms have more structured learning centers where programs are created to assist individuals in their leadership abilities. Firms such as Gensler provide leadership development programs like its NextGen Program to up-and-coming young talent within the firm. Other firms create programs focusing on the employee's development and organization's commitment to an employee's career development and growth. It is important to support staff in training and development, as the firm will reap the benefits long-term.

Training and Development Programs
- Technical training
- Project management training
- Leadership/management training
- Safety/legal/risk management
- Company orientation
- Health/wellness

Delivery Options
- Outside training seminars or classes
- In-house training by firm employees
- In-house training by outside consultants
- Reference books or materials for self-study
- Online training
- User groups or round-table discussions
- Other

HUMAN RESOURCE MANAGEMENT IN SMALLER FIRMS

According to numerous studies completed by the Society for Human Resources Management (SHRM), the standard for HR is a ratio of one exempt/professional level HR professional to approximately 75 to 100 employees. Nevertheless, it is important for leaders of smaller firms to keep up to date with the latest trends in human resources, which will help the firm attract and retain staff. External recruiters, benefits brokers, and attorneys can assist smaller-firm principals and administrators in the transactional aspects of HR for smaller firms.

▶ Leader Effectiveness (5.5) presents a model of leadership development for architecture firms.

There are some basic elements to an HR function that all firms, regardless of size, should strive to include in its organizational processes and procedures. These include:

- Job applications that are consistent and professional
- Benefit and compensation plans that are competitive and equitable
- Consistent process for all procedures (e.g., orientation to the firm, communications regarding salary increases, adjustments, and promotions, exit strategy, employee feedback)
- Employee handbook detailing organizational expectations, benefits, payroll, etc.
- Training and development opportunities (e.g., AIA CEU credits allowance or reimbursement to employees)
- Performance evaluations that are consistent and timely

Every organization should have an employee handbook in place whether it has 5 employees, 20 employees, 50 employees, or beyond. An extensive table of contents for a larger firm is included in this article. However, an employee handbook in a smaller firm should include these key elements:

- Introduction
- Employment policies (including federal, state, and local employment law requirements)
- Scheduling and attendance
- Compensation and benefits

LUCKETT & FARLEY LEADERSHIP INSTITUTE

In 2011, Luckett & Farley, a midsize AE firm, held its first Leadership Institute classes. The principals wanted to make sure they would be able to leave the firm in capable hands, so the Leadership Institute was launched.

Classes were held once a month over an eight-month period. An outside consultant was hired as the instructor. The curriculum covered topics such as emotional intelligence, collaboration and trust, and leadership excellence. In addition, understanding firm vision/values/culture; building strategic relationships; engaging in crucial, critical, or candid conversations; mastering conflict; and conducting facilitation were taught. Systems Thinking for Leaders was introduced, and each participant developed an individual roadmap to becoming a successful leader.

The goal of the firm is to have every employee go through the Leadership Institute. Although this is not a small investment, the organization believes everyone has a role to play in leadership. As a result, all staff members have the opportunity to develop confidence in their leadership ability.

Michelle Smith, PHR, Luckett & Farley Architects, Engineers, and Construction Managers Inc.

- Standards of conduct
- Workplace policies and expenses
- Acknowledgment of receipt of employee handbook

The key is to provide details and consistency in practice so that if an issue ever arises, the firm can look to what is formally in place as a guide.

BEST PRACTICES TO ATTRACT AND RETAIN TALENT

If you take care of your people, they'll take care of you. If you don't take care of your people, they'll take care of you.

—(Author unknown)

Identifying what separates a firm from the competition and what works well from an HR perspective will help to attract and retain talent. This is also important to ensure that when talent has been found and trained, they will not be driven to look elsewhere for advancement. These best practices include focusing on work-life balance, developing future leaders and technically proficient professionals, and supplying employees with transparent career paths and professional enrichment opportunities.

It is also critical for firm leaders to listen to their workforce. Given the opportunity, employees enthusiastically respond to sharing their ideas and desires for a cooperative workplace. Periodic employee surveys and focus group discussions will help HR staff and firm leadership to develop the new programs and policies that are effective in retaining and developing talent.

Work-Life Balance

Work-life balance is a top priority in twenty-first-century American culture. A February 2012 SHRM online study of U.S. workers found that the work-life balance is preferred over growth opportunity, camaraderie with coworkers, and a strong supervisor relationship.

An increasing number of firms are seeking to implement policies and programs that increase productivity while also promoting personal well-being and work-life balance for their employees. Employers who implement work-life balance programs can expect to find a reduction in turnover, increase in employee satisfaction and commitment, and less unscheduled absenteeism. Firms can offer a range of programs and initiatives, such as a wellness program, on-site child care, and parental leave. Other options include flexible scheduling, seasonal hours, and/or teleworking.

Telework

A growing number of firms are embracing the concept of telework. Telework simply means working from a remote location, typically a home office, while linked electronically to the firm.

In a 2010 Employee Benefits Survey conducted by the Society of Human Resource Management (SHRM), 55 percent of employers offer telecommuting as either a part-time or full-time option for their employees. Employers are shifting their focus from where, when, and how work gets done to the results and business impact of the work.

As an instrument in a firm's toolbox, teleworking can be beneficial in many ways. The following are among the benefits a firm may gain by allowing employees to telework:

- Save on office space, parking, equipment, and related costs.
- Reduce absenteeism and downtime due to weather, traffic, emergencies, etc.
- Create a performance-based environment that enables better work.
- Increase work satisfaction and commitment to the firm.
- Attract and retain employees and expand pool for talent recruitment.
- Demonstrate the firm's concern for the environment.

For a firm to be successful in administering a teleworking program, it must also consider the challenges of such a program. Strong supervision, norms of behavior, and regular communication are crucial. Other considerations may be security, tax and zoning, and insurance and liability under state law. A formal program should be put in place and assessed regularly to ensure it is beneficial to both the employee and the firm.

Diversity

Diversity as a concept focuses on a broader set of attributes than race and gender. In the context of the workplace, valuing diversity means creating a workplace that respects and includes differences, recognizing the unique contributions that individuals with many types of differences can make, and creating a work environment that maximizes the potential of all employees.

Embracing the diversity of today's population in the workplace goes well beyond compliance and an affirmative action plan that focuses on gender, ethnicity, generational diversity, and sexual preferences. In a creative environment the experience that the diverse workforce brings to the table enables a firm to provide a broader approach to projects. A successful architecture firm will use this diversity to bring a synergy of collaboration to the organization, which will enrich its creativity and provide its clients with a wider array of innovative and exciting ideas.

▶ See Diversity and Practice Management (2.1) regarding the contribution a diverse workforce makes toward maintaining a successful business and a competitive edge.

Generational Issues

Today's workforce consists of four generations: the Traditionals, the Boomers, Generation X, and Generation Y. Each generation has different skills and priorities. It is important for organizations to tap into generational differences, expertise, and work/life balance expectations. The "one size fits all" approach is outdated and ineffective in today's multigenerational culture.

Understanding generational differences in approaches to work will reap many benefits for architecture firms of any size, market sector, or specialty. Understanding the generational diversity and differences will benefit organizations by enhancing communications and productivity. In addition, it will portray to the staff a commitment to meeting employee needs.

In order to optimize productivity and organizational effectiveness, firms need to be innovative in finding ways to customize their workforce programs. Tailoring practices and policies to individuals and groups of employees throughout an organization will allow employees to utilize their skills and talents in an atmosphere that best suits their lifestyle, and as a result will increase employee engagement within the firm.

According to a major survey of 4,364 Millennials in 2011 by Pricewaterhouse Coopers (PwC), nearly a quarter (22 percent) of respondents rate training and development as their number-one benefit. Work/life balance follows, with 19 percent claiming it as most important, while cash bonuses rank third at 14 percent. The survey, *Millennials at Work*, *Reshaping the Workplace*, also showed that 72 percent of Millennials have had to make some sort of compromise in terms of location, salary, or industry to get a job.

Millennials Want More than Just a Job

Jon Andrews, a partner at PwC says, "Millennials want more than 'just a job.'" They expect rapid progression, a varied and interesting career, and constant feedback. "What they want might shift as they move through different stages of life and their commitments change, but this group is characterized by their ambition and optimism as they look at more than money when there's a job offer on the table," Andrews says. "There are significant implications for employers as they need to adapt to ensure they remain attractive to this new workforce."

So, to better understand this future generation, firms need to recognize that the roles and responsibilities for employees are critical for the long-term success of not only the firm but also the individual employee. Keeping employees engaged and energized by providing them with meaningful goals and objectives and keeping them involved in various projects will create a win/win for all.

Time-honored practices such as traditional mentoring programs share best practices in the industry and institutional knowledge that is invaluable to new employees in the workforce. Utilizing newer "reverse mentoring" programs that allow Gen X and Y employees to share their insights and experiences with newer technology helps to build a sense of sharing and belonging for more recent members of the workforce while at the same time providing guidance to the more seasoned professionals in new arenas. Both practices help to build a more unified and productive workforce.

CONCLUSION

Keeping abreast of the ever-changing human resources issues, trends, and programs, and aligning those programs to overall business strategy is critical to the success of an architecture firm of any size. Acknowledging that today's workforce needs are numerous, it is important for firms to think and act progressively and proactively and to find innovative opportunities to attract and retain talent. Developing human resources programs, focusing on the importance of staff, and finding ways to engage and develop staff, as well as instituting policies and practices such as telecommuting and flexible hours, will help employees maintain a productive and satisfying work-life balance. These types of programs increase the retention of staff and thereby reduce the amount of overhead incurred when hiring new talent. Putting transactional and tactical human resources in place will allow firms to focus on the strategic aspects of human resources and their impact on fostering and sustaining the success of the firm.

For More Information

American Society for Training and Development (ASTD): www.astd.org.
Equal Employment Opportunity Commission (EEOC): www.eeoc.gov/.
HR Advisors Group: www. Hradvisorsgroup.com.
Society for Human Resources Management (SHRM): www.shrm.org.
U.S. Department of Labor: www.dol.gov.
"Millenials at Work: Reshaping the Workplace Survey" (PricewaterhouseCoopers, 2011): www.pwc.com/gx/en/managing-tomorrows-people/future-of-work.

BACKGROUNDER

ARCHITECTS AS EMPLOYERS: LEGAL REQUIREMENTS

Patrick Bannon, Esq.

This is an update of a backgrounder first published in the 14th edition of the Handbook by James J. O'Brien.

Patrick Bannon is a partner in the Labor & Employment group of McCarter & English, LLP. He represents employers in court and helps them comply with employment laws and avoid litigation with their employees.

A wide range of federal and state statutes, regulations, administrative orders, and case law governs employment relationships. While most states still adhere to the basic rule that employment is "at-will"—a legal term meaning that, in the absence of a contract providing otherwise, an employee's employment may be terminated at any time, for any reason, with or without notice—in fact, there are many exceptions to the at-will concept. A brief overview of some federal and state laws governing employment follows. The body of law governing employment tends to be complex and very dependent on individual circumstances. In addition, this brief overview does not come close to covering all the legal rules and potential pitfalls that apply to the employment relationship. For these reasons, this summary should not be considered a substitute for competent legal advice.

INTERVIEWING AND HIRING

The *Fair Credit Reporting Act* requires employers who wish to use third parties to obtain background checks of applicants or employees, including credit verification, criminal history, and education verification, to follow certain rules governing the use of the information, and requires specific notice and disclosure to the affected applicant or employee. In addition, the federal Equal Employment Opportunity Commission takes the position that using criminal history that is not relevant to an employee's fitness for a job could violate laws prohibiting discrimination based on race and national origin. Some states have their own laws restricting the use of criminal history and other background information in hiring decisions.

The *Drug-Free Workplace Act* requires federal government contractors to have programs to ensure a drug-free workplace. The federal government also requires drug testing in some instances; for example, for certain employees of defense contractors. Many states and some local jurisdictions have their own laws addressing drug testing of employees or applicants for employment, and these vary widely.

The *Employee Polygraph Protection Act* restricts the use of lie detectors in most hiring and employment situations. Many states also regulate the use of polygraphs in employment.

The *Immigration Reform and Control Act* requires verification of authorization of new hires to lawfully accept employment in the United States and the maintenance of I-9 forms by the employer. The act also prohibits discrimination on the basis of national origin.

Other Selection Criteria

Federal or state laws may regulate checks concerning applicants and employees. These include criminal background checks, medical exams, interview and employment application questions, and pre-employment testing.

WAGES AND BENEFITS

The *Fair Labor Standards Act* governs minimum wage and overtime requirements and defines classes of employees who may be treated as exempt from these requirements. While paying an employee on a salary basis meets one of the standards for exempt treatment, it is not the only standard, and even employees who are paid a salary may be entitled to overtime pay for time worked over 40 hours per week if their duties do not qualify as exempt. Mistaken treatment of employees as exempt is common. Employees whose primary duty does not require an advanced degree or professional license, designers who are primarily responsible for discrete tasks, and nonprofessional support staff are examples of frequently misclassified employees. Many states and municipalities have analogous laws. Construction work of certain types on federal contracts may be subject to provisions of the Davis-Bacon Act, requiring payment of wages at a special local prevailing wage that is often much higher than ordinary minimum wage.

The *Employee Retirement Income Securities Act* governs the duties and responsibilities of employers regarding certain benefit plans, including retirement plans but potentially applying to many of an employer's benefits. It requires extensive disclosure to plan participants.

The *Family and Medical Leave Act* requires that most employers of 50 or more persons provide eligible employees with up to 12 weeks per year of unpaid leave due to a serious health condition of the employee; the arrival of a child, whether by birth, adoption, or through foster care; the illness of an employee's spouse, parent, or child; or certain needs of immediate family who are on active duty in the armed services. Eligible employees may also take up to 26 weeks of leave to care for a service member who suffered a serious illness or injury in the line of duty. The law provides this leave to most employees who have worked for an employer for at least one year and for 1,250 hours over the previous 12 months. Some states also provide for family and medical leave, and the employee may be entitled to benefits under both federal and state provisions.

The *Health Insurance Portability and Privacy Act* governs privacy and security of employee health data and requires employers to issue certificates verifying insurance coverage.

The *Patient Protection and Affordable Care Act of 2010* includes a variety of provisions affecting employer-sponsored health insurance, including a January 1, 2014, requirement that firms with 50 or more full-time employees offer health insurance or pay a fee. A few states also have laws penalizing employers who do not offer health insurance.

EMPLOYMENT TAXES AND WITHHOLDING

The Internal Revenue Code mandates withholding of taxes from employees' pay and forwarding the amounts withheld to the Internal Revenue Service. Employers are subject to various liabilities, including attachment, for failure to comply. States have analogous withholding requirements, as do many local jurisdictions.

The *Social Security Act* requires withholding contributions from employees' pay and forwarding these amounts, as well as employer contributions on behalf of employees, to the Social Security system.

Unemployment insurance requires employers to make payments for federal unemployment benefits. State statutes also govern payments to certain employees who have been terminated or laid off.

TERMS AND CONDITIONS OF EMPLOYMENT

A number of federal laws and some state statutes govern the terms and conditions under which individuals are hired and employed.

Discrimination

Title VII of the *Civil Rights Act of 1964* applies to employers with 15 or more employees, and the *Civil Rights Act of 1866* applies to all employers. These acts prohibit discrimination

(continued)

on the basis of race, color, sex, pregnancy, religion, and national origin. Executive Order 11246 applies to federal contractors and, depending on the dollar amount of a private employer's contract with the government, imposes certain requirements, such as implementing an affirmative action plan designed to improve employment opportunities for minorities and women. Most states and many local jurisdictions also prohibit discrimination based on the characteristics protected by federal law, and some also forbid discrimination based on sexual orientation.

Sexual harassment has been interpreted by the courts to be a form of sex discrimination prohibited by law. Court decisions on this issue have led to great potential liability for employers, and every employer should adopt a strict policy outlawing such discrimination, conduct workplace training, and have procedures in place to address any complaints of sexual harassment. The laws of some states now mandate that certain employers conduct sexual harassment training.

The *Americans with Disabilities Act* prohibits discrimination against a qualified person with a disability who can perform the essential functions of a job, and in some cases requires an employer to provide reasonable accommodations in order to permit the disabled person to perform those functions. Whether an employee's physical or mental condition counts as a disability under the ADA is often hard to determine, despite recent efforts to clarify the law. Employers who have certain relationships with the federal government are required under the *Rehabilitation Act of 1973* not to discriminate against handicapped individuals, and some employers are required to prepare affirmative action plans. Many states have analogous statutes applying to private employers.

The *Age Discrimination in Employment Act* prohibits discrimination on the basis of age by employers who employ 20 or more employees. Persons in this protected category are those age 40 and over. The act also governs certain aspects of the operation of retirement plans and sets standards for severance agreements in certain situations.

The *Equal Pay Act* prohibits most employers from engaging in wage discrimination based on gender for work involving equal skill, effort, and responsibility, unless the differential in pay is based on a lawful factor other than gender. Many states have analogous laws, and some have adopted the comparable-worth concept, applying to jobs that are similar but not identical.

The *Genetic Information Nondiscrimination Act* prohibits employers from requesting or using employee genetic information, including family medical history.

Veterans' Employment Rights

These rights are governed by the *Uniformed Service Employment and Reemployment Rights Act,* which covers all private employers and prohibits discrimination because of application to or membership in a uniformed service. It requires posting in the workplace of notices explaining employees' rights under the law and reinstatement to the veteran's former position upon return from military training or service; and bars discrimination relative to hiring, retention, promotion, or other employment benefits. The *Vietnam Veteran Readjustment Act* applies to certain government contractors and prohibits discrimination against Vietnam-era veterans and disabled veterans.

Rights to Organize

The *National Labor Relations Act* protects the right of employees to organize and to form or join labor unions, the right to engage in concerted activity, and the right to bargain collectively. In recent years, the federal agency that enforces this law has sought to apply it to nonunion employers in a variety of contexts, seeking to protect employees who disclose their compensation, discuss ongoing workplace investigations, or use social media to criticize their employers.

Workers' Compensation Laws

Almost every state requires employers to carry workers' compensation insurance (or to offer the option to employees), to provide benefits, and not to discriminate on the basis of claims. In some states an employer who fails to carry such insurance is liable for injuries to employees, is deprived of certain defenses normally recognized in comparable circumstances, and can even be criminally prosecuted. Variations from state to state are often important.

The *Occupational Safety and Health Act* regulates employee health and safety and requires a safe workplace. The Department of Labor publishes specific regulations on certain workplace hazards, especially in construction. Under an approved state plan, states may regulate in this area. The act also regulates office workers as to fire protection and injury records, and imposes a "general duty" to provide a safe workplace.

The *Jury Service and Selection Act* bars an employer from discharging an employee for serving on a federal jury, and requires that leave be given for service. Nearly all states also require that employees be given time off to perform jury duty without being penalized.

Employment Contracts

Contracts can be found to exist even when an employer did not intend to be contractually bound. In fact, all employment relationships are properly understood as contractual. However, most firms prefer to retain the right to part ways with their employees at will. To preserve this right, care must be taken in drafting offer letters, policies, and handbooks to avoid creating an explicit or implied commitment where none was intended. In addition, in most states, noncompete and nonsolicit agreements with employees can be enforceable in appropriate circumstances if properly drafted, helping architecture firms to protect their practices from unfair competition or raiding of employees or clients. It should be noted that case law in this area is changing rapidly, and varies by state.

Posting of Notices

Many federal and state statutes require that notices advising employees of their rights be posted so that employees can see them.

TERMINATION OF EMPLOYMENT

The *Workers' Adjustment and Retraining Notification Act* requires that employers with 100 or more employees give 60 days' written notice to the employees and the local government in the event of a mass layoff (50 or more employees if the layoff is at least one-third of the workforce) or plant closing. Many states also have laws governing mass layoffs and plant closings.

The *Consolidated Omnibus Budget Reconciliation Act of 1986* (COBRA) requires that employees be given notice of the right to extend group health benefits coverage after termination and at the time of other qualifying events. COBRA applies to employers with 20 or more employees, although some of COBRA's provisions, and some states' analogous laws, can apply to smaller employers as well.

EMPLOYMENT RECORDS

Retention of employment records, as well as access to them, are regulated by government statutes.

Retention

Many federal and state laws require retention of employment-related records. The length of time these records must be kept can vary widely, from as few as 90 days to as many as 30 years beyond the termination of employment. Most statutes also require that all records be retained once a charge or claim has been filed, and kept until its final disposition. Employers should check with legal counsel regarding specific records.

Access

Third-party access to employment-related records is governed by statutory authority in the case of governmental agencies, and can be restricted by privacy rights granted to employees by state law in the case of disclosure to others. Various states require that employees and former employees be granted access to personnel files regarding their own employment, while other states continue to recognize that such files are the property of the employer and that the employee has no inherent right of access to them.

8.2 Compensation Strategy and Philosophy

Steven J. Isaacs, PE, Assoc. AIA

Compensation requires a holistic approach encompassing the firm's strategy, values, goals, firm culture, and position in serving the needs of the marketplace. The expression of compensation strategy should be driven by elements unique to each firm: customer service, operations, finance, and human resources.

Success for the architecture firm depends on the talent and work of its staff. This means attracting people to the firm, motivating them in their work, and retaining them, with their abilities and knowledge, for the firm's long-term health. Compensation is a key element in this relationship. As a firm grows and becomes more complex, several interconnected issues come into play: What is the firm's position in the marketplace? How does the firm create a compensation strategy? Will the firm choose a low base salary with high incentives, or a high base salary with lower or no incentives? How the compensation strategy is constituted is directly related to the firm's business strategy, philosophy, and culture.

FIRM STRATEGY, PHILOSOPHY, AND CULTURE

Architecture as a creative process is conducted at a high level of intellectual complexity requiring the work of individuals and high-functioning teams, so the importance of having the right people in the firm cannot be overstated. Every person who comes into

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a firm brings unique abilities, perspectives, and potential. Finding the right people with the talents that fit a firm's chosen work, culture, goals, and strategy is at the heart of building a successful architecture practice.

The right compensation strategy can help attract people who are a good match for the firm. Once those people have been found, hired, trained, and integrated into the firm, losing them is extremely costly. A 2010 study by PwC (PricewaterhouseCoopers) reveals that the cost of replacing a competent staff member is roughly equal to a year of that person's salary; therefore, strong employee engagement practices and long-term retention are highly desirable objectives for most firms. Compensation is an important factor in the complex equation that comprises the career contentment and job satisfaction that lead to long-term retention.

A firm's compensation strategy also reflects its attitude toward itself, its position in the marketplace, its approach to clients and projects, and its involvement in the community. Details of compensation strategies are generally private, yet a firm's approach to compensation is often widely known—especially in this high-communications era—and becomes part of the firm's overall reputation.

That reputation, or brand image, is a key element in attracting appropriate staff, clients, and projects to the firm. A firm with a compensation strategy that clashes with its desired reputation may not obtain the optimum market position it is seeking. For example, a firm that specializes in low-cost, rapid-deployment warehouses could unwittingly gain a reputation among clients for being "too expensive" if word gets out that it pays above-market salaries to staff. An approach more aligned with this firm's strategy could be to balance more moderate salaries with an incentive program.

Evaluate Strategy and Culture

The first step in developing a compensation strategy is to review the firm's values, vision, and goals. Many of these questions are revisited regularly during the strategic planning process. Among the questions the firm should consider are these:

- What are our core values?
- Why do we want to work together?
- What business are we in?
- Who are our customers?
- How will we get their business?
- What key competencies do we need to serve our customers?
- What jobs/roles comprise those competencies?
- How many people do we need in those roles?
- What are the core competencies of our staff?
- Who will lead the firm forward in the future?

► Strategic Planning for the Design Firm (5.3) discusses how firm leaders can envision the future of their firms and then implement strategies and action plans that will achieve positive results.

The second step is to determine the firm's culture, which tends to derive from the firm's values, vision, and leadership. Cultural attributes are expressed in unique ways within every firm, and can be so ingrained that it is difficult to observe them objectively.

One useful tool for looking at firm culture is found in the work of University of Michigan professors Kim Cameron and Robert Quinn, whose book on *Diagnosing and Changing Organizational Culture* offers four simply defined categories:

- *Collaborate (Clan) culture*. The Collaborate culture is an open and friendly place to work where people share a lot of themselves. It is like an extended family. Leaders are considered to be mentors or even parental figures. Group loyalty and sense of tradition are strong. The organization places a premium on teamwork, participation, and consensus.
- *Create (Adhocracy) culture.* The Create culture is a dynamic, entrepreneurial, and creative place to work. Innovation and risk-taking are embraced by employees and leaders. A commitment to experimentation and thinking differently are what unify the organization. Leaders strive to be on the cutting edge. Individual initiative and freedom are encouraged.

- *Control (Hierarchy) culture*. The Control culture is a highly structured and formal place to work. Rules and procedures govern behavior. Maintaining a smooth-running organization is most critical. Stability, performance, and efficient operations are the long-term goals. Success means dependable delivery, smooth scheduling, and low cost. Management wants security and predictability.
- *Compete (Market) culture*. The Compete culture is a results-driven organization focused on job completion. People are competitive and goal-oriented. Leaders are demanding, hard-driving, and productive. The emphasis on winning unifies the organization. Success means market share and penetration. Competitive pricing and market leadership are important.

Many firm cultures can be understood as a balance between varying combinations of these four categories.

Determine a Compensation Philosophy

Having determined with clarity the firm's strategy and culture, the competencies needed to serve clients, and the roles needing to be filled within those competencies, the firm must now determine a philosophy about compensation. The firm's approach to compensation, benefits, and incentives should reinforce the firm's vision, values, and strategic objectives.

This alignment is brought about by directly rewarding the behaviors that the firm desires in order to advance its objectives. If the firm's objective is to maximize profit, then the compensation plan must reward profit-maximizing activities, such as business development, project management practices that enhance project profitability, and innovations that reduce overhead. By comparison, if the firm's strategy is to become a regional leader in energy-efficient design, then compensation should seek to encourage a focus on design practices that promote energy efficiency, and business development that brings in regional clients.

Compensation must also align with where the firm wants to be in the market:

- *Above market rate:* Firms may choose to offer a higher than market compensation package to attract the necessary talent for their strategic approach. Many small firms use this approach, as they may not have the ability to offer as wide a range of additional benefits as larger firms.
- *At market rate:* Market rates for compensation vary somewhat from region to region, but tend to fall into similar proportions for peer positions. Most firms choose to compensate staff in ways that are similar to other firms, with benchmarks easily available through annual surveys and on the Internet.
- *Below market rate:* The firm's chosen business focus and culture demand a highly competitive pricing structure, with lower compensation playing a part in creating that competitive pricing.

CASE STUDY: WHEN COMPENSATION IS OUT OF ALIGNMENT WITH FIRM STRATEGY AND VISION

An architecture firm had a successful, wholly owned subsidiary in construction management. During the firm's long-term strategic planning process to set future direction, it became clear that their highest goal was to become a nationally recognized design firm. At the same time, the highest rewards in the firm were all going to the construction management division, because it was the most profitable. While the CM division's contributions to design were limited, it was taking in the most compensation because the compensation plan was structured to reward profit. This created a high amount of tension between the divisions and increased employee dissatisfaction. With the firm's future vision squarely focused on design, the firm had to develop a compensation strategy that rewarded design over pure profit. This direction meant that the CM division would in the future have little opportunity to advance their compensation or win bonuses. The firm and the CM division chose to part ways and spin off the construction management division as a separate firm.

CONSIDERATIONS FOR THOSE SEEKING TO BE HIRED

For architects and recent graduates who are seeking positions in firms, considerations include the following:

- Does the firm do the kind of work you are interested in or passionate about?
- Will your skill set be expanded through your experience at this firm?
- Is there a specific mentor at this firm you seek to work with?
- Does the firm offer the career paths or opportunities for growth that fit with your long-term goals?
- Are the firm's culture and values in alignment with your personal values and goals—that is, will you feel comfortable there?
- How is the compensation structured, and does it align with your needs and goals?

Evaluate How to Attract Talent

Compensation packages are key to the firm's recruiting process, the individual professional's interest in a firm, and their acceptance of employment. An architecture firm's staffing strategy plan should include where the firm will find and recruit talented individuals, and how to attract them.

An important consideration for a firm's leaders as part of this plan is the firm's overall brand image and reputation in the marketplace. Compensation practices will help attract people who will fit with the firm's culture and vision. In other words, marketing and branding efforts attract more than just clients, they also support a recruiting program. Depending on the firm's size, it may have human resources professionals to guide recruiting strategy and efforts.

THE FUNCTION OF COMPENSATION IN AN ARCHITECTURE FIRM

A rewards system comprises multiple elements, including these:

- Compensation
- Benefits
- Work-life
- Performance management and recognition
- Talent development

► Professional Development and Mentoring (8.4) and Intern Development (3.2) further discuss training, mentoring, and appraisal programs that support both employees and the firm's strategic plan.

Architecture firm staff members usually have strong expectations that compensation plans will be well-defined and offer clarity about how compensation is tied to both their job function and their performance. Most firms have specific tiers that identify this correlation of function to compensation, often with several sub-tiers per function. These sub-tiers allow for graduated promotion based on a staff person's ability to perform in a new function. Compensation packages can be designed in ways that allow the firm to meet the needs of most staff as well as rewarding star performers. "Pay your stars," advises the director of human resources at a large international firm. She explained that many firms are moving to plans that offer tiered base pay levels tied to function, with incentive compensation as the way to both encourage desired behaviors throughout the firm and reward the top performers.

Definition of Compensation

Compensation in its most basic definition is the exchange of money or something of value for a service. Employees typically exchange their time, knowledge, and talents for a combination of financial and nonfinancial rewards from the firm.

Every individual has both common and unique motivations, and a means of understanding those motivations can help in structuring compensation packages. Psychology offers a range of theories about motivation, but one of the most familiar is Abraham Maslow's Hierarchy of Needs. His work posits that human needs can be seen as a scale that ascends through five key areas: physiological needs (food, water, sleep), safety and security needs (shelter, safety), the need for belonging (family, friends, community), esteem and achievement (recognition of accomplishments, respect of others), and culminating in the most complex needs for self-actualization, comprising creativity, morality, problem-solving, and the like.

Such models oversimplify human motivations and needs, but also make them easier to grasp and work with; they can be helpful for looking at the firm's relationship with staff and seeing that the range of needs being met is at a level that helps support the desired relationship with an individual. That relationship may begin at the basic exchange of wage for time and knowledge, but nearly everyone would also like to know they are safe in the workplace, and to have a sense of community with their colleagues. A highly trained architect will also want recognition of achievements, challenging responsibilities, and the freedom to use a high level of creativity to solve complex design problems.

Are Architects Different?

The importance of these three latter points—recognition, challenging responsibilities, the freedom to be creative—to the career contentment and job satisfaction of architects was notably examined by Judith R. Blau in her 1984 landmark work, *Architects and Firms: A Sociological Perspective on Architecture Firms.* According to Blau, "Just as architecture is not mere building, architects are not mere professionals." Her survey of 422 architects revealed that architects see, in themselves and their work, a combination of art, science, creativity, technical responsibility, and diversity of problems to be solved which sets them apart as unique. They also emphasize the highly individual nature of idea development and creativity, characteristics that are emphasized in popular culture to the point of eccentricity. Anyone who practices architecture knows that individual creativity must be balanced with the efforts of a team, sometimes comprising hundreds of people. Blau lists four specific factors that contribute to career contentment and job satisfaction for architects, and says that her study shows that these factors operate regardless of firm size or characteristics:

- Current responsibility for many different tasks
- Having had some responsibility on an award-winning project
- Exercising much power within the firm
- Working on many different types of projects

These expectations for challenging responsibility, recognition, and creativity have an important role in hiring, retaining, and working with architects.

Demographic Factors: Age, Culture, Gender

The components of compensation packages should consider the needs of the range of staff the firm will be employing. For example, employees have different needs at different stages of their lives. These generational differences can affect an individual:

- Staff who are entering the prime earning years of their careers will be seeking strong retirement plans (IRAs, 401(k)s, etc.), as do members of the large baby boom generation, whose first members turned 65 in 2011 and who will successively reach retirement age through 2030. Many plan to continue—or must continue due to recessionary losses of savings—working well into their seventies before retiring.
- Younger staff may be more interested in flexible time, the ability to work from home, having the latest technology and equipment on their desks, and the ability to use paid time for pro bono, sustainable, or community projects. HR directors at architecture firms generally say that time off and flexible time were among the most desired perks, regardless of age.
- Staff members with children have demands on their time related to athletics, tutoring, school events, and the like. Also consider how these activities affect single staffers (who are sometimes left holding down the fort during Little League season), and offer them comparable options.

- All staff want clear career paths and learning opportunities, and several HR directors shared the insight that the Millennial generation especially craves a learning career path with specifics about how they can climb the tiers. They thrive on frequent promotion, so designing job functions with many opportunities to level up will keep them engaged.

In an increasingly globalized marketplace, staff may come from anywhere in the world, bringing different expectations of their employment conditions with them. It can be important to the hiring process and compensation negotiations—as well as retention for the long term—to do some research. Understanding how compensation is treated in the candidate's culture, styles of negotiation, and employment expectations are highly relevant. The candidate may need to be coached through the differences to prevent either too-high or too-low expectations, or the loss of a promising candidate through misunderstanding.

Gender bias in pay is an unethical practice and should never occur. Failure to pay female staff equitably with male staff will damage the firm's reputation, and open it to legal risks.

A key purpose of defining compensation plans with pay tied to function is to prevent bias, favoritism, nepotism, and the like. Individuals who perform at the highest levels can be rewarded through incentive systems.

The Four Functions of Compensation

From the firm's perspective, the compensation plan accomplishes four actions, as shown in Figure 8.2:

- *Attracts.* Helps brings the firm to the attention of talented individuals and attracts them onto the team
- *Retains.* Plays a key role in the long-term engagement and retention of valuable employees
- *Motivates.* Offers incentives that motivate employees to higher performance
- *Rewards.* Provides additional compensation beyond salary for recognition of outstanding contributions, which boosts all three of the functions above

Attract

Firms currently face many challenges in recruiting, including demographics, competition for talent, and the ups and downs of economic cycles.

Attract. Retain. Motivate.

Total Rewards Element	Goal		
	Attract	Retain	Motivate
Base pay	High	Medium	Low
Short-term variable pay	Low	Medium to High	High
Long-term, qualified deferred compensation	Low	Medium	Low
Long-term, nonqualified deferred compensation	Low	High	High (2)
Perks	Medium	Low	Medium (1)
Recognition	Low	High	Medium
Performance management	Low	Medium	High
Work/Life programs	Medium	Medium	Low
Career pathing	High	High	Medium
Training	High	Medium	Low
Benefits	Medium	Medium	Low

(1) If tied to performance (2) If long-term incentive compensation is used

FMI Corporation

FIGURE 8.2 **Attract-Retain-Motivate**

Demographics

Many boomers were substantially affected by the Great Recession, and now expect to continue working longer to make up for their financial losses. The Conference Board reported in a study issued May 2011 ("U.S. Workers Delaying Retirement: What Businesses Can Learn from the Trends of Why, Why and Where") that the Great Recession resulted in "significant cuts to households' net worth," thereby forcing many to delay retirement. Among those groups with the highest number of people projecting they will retire later are managers with a college degree and those in the construction industry—the first group, because they have higher expectations for retirement years and therefore plan to accumulate more retirement funds before taking that step, and the second group (which presumably includes architecture and engineering), due to the tremendous impact of the Great Recession on the AEC sector's financial well-being.

Accordingly, those who are actively building or rebuilding their retirement savings will be more attracted to compensation packages with strong retirement features.

The War for Talent

Competition for the best and brightest talent is a perpetual challenge in the design professions, and attractive compensation packages can help bring top talent to the firm. American firms now compete for such talented individuals with firms from around the world, as well as other industries who find the creativity of design thinkers to be of benefit. The U.S. Bureau of Labor Statistics projects a need for 27,900 new architects to enter the industry between 2010 and 2020, and says that "employment of architects is projected to grow 24 percent from 2010 to 2020, faster than the average for all occupations."

Dealing with Economic Cycles

Architecture firms are highly subject to economic cycles, as workloads rise and fall with the clients' needs and ability to fund projects. This tends to result in hiring and layoff cycles at architecture firms. During a slow job market, firms may be tempted to make below-market-rate offers to new employees to keep overhead costs down. This practice can backfire over time, leading to higher turnover and staff dissatisfaction, and potentially harming the firm's reputation as a desirable workplace when times are busier and staffing needs become urgent.

Retain

While there are many ways to compose talented teams, for architecture firms the core is still built on having a talented in-house staff. These employees represent a significant investment in recruiting costs, in integrating them into the firm, in training and professional development, and in their accumulated knowledge, skills, and experience over time. A widespread figure used as a rule of thumb is that it costs 150 percent of a staff member's annual wage to replace him or her. Clearly there is a huge financial advantage in having a 2 percent annual turnover versus a 20 percent annual turnover.

The causes of employee turnover can be difficult to pin down. In exit interviews people often say they "received a better offer," which implies that they are leaving for higher pay. In 2005 Leigh Branham published his authoritative study, *The 7 Hidden Reasons Employees Leave*. In partnership with the Saratoga Institute, Branham studied 19,700 post-exit interviews and 3,179 verbatim comments. His analysis identified seven key reasons employees leave:

- The job or work environment was not as promised or expected.
- The job did not fit or provide enough challenge.
- They didn't receive enough coaching or performance feedback.
- They didn't see opportunity for career growth or advancement.
- They didn't feel valued or recognized for their contributions.
- They had become burned out from stress and overwork.
- They had lost trust and confidence in the company's leaders.

Only 12 percent reported that money was their main reason for leaving. The popular saying is that "People leave their bosses, not their jobs." The seven items identified here certainly support that folk wisdom.

Branham's most recent study of America's "Best Places to Work" has revealed six drivers of employee engagement:

- Caring, competent, and engaging senior leaders
- Effective managers who keep employees aligned and engaged
- Effective teamwork at all levels
- Job enrichment and professional growth
- Valuing employee contributions
- Concern for employee well-being

All of these drivers are primarily cultural, not monetary. Retaining talented staff members for the long term goes beyond the mechanics of pay rates, and must be part of an overall approach to human resources strategy.

Motivate

Along with the complex personal and cultural concerns that affect employee engagement and retention, compensation remains a strong motivator for most people—it is one of the primary drivers for why they work in the first place.

For compensation to motivate effectively, the firm must define the behavior it expects to encourage or reinforce, beginning with a clear job description.

Incentive compensation programs can be powerful motivators. They are most effective if they are well defined and communicated regularly. The steps in creating an incentive plan are described in the financial rewards section that follows.

Rewards

Rewards include base compensation, incentive compensation, bonuses, and nonfinancial rewards. Rewards are provided in recognition of meeting specific goals, from daily work to exceptional performance. For any system of rewards to be effective, it must reflect internal equity and parity among peers and within the hierarchy, and be in alignment with the firm's vision, values, and culture.

Creating a Financial Rewards System

Base Compensation

The importance of calibrating base pay cannot be overestimated. Pay too much, and the firm will increase its fixed costs unnecessarily. Pay too little, and the firm will not be able to attract qualified talent and will waste time interviewing and screening inappropriate candidates. Market data is key to setting appropriate base pay levels (see the "External Benchmarking" section). An offer is based on a combination of firm compensation strategy, job requirements, market pay rates, and the individual's personal salary history. It is not inappropriate to ask a candidate to provide evidence that justifies a high salary claim, but it is unwise to take advantage and perpetuate a below-market salary because of market conditions or opportunism.

If the firm's compensation strategy is to pay below-market salaries and above-market incentives to be competitive, then offering below-market salaries may work. Paying less than known market rates is a short-term strategy that is likely to result in high turnover. At the other extreme, continually hiring new candidates above existing staff members' pay rates will create animosity. The entire compensation system must balance both external equity to attract new candidates and internal equity to retain existing, experienced staff.

Incentive Compensation

An incentive compensation plan is a short- or long-term pay system that rewards participants based on the achievement of critical performance goals aligned with the goals, objectives, and strategy of the company. Short-term incentive compensation plans have three levels of performance measures (see Figure 8.3):

- Company level: financial measures
- Business unit, group, or team: typically these are quantitative measures
- Individual

Funding mechanisms for the plan may be top-down, with a formula-based funding pool, or bottom-up, with labor market pricing determining the target incentives. Incentive plans have several objectives:

- Motivate and energize employees to achieve company objectives
- Reinforce and communicate company strategy
- Attract, motivate, and retain top staff
- Provide adequate financial returns for a reasonable cost
- Serve as an employment agreement between the employee and the company

A well-designed incentive compensation plan can help the firm in two ways:

- Positively reinforce middle-level performers, who are the majority of the firm, to achieve incrementally higher performance
- Provide meaningful pay differentials between high-level and low-level performers

However, such incentive plans are not effective at changing already high-level performers into even higher-level performers, nor can they transform the behavior of the lowest-level performers.

Creating an Incentive Plan

Good incentive compensation plans have three key principles:

1. If you can't measure it, it doesn't go in the plan.
2. Use no more than three performance measures.
3. No less than 20 percent weight should be given to any single measure.

Payment Limitations

The design team must consider whether or not to cap the incentive plan to protect the firm's interests. As a guideline, general incentive plans should be capped. Professional staff that do not carry ownership risk should have clearly defined target and upside opportunities. However, overachievement is a function of performance and goal setting, so having a capped plan prevents overpayments in situations when the forecast is unable to predict windfall events. This general incentive plan is different from shareholder distributions for owners. Owners typically carry more risk by contributing their own capital to the business, providing personal guarantees, and underwriting insurance certificates/bonds. While owners may also participate in a general incentive plan or executive short-term incentive plan, profit distributions are typically uncapped to reflect the amount of risk in funding and managing the business.

Formulaic or Discretionary

Under *formulaic plans*, employees earn incentives that are part of the plan formula only. There is no discretionary adjustment to the calculation, and it reinforces a culture of fairness.

Under *discretionary plans*, managers have some latitude to adjust the final payment. It should be based on the individual performance section of the plan only; it recognizes that certain individuals contribute more than others.

Key elements in the incentive plan include:

- Plan objectives
- Eligibility

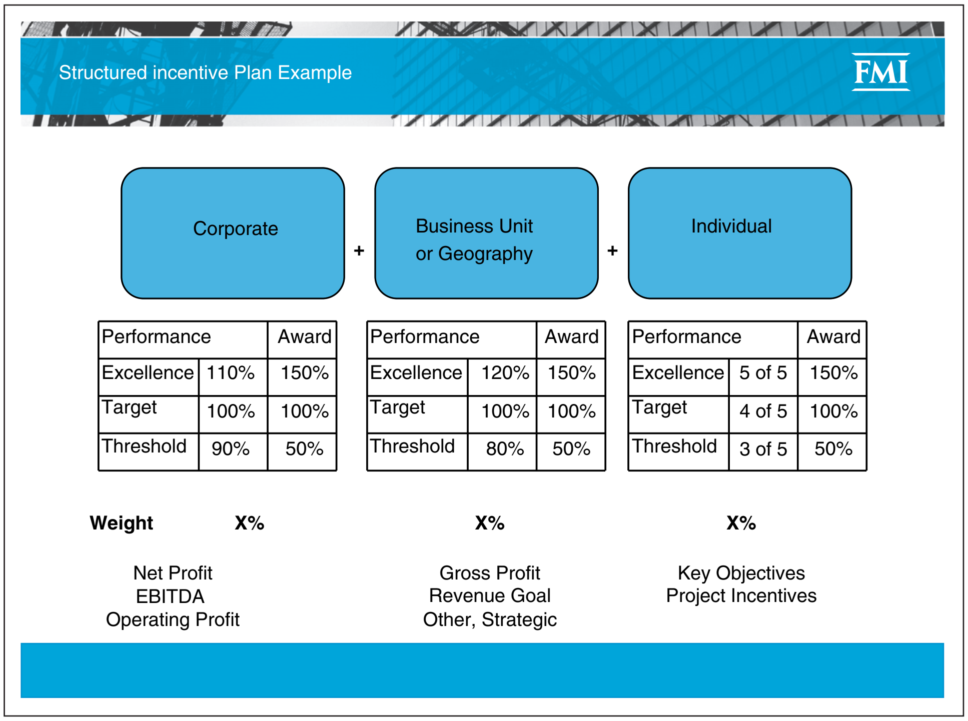

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FIGURE 8.3 Structured Incentive Plan Example

- Target opportunity
- Performance measures and weights
- Performance standards
- Performance period and payment frequency
- Payment limitations
- Terms and conditions

Nonfinancial Rewards

The range of nonfinancial rewards a firm may offer employees is extensive and may include commonly expected perquisites such as:

- Educational and learning programs
- Health care
- Retirement savings plans
- Profit sharing
- Paid time off, including sick and vacation time
- Maternity and paternity leave
- Vehicle or transportation compensation

Less traditional options include:

- Opportunities for community service
- Health club membership
- Child care assistance
- Various services delivered to the office, such as dry cleaning

Developing a mix of these rewards depends on the firm's resources, and what fits well with the compensation strategy. Firms in large urban centers will be expected to provide a wider range of benefits, and may offer such lighthearted perks as ping-pong tables or dartboards. Nonfinancial benefits may also have regional or local characteristics; for example, it may be expected by local business customs that executives participate actively in the country club.

EMPLOYEE BENEFIT PROGRAMS

Ann Casso, Executive Director of AIA Trust

TheAIATrust.com offers a wide variety of individual and employee benefits to AIA members—as well as a wide range of risk management resources, from information on starting a new firm to retirement planning. The AIA Trust is governed by AIA Members dedicated to providing programs for AIA Members to run their architecture firms successfully.

Employee benefit programs are important for many reasons. In some cases, they may be a necessity for various insurance coverages. They boost employee morale and motivation, which translates to better performance and higher productivity on the job. They improve employee retention, helping a firm to keep its best workers and avoid recruiting/retraining costs. And, they help firms to attract the top employees.

It's important for firm owners and managers to be well acquainted with the types of benefit programs available to themselves and employees, and the regulations governing them. With the implementation of the Patient Protection and Affordable Care Act (PPACA), an aging population, health care technology advances, and increasing health care costs, there are many potential ramifications for employers. In addition, architects need to consider planning earlier for retirement savings and saving longer. Increasing retirement age, longer life span, and a larger number of people at retirement age mean that substantial retirement savings will be needed in order not to work well beyond normal retirement age or outlive one's retirement savings.

HEALTH INSURANCE

The best approach to finding health insurance to suit a firm's needs and budget is to find a good insurance broker familiar with the local market, including carriers, plans, and issues regarding small employers. The AIA Trust offers an online brokerage service for AIA members to find individual or small group coverage. Various options and programs should be discussed with the broker, who is paid on commission so there is no up-front expense.

In general, there are three distinct markets within health insurance: individual, small group, and large group coverage. The types of health insurance plans available in the marketplace continue to change, ranging from indemnity plans to Preferred Provider Organizations (PPOs) and Health Maintenance Organizations (HMOs) to consumer-directed plans. In addition, national health care legislation has created State Health Insurance Exchanges, which may make access to health insurance more affordable to sole proprietors and small-firm owners. For information on the major impacts and the most significant requirements of the Affordable Care Act for employers, the AIA Trust created a short webinar: http://www.theaiatrust.com/members/webinars/PPACA.swf.

INCOME PROTECTION AND REPLACEMENT BENEFITS

Life insurance provides benefits in the event of the death of the insured and serves as income protection for the spouse or other employee beneficiaries. Group term life is commonly provided to all employees as a fixed-dollar amount per employee or as a multiple of salary.

Key person insurance is a potential source of protection for the firm in the event of the death of the owner or a principal, and for that reason, it is referred to as "key man" or "key person" insurance. Life insurance may be used for this purpose, but an actual key person policy usually includes disability benefits as well as death benefits. Key person insurance does not indemnify the actual losses incurred but compensates with a fixed monetary amount.

Disability benefits may be provided in several forms. Short-term disability insurance protects against absence from work of short duration, typically up to six months, though most employers self-insure against short-term disabilities through sick leave. Long-term disability benefits protect against extended disabilities, often until the employee recovers or reaches age 65. For architects, it is important that the test of disability be their ability to practice their own chosen profession—the test used in the AIA Trust policy.

Business overhead expense (BOE) disability benefits are similar to long-term disability benefits except that BOE protects business-related expenses (e.g., rent, mortgage interest, utilities, and employee salaries) in the event of total disability of a business owner for up to 24 months to help the owner maintain business viability.

RETIREMENT BENEFITS

Retirement plans take different forms with many variations and options, and all plans must conform to IRS regulations, which may change annually. Employers may consider, depending on the type of plan, whether the plan will be employee-only contributions or whether to contribute as an employee benefit with an appropriate vesting schedule. Retirement plans are important for the firm owner as well as for an employee recruitment and retention tool. Defined contribution plans and pension plans are increasingly rare, while profit-sharing plans allow flexibility with a variable contribution annually. Traditional, Simple, Safe Harbor, and Owners 401(k) plans each have different characteristics to address firms' specific needs. The key for firms as well as for individuals is to start a retirement plan early. More information on retirement planning can be found at TheAIATrust.com

TACTICS AND STRATEGIES

Additional Key Components to Consider

Finding a good balance of salary, bonuses, incentives, and benefits for your firm helps establish stability for your staff, with the attraction of rewards for excellent work and incentives that draw high achievers to focus on strategic goals.

Other components of employment packages can include vacation time, paid time off, flexible schedules, health care benefits, retirement plans, profit sharing, and miscellaneous benefits such as public transportation reimbursement.

The plan should address all components in a unified, comprehensive way and describe them with accuracy.

Bonuses

Bonuses as part of the strategic compensation plan can help a firm share profits, reward individual accomplishments or contributions to the firm, or motivate desired actions that are not included in the incentive plan—for example, a referral bonus for bringing a talented individual to join the firm. Bonuses can also help reinforce firm culture; for instance, annual holiday bonuses help make it clear that staff are appreciated and valued. Types of bonuses include:

- *Profit sharing*: The firm may set aside a percentage of salary for employees based on the firm's overall profitability, or the profitability of a particular division or office.
- *Milestone bonuses*: A bonus typically offered for completing a major project milestone early.
- *Achievement bonuses*: Small bonuses typically awarded on the spot by an immediate supervisor for an achievement that deserves extra recognition.
- *Referral bonuses*: For bringing talented individuals to the firm; as an alternative to paying a 20 to 30 percent fee to a recruiter, a firm can pay that fee to its own staff and increase the incentive to help bring in top talent.
- *Retention bonuses*: Sometimes offered during a merger or acquisition as an incentive for key staff to stay on.
- *Holiday bonuses*: Holiday bonuses should be clearly distinguished from profit-sharing structures to avoid confusion. They are a thank-you from the firm, and can range from a small gift to a month's salary to extra paid time off.

The firm may come up with a variety of creative bonuses that help reinforce culture, drive desired behavior, and reward achievements. The size, degree of structure, and amount of bonuses vary from firm to firm and may be influenced by local/regional expectations, the size of the firm, and the goals of the plan.

Communication

Communicating a firm's compensation and incentive plans to staff members is important: The role of compensation in recruiting, motivating, and retaining staff makes it crucial that all understand the plan clearly. Communication is particularly important to the success of incentive compensation plans. Many discretionary plans have no documentation or structure, and are often not effective as a result. Making the compensation plan public and reminding staff to review it also helps promote the feeling of equity in the firm.

How often firm leaders communicate both the plan and the business results of the firm can have a direct impact on incentive results. Some mechanisms for communication might include:

- Publishing quarterly results to provide a feedback loop and motivate participants throughout the year
- Directing managers to have one-on-one meetings with subordinates regularly

- Presenting the plan to the staff along with the annual strategic plan or similar documents to reinforce awareness
- Reminding staff regularly that compensation plans are outlined in the employee handbook

For smaller firms, this process is often less formal but no less important. Communicating financial results and the impact they may have on compensation including raises and bonuses is critical to the establishment of trust and positive morale.

External Benchmarking

Benchmarking the firm against peers in the industry and the general marketplace is a useful practice for determining base compensation rates. It indicates how similar firms structure benefits offerings and provides useful data and practices. Comparing several different sources of information is recommended to verify the benchmarks being offered.

Sources of Information

Salary data for 2012 are provided in Table 8.6:

TABLE 8.6 U.S. Architect Salaries 2012

Employee Classification	Low Salary	Median (Midpoint) Salary	High Salary	Job Description
Architect 1	$44,100	$57,400	$70,800	These are entry-level jobs for graduates in architecture. Under close supervision, does routine architecture requiring knowledge and application of basic architectural principles and concepts. Using prescribed methods and standards, does specific and limited architecture involving interior space layouts and exterior appearance.
Architect 2	$51,400	$67,800	$84,200	Under general supervision, evaluates, selects, and applies standard architectural techniques, procedures, and standards. Analyzes proposals and vendor submittals. Assignments are generally well defined. With additional specialized experience, may do parts of larger and more complex architecture. Normally requires at least 2 years' experience, with typical architectural experience from 3 to 7 years.
Architect 3	$60,600	$80,800	$101,000	Under general supervision, performs all conventional architectural design and development. Plans and conducts architecture requiring more advanced techniques. May technically guide and supervise designers/drafters and less-experienced architects. Requires at least 4 years' experience, with typical experience from 6 to 10 years.
Architect 4	$70,400	$93,500	$116,500	With minimal supervision, independently applies architectural concepts and designs for interior layout and design and exterior appearance. May technically guide and supervise designers/drafters and less-experienced architects. Requires at least 7 years' experience, with typical experience from 10 to 15 years.
Architect 5	$85,000	$111,200	$137,300	With very limited supervision, is an architectural project manager on small to medium projects, a supervisory architect for a small group of architects and designers/drafters, or a senior architect responsible for a specific architectural area. Reviews and approves conceptual designs. Directs development of new methods or techniques. Normally requires at least 10 years' experience, with typical experience ranging from 14 to 20 years.
Architect 6	$96,300	$128,100	$159,800	With supervision through general directives, is an architectural project manager on medium to large projects, a supervisory architect for a major group of architects and designers/drafters, or a senior architect responsible for architecture by a firm. Reviews and approves conceptual designs. Directs development of new methods or techniques. Normally requires at least 15 years' experience, with typical experience from 19 to 25 years.

FMI Corporation 2012 Compensation Survey

Regional Variations in Salary

Compensation amounts vary from region to region. These variations fluctuate from year to year depending on local economic conditions, but in general, salaries tend to be higher in major urban settings and more moderate in second- and third-tier cities.

Up-to-date data on regional salary variations are easily found using online tools such as CNN Money's Cost of Living Calculator (http://cgi.money.cnn.com/tools/costofliving/costofliving.html). Such calculators track differences in the cost of living between states and cities, and can offer the most current data available. Some calculators detail specific differences that affect the cost of living, such as housing, utilities, and groceries.

Salaries and benefits also vary with the size of the firm, with larger firms tending to offer higher compensation packages. Smaller firms may seek strategies that are less reliant on high-end salaries, such as offering opportunities for greater responsibility.

A wide variety of salary benchmarking sources for the architecture profession are available. The AIA conducts a salary survey every three years, with the report available from the AIA Store website (http://www.aia.org/store).

Many organizations and industry media offer salary and benefits data, some on an annual basis, and several of these are broken down by region. Information is also available from professional human resources consultants. A list of resources can be found below.

Salary Surveys for Architecture

- *Architect* Magazine Online: http://www.architectmagazine.com/business/salary-survey/.
- American Institute of Architects: The AIA periodically conducts compensation surveys. http://www.aia.org.
- Design Intelligence: Conducts compensation surveys in the design industry annually. http://www.di.net.
- U.S. Department of Labor, Bureau of Labor Statistics: http://www.bls.gov/ooh/architecture-and-engineering/architects.htm.
- ZweigWhite: Conducts compensation surveys in the design industry annually. http://www.zweigwhite.com.

CONCLUSION

A firm's compensation plan must reflect the firm's strategy, goals, and culture to effectively attract the appropriate talent and see that those individuals engage with the firm for the long term. A tiered compensation plan tied to job function provides clarity, helps establish career paths, and reduces risk.

Incentive compensation plans help firms reward top performers, offer staff clear goals, and encourage desirable actions.

Many factors are involved in compensation, from salary to nonfinancial perks, and each should be considered carefully as the plan is formed and periodically updated. Compensation should be equitable and communicated to all employees regularly.

Periodic benchmarking of compensation can be helpful in determining how competitive the firm's plan is compared to competitors for the same talent pool.

For More Information

Re-engage: How America's Best Places to Work Inspire Extra Effort in Extraordinary Times (McGraw-Hill, 2010) by Leigh Branham and Mark Hirschfeld.

Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework, 3rd edition (Jossey-Bass, 2011) by Kim S. Cameron and Robert E. Quinn.

Getting to Yes, Negotiating Agreement Without Giving in, 3rd edition (Penguin, 2011) by Roger Fisher, William L. Ury, and Bruce Patton.

"How a New Jobless Era Will Transform America," *The Atlantic* (March 2010) by Don Peck.

"The Impact of Recognition on Employee Engagement and ROI," Society for Human Resource Management/Globoforce Employee Recognition Survey, Winter 2012: http://globoforce.com/the_impact_of_recognition_on_employee_engagement_and_ROI.

8.3 Recruiting and Hiring: Strategies and Methodology

Kerry B. Harding

To remain competitive in today's global practice arena, firms of all sizes need to be more savvy than ever to attract and retain top talent. Combining effective research and strategies with technological and social media tools will enable firms to successfully compete in recruiting and hiring the best candidates.

RECRUITMENT: THE KEYSTONE OF THE DESIGN PRACTICE

Finding qualified employees can be the most difficult and time-consuming function of human resources and for firm leaders. Recruitment, the "marketing" function of human resources, requires finding quality candidates that fit the organization's culture and will remain with the firm over time. This is important considering that the average cost of turnover is 50 to 150 percent of an employee's salary. Recruitment plays an integral part in getting the employee started on the right foot, which is key for increased retention. Following are some of the goals of recruitment efforts:

- Determine the firm's present and future requirements through human resource planning and job analysis activities.
- Increase the pool of job candidates at minimum cost.
- Increase the success rate of the selection process by reducing visibly under- or over-qualified applicants.
- Reduce the probability that applicants, once hired, will leave the firm after a short period.
- Meet the firm's legal and social obligations regarding workforce composition.
- Identify potential candidates to fill projected vacancies due to attrition, promotion, expansion, and retirement.
- Evaluate the effectiveness of recruiting techniques and sources for all types of applicants.

Recruitment represents the first contact that a firm makes with prospective employees. Through this process, professionals come to know a firm and decide whether they wish to work there. There are only two types of firm reputations: those where people want to go, and those where people want to leave. Recruitment activities include:

- Determining the best strategies for finding candidates and creating attention-grabbing job advertisements
- Reviewing (screening) the applicants' resumes and phone interviewing the top candidates
- Participating in face-to-face interviews

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- Conducting reference checks, background checks, and employment testing
- Partnering to make a hiring decision and extend offers to candidates to "seal the deal"
- Developing and facilitating new employee orientation
- Drafting press releases and media plans to announce strategic new hires

The financial crash of 2008 resulted in sweeping project postponements and cancellations. Fallout from this situation caused downsizing across the board. It was only through salary reductions, benefit cutbacks, and eliminating bonuses and raises that many firms were able to keep afloat. Faced with a lack of opportunities, anecdotal evidence shows that architectural design graduates migrated to other fields interested in their computer skills as well as their creative thinking and problem-solving abilities.

DEVELOPING THE RECRUITMENT PLAN

A strategic recruitment plan outlines the methods the firm will use to solicit qualified applications for its open position(s). It includes three key components:

- *Internal distribution*: Send a thoughtful e-mail to the firm's staff including a brief yet appealing description of the role as well as a full job posting attached or included in the body. This e-mail provides the opportunity for qualified internal candidates to apply for the position. Firm colleagues are also good sources of referral candidates because they know the firm and what it takes to succeed there.
- *Constituent distribution*: Next, share the job description with the firm's constituents—consultants, vendors, financial institutions, etc. Post the job on an appropriate section of the firm's website and include information about the position in any newsletters or other external communications. If this is a new position, use it as an opportunity to highlight the firm's growth and development. If appropriate, contact board members, partners, and other contacts; one never knows who may be the source of a great referral.
- *External posting*: Broaden the firm's reach beyond its inner circles by advertising externally. Gone are the days of placing an effective want ad in the local newspaper; it is now more cost-effective to post positions on multiple online job boards. To determine how to spend recruiting dollars most efficiently, research the relevant job boards or publications where similar postings are likely to be found. Ask staff who have similar roles where they would look for jobs. Find out what professional associations people in the field belong to and see if they have a job board or listserv. Remember when evaluating posting channels to consider both flow and quality; usually, those hiring would rather have a smaller pool of qualified candidates than a larger pool of unqualified candidates.

Job Descriptions

The next important step is developing an accurate job description, on which all parties concerned have agreed. A job description typically consists of six major components:

1. Essential job functions
2. Knowledge and critical skills
3. Physical demands
4. Environmental factors
5. Roles of the Americans with Disabilities Act (ADA) and other federal laws
6. Explanatory information that may be necessary to clarify job duties or responsibilities

RELEVANT HIRING RULES AND OTHER REGULATIONS

Firm principals question what rules and regulations govern policies on developing job descriptions. Though other federal and state requirements may exist, employers are often concerned with whether Title I of the Americans with Disabilities Act (ADA) requires employers to complete job descriptions. According to the enforcing agency for the ADA, the Equal Employment Opportunity Commission (EEOC), the ADA does not require an employer to develop or maintain job descriptions. A written job description that is prepared before advertising or interviewing applicants for a job will be considered as evidence in determining essential functions along with other relevant factors. However, the job description will not be given greater weight than other relevant evidence.

Employers should develop job descriptions that clearly define essential functions of every job before advertising the job or interviewing applicants. A job description should have clear, concise, nontechnical language, and avoid unnecessary words. The desired outcome of the work should be described, rather than the method for accomplishing that outcome. Writers should avoid using gender-specific language, jargon, technical language, proprietary names (Xerox), and ambiguity. Employers should let individuals read their job descriptions, voice any concerns, and sign their descriptions.

Job descriptions should be accurate. Within the actual job description, an employer could include the following, adaptable as needed to firm size and organizational structure:

- Job title (job code number if applicable)
- Relationships to other jobs
- A brief summary of job functions
- Duties and responsibilities
- The quality and quantity of work expected from an individual holding the position
- Information on the accountability for results
- A statement that when duties and responsibilities change and develop, the job description will be reviewed and subject to changes of business necessity

▶ See the backgrounder Architects as Employers: Legal Requirements (8.1) regarding the wide range of federal and state statutes, regulations, administrative orders, and case law that govern employment relationships.

Detail Qualifications

When detailing qualifications on job descriptions, firms typically require certain knowledge, skills, aptitude, training, and previous experience.

Maintain Consistency

Internal consistency is important when developing an overall bank of firm job descriptions. The firm may want to select specific formats, fonts, logos, and other elements to streamline and standardize their appearance.

Sell the Sizzle

One of the most important things to remember about writing job descriptions is that they are a two-way street. As a baseline, they need to be sufficiently comprehensive that potential applicants clearly understand whether or not they are qualified for the position. Equally important is that the description be written in such a way as to sufficiently entice potential applicants to actually submit their credentials. To accomplish this, someone in the firm's marketing or public relations arena should review job descriptions to see that they adequately reflect the firm's brand and culture.

Beyond the Job Description

Recruiting's most difficult challenge is finding those individuals who match the job description and bring something extra to the firm that indicates they have leadership potential. People who hire others become more adept at identifying these individuals through gut instinct. For others, the process is a bit more elusive. There are six common traits that distinguish top performers:

- *Self-management*. Employees who can effectively regulate their own work agenda and work independently do wonders for firm productivity. While all employees need basic direction and tasks, the best can take direction and run with it. Top employees have the ability to leverage what they know and effectively manage themselves.
- *Accountability*. In a productive firm, employees should be expected to create results from the task at hand. Top employees take this concept to the next level. They have a sense of responsibility for their tasks.
- *Initiative*. Top employees rise above the rest through their own initiative. Whether assuming leadership responsibilities or pitching ideas, action-oriented employees thrive on taking calculated risk. Where initiative really matters is when people already have the basics well covered.

- *Humility*. Nobody enjoys working with arrogant know-it-alls. Top employees own up that they don't know what they don't know. They reach out for training and mentoring.
- *Vision*. Visionary employees see beyond the basic job description. While they have personal ambitions, their main interests are growing and improving their firm. Top employees see the big picture instead of fulfilling only expected requirements.
- *Values*. It's in every firm's best interest to have employees who value integrity, honesty, and respect. Top employees uphold basic principles, creating a standard for a comfortable, ethical work environment.

Finding Candidates

Known also as "sourcing," how does one proactively identify people who are either (a) not actively looking for job opportunities (passive candidates) or (b) candidates who are actively searching for job opportunities (active candidates)?

Though there has been much debate within the recruitment community as to how to accurately define an "active candidate" versus a "passive candidate," typically either term is irrelevant, as the status of any particular candidate can change from moment to moment or with a simple phone call from a recruiter that happens to present a job opportunity. The status of being an active or passive candidate is fluid and changes depending on the circumstances, including the position being offered. Activities related to sourcing in recruiting can be categorized into "push activities" and "pull activities":

- *Push activities* are activities undertaken to reach out to the target audience such as campus recruiting, reaching out to individuals discovered through such vehicles as LinkedIn and Facebook, responding to employee referrals, and searching resume databases such as Monster.com, CareerBuilder.com, Indeed.com, Hotjobs.com, Simplyhired.com, and other Internet databases for a match to specific position criteria.
- *Pull activities* are activities that result in applicants coming to know of an opportunity on their own. Pull activities may include advertising on a profession-related job board such as Architect, AIA Jobs, or one of the many other design firm–related job boards with a registration process, posting on job portals, etc.

Employee Referrals

Employees can develop good prospects within their networks of friends, former classmates, and professional associates by acquainting them with the advantages of the company, furnishing them with an introduction, and encouraging them to apply, which enables the firm to reach qualified applicants at relatively low cost. Employees bring referrals to the firm that they feel will be a good fit, based on their own experience. The firm can be more assured of the candidate's reliability and character.

Former Employees

Many employees leave firms on good terms due to circumstances unrelated to workplace culture and compensation issues. Some firms adopt an "out-of-sight, out-of-mind" attitude, refusing to even consider hiring back a former employee, even if their original departure was not desired by either side. Other firms specifically target former employees, known as "boomerangs," because they know the firm, its culture, and procedures and can come in and hit the ground running. In the end, they are less likely to leave a second time after returning to the fold.

Advertising

Recruitment advertising has evolved dramatically in recent years to accommodate new technologies like social media, mobile recruiting, and niche job boards. Thus, it has become increasingly important for HR recruitment professionals and firm leaders to keep abreast of what avenues will help them be most effective in their recruiting. Internet ad specialist Indeed.com identified the Four As of Recruitment Advertising:

- *Assign*: Make someone in the firm responsible for tracking and measuring the effectiveness of every dollar spent on recruitment advertising.
- *Automate*: Implement automated candidate source tracking with the firm's applicant tracking system or career site vendor.
- *Analyze*: Review the firm's cost-per-applicant and cost-per-hire data to determine which sources perform the best.
- *Adjust*: Optimize the firm's recruitment advertising investments by shifting budget to sites and sources that deliver the best return on investment.

Campus Recruiting

Economic and demographic trends continue to affect the job market and how employers develop and manage their campus recruitment programs. In a competitive environment, maintaining campus relations is crucial to the success of campus recruiting. To do this, firms must build relationships with faculty, administrators, career center staff, and students.

Along with on-campus recruiting tools, such as career fairs and interviews, employers can also work education programs into their college recruitment efforts. These include internships and co-op programs. Employers have consistently rated these as some of the most effective college recruitment methods. Some firms sponsor student design competitions, scholarship programs, and research fellowships for the brightest talent to self-select. Other firms encourage staff to participate in education—teaching and on juries—to identify and recruit talent.

What can traditional architecture practices do to woo the young graduate? "Show us the big picture," says one respondent. "Help us to understand how what we're doing fits in. Lay out a plan that shows how we're going to learn what we need to grow and succeed—and be a little bit more flexible. We've met deadlines all on our own for five years without someone standing over us with a whip. Give us some flexibility." While that is good advice, and certainly doable, how does the firm respond to the enormous salary gap between what architecture firms can offer, and what is available from the entertainment and consulting arenas? Says one candidate from a top design school, "If you can get me excited about your vision, I'm willing to work for less money, if it's also mine."

MANAGING THE RECRUITMENT PROCESS

Many firms maintain ongoing recruitment activities for a variety of ongoing hiring needs such as drafters, project architects, project managers, or marketing coordinators. In addition to these lower-level positions, other firms also identify long-term strategic hiring needs to anticipate promotions, retirement, and geographic expansion.

The Reference Check: Confirming Credentials

Standardize reference checks so that the same information is obtained about every candidate. Verify the facts of a prospective employee's previous work, including dates of employment and job titles as well as educational credentials and architectural registrations.

If a reference can't be reached, call back instead of leaving a detailed message to respect both the candidate's and the reference's privacy. If you must leave a message, be as general as possible, giving your name and a number at which to return your call.

Give your name, the company, and the purpose of the call. Explain a little bit about the vacant position and ask whether the candidate's qualifications fit the job, allowing them to elaborate as they see fit.

AVOIDING HIRING LITIGATION

We live in an increasingly litigious society. If proper interview protocols aren't followed, candidates who might be otherwise unqualified or unsuitable for a particular position may retaliate through legal channels. Following these three basic rules should help avoid legal trouble:

Don't ask about anything that the law prohibits. The best way to avoid improper questions is to do some preparation. Before the interview, create two lists: one of all the tasks that the applicant will have to perform as part of the job, and the other of all the skills and experience required for the position. This will help you focus on what you really need to find out: whether the applicant can do the job.

Don't probe into private areas. To avoid questions that violate an applicant's privacy, good taste is your best guide. The same rules of polite conversation—no sex, religion, or politics—are good general guidelines to apply.

Don't say anything false or misleading. To avoid making inflated promises, simply tell the truth. Job applicants are trying to figure out whether the job fits with their own career goals, skills, and work-life balance requirements. Here are a few rules that will help you avoid common promise pitfalls:

- *Don't make predictions about the firm's future*. If the applicant asks about the firm's backlog or lack thereof, stick to the facts. If you make any statements about what the future might bring, clearly identify them as hopes, not predictions. For example, you might say "our business has doubled in each of the last three years, and we're hoping that growth trend will continue," but you shouldn't say "we'll be the number one on the ENR 500 by next year."
- *Don't say anything that might limit your right to make future staffing decisions in the future*. If you tell an applicant that you never lay off people during economic downturns, this can limit your ability to terminate that person if he or she accepts the job. Similarly, if you promise regular pay increases and/or bonuses, the employee could hold you to that promise, even if the firm's financial position or the employee's performance doesn't warrant a raise.
- *If layoffs are likely, say so*. If the firm is considering staff reductions and there is even a remote chance that the applicant you are interviewing might lose that new job as a result, disclose this before the applicant accepts the job. Otherwise, you may find yourself slapped with a lawsuit, especially if the employee left a secure job elsewhere to come work for you. Of course, this strategy might make it difficult to find new employees, but it isn't legal to hire people on false pretenses.
- *Accurately describe the position*. Don't exaggerate the job requirements to land a great candidate, or offer them one job and place them in another. In addition to leaving, resulting in costly turnover, an employee who accepts a job based on statements that turn out to be false could have grounds for a lawsuit after they leave.

Ask for specifics about the candidate's work responsibilities and how those responsibilities were fulfilled. Using a summary statement may make it easier for a reference to overcome any hesitation to fully respond to further questions.

Thank the contact and ask permission to call again if there are further questions.

Legal Aspects of Reference Checking

One of the first things firm representatives will discover about employment reference checking is that it is more easily said than done. Employers who will freely provide information in response to a reference check are the exception. Based on the advice of legal counsel, many employers have adopted policies to protect themselves from costly litigation from former employees. In the course of conducting reference checks, firm representatives will encounter policies such as these:

- *No comment:* These employers will not provide any information about previous employees.
- *Factual information only:* These employers will provide only basic factual information about former employees such as dates of employment, position title, last salary, and eligibility for re-hire. The company may or may not require a waiver to release this information.
- *"900" numbers:* Many large firms have installed "900" telephone numbers that will provide computerized voice response to employment reference and verification inquiries.

The legal concepts associated with employment reference checking include the following:

- *Defamation of character:* Communicating to another person information that is false and injurious to the reputation of an employee or former employee.
- *Qualified privilege:* An exchange of information between employers who have a common interest in hiring qualified applicants regarding the previous work history of an employee. The employer providing the information is protected from suits for defamation if the statements regarding an applicant's previous work history are made in good faith to persons having a legitimate need to know.
- *Negligent hiring:* Failure by a prospective employer to adequately check references or to gather information relevant to the hiring decision. If a prospective employer knew or should have known, based on a reasonable inquiry into an applicant's background, that the person was not suitable for the position and subsequently places a dangerous or unqualified individual in a position where they can harm coworkers or third parties, the employer can be held liable for the employee's acts.
- *Negligent referral:* The act of failing to disclose certain types of information. Failing to provide negative information in response to specific questions from one employer could be grounds for substituting or transferring liability to the other employer.

An employer who refuses to provide references may believe that this is the safest approach to take with regard to reference checking. However, this approach is not risk-free. Failing to provide negative information in response to specific questions could be grounds for substituting or transferring a company's liability to the individual who withheld the information. The legal argument could be easily made that had the negative information been provided when requested, the company would not have hired the applicant. This argument would be especially convincing if the information withheld is so negative that the applicant would not have been hired had the other employer known about it.

Offer Presentation

Presenting the Offer

Put the job offer together. Review the company's budget and compensation packages for similar positions. Compare the candidate's current benefits package to the company's standard employee benefits. Include whether the company will offer additional incentives such as a signing bonus, additional vacation days, or waiving the waiting period for insurance and retirement benefits.

Telephone the chosen candidate. Tell the candidate they impressed you at the interview and you feel they would fit well with the firm's culture. Provide the candidate with an overview of the firm's philosophy and why they, specifically, were selected. Explain that the firm would like to extend a job offer.

Discuss the details of the offer. Share the starting salary for the position and any additional terms that have been previously discussed and agreed to. Include information about other company benefits, such as flextime, tuition reimbursement, and paid training opportunities. If the firm requires the signature of a non-compete or other type of employment agreement, this should have been discussed prior to presenting the offer. Ask the candidate if there are

TYPICAL JOB OFFER COMPONENTS

Depending on the firm and the position, here are typical aspects of the job offer letter that should be included:

- Job title
- Reporting structure
- Main form of compensation and frequency of payment, such as base salary, hourly rate, etc.
- Other compensation details if applicable, such as bonus, stock options, overtime rate, etc.
- Start date
- Vacation time and paid holiday schedule
- Work schedule
- Benefits plan
- Expenses plan
- Technology provided
- Association/professional society dues
- Architectural registration fee policy
- Date and frequency of salary/job review

Here are a few other offer components that might appear in a candidate's job offer:

- *Non-compete agreement*: a document that limits the candidate's ability to work for a competitor or within the industry for a specified period of time should they leave the firm
- *Nondisclosure agreement*: a document that prevents the candidate from discussing aspects of the firm and job with anyone outside the firm
- *Probation period*: a period of time during which the employer can terminate someone without cause and may decline to pay benefits

any concerns that prevent them from accepting the offer as it has been communicated. All too often, firms spend abundant staff time and resources to get a candidate to this point, only to discover the entire process has merely been to get leverage for the candidate to negotiate a better compensation package at their current employer.

Give the candidate a specific time deadline to respond—no less than 48 hours, no more than a week. The candidate must know how long they have to make a final decision. Explain the process for accepting the position and whether the candidate can respond by telephone or if they must respond in writing. Ask the candidate for questions and provide answers. If you don't know the answer, research it and respond within 24 hours. *Send the letter via overnight delivery to the candidate confirming the offer you stated on the phone*. Include compensation and benefit information in the letter. Request that the candidate sign and return the letter within three days.

NONRESIDENT WORKERS

In periods of extreme candidate shortages or for positions requiring extraordinary technical, geographic, or market sector experience, some firms turn to employer-sponsored immigrant visas to be able to hire workers who are not yet authorized to work in the United States. There are a variety of visa types, and each requires complicated paperwork and procedural compliance:

- *EB-1 Foreign Nationals of Extraordinary Ability, Outstanding Professors and Researchers, and Multinational Executives and Managers*. Individuals in this category can petition for permanent residency without having to go through the time-consuming labor certification process.
- *EB-2 Workers with Advanced Degrees or Exceptional Ability in the Sciences, Arts, or Business*. Visa holders in this category normally must have a job offer, and the potential employer must complete the labor certification process. The labor certification involves a testing of the job market to demonstrate that the potential visa holder is not taking a job away from a U.S. worker. In cases where an individual can show that their entry is in the national interest, the job offer and labor certification requirements can be waived.
- *EB-3 Skilled Workers and Professionals*. Visa holders in this category normally must have a job offer, and the potential employer must complete the labor certification process.
- *EB-5 Investor/Employment Creation Visas*. Under the 1990 Immigration Act, Congress has set aside up to 10,000 visas per year for alien investors in new commercial enterprises who create employment for 10 individuals. There are two groups of investors under the program: those who invest at least $500,000 in "targeted employment areas" (rural areas or areas experiencing unemployment of at least 150 percent of the national average rate), and those who invest $1,000,000 anywhere else. No fewer than 3,000 of the annual allotment of visas must go to targeted employment areas.
- *H-1B Specialty Occupation (Professionals) Visas*. Professional workers with at least a bachelor's degree (or its equivalent work experience) may be eligible for a nonimmigrant visa if their employers can demonstrate that they are to be paid at least the prevailing wage for the position.

For additional information and forms, contact the U.S. Citizenship and Immigration Services website at http://www.uscis.gov.

THE ONBOARDING PROCESS

Onboarding, also known as *organizational socialization*, refers to the mechanism through which new firm employees acquire the necessary knowledge, skills, and behaviors to become effective firm members and insiders. Tactics used in this process in larger firms include formal meetings, lectures, videos, printed materials, or computer-based orientations to introduce newcomers to their new jobs and organizations. These socialization techniques lead to positive outcomes for new employees such as higher job satisfaction, better job performance, greater firm commitment, and reduction in stress and intent to quit. These outcomes are particularly important to a firm looking to retain a competitive advantage in an increasingly mobile and globalized workforce. To increase an onboarding program's success, it is important for a firm to monitor how well their new hires are adjusting to their new roles, responsibilities, peers, supervisors, and the firm at large. The benefits of an effective onboarding system include the following:

- *Role clarity* describes a new employee's understanding of his or her job responsibilities and firm role. One of the goals of an onboarding process is to aid newcomers in reducing uncertainty so that it is easier for them to get their jobs done correctly and efficiently. A strong onboarding program produces employees who are especially productive because they know exactly what is expected of them in their job tasks and firm role.
- *Self-efficacy* is the degree to which new employees feel capable of successfully completing their assigned job tasks and fulfilling their responsibilities. It makes logical sense that employees who feel as though they can get the job done would fare better than those who feel overwhelmed in their new positions, and unsurprisingly, researchers have found that job satisfaction, firm commitment, and turnover are all correlated with feelings of self-efficacy.
- *Social acceptance* gives new employees the support needed to be successful. While role clarity and self-efficacy are important to a newcomer's ability to meet the requirements of a job, the feeling of "fitting in" can do a lot for one's perception of the work environment and has been demonstrated to increase commitment to a firm and decrease turnover. If an employee feels well-received by their peers, a personal investment in the firm develops, and leaving becomes less likely.

Knowledge of Firm Culture

Knowledge of firm culture refers to how well a new employee understands a firm's values, goals, roles, norms, and overall organizational environment. Overall, knowledge of organizational culture has been linked to increased satisfaction and commitment, as well as decreased turnover.

Employee engagement begins with onboarding. And onboarding begins *before* your new employees arrive at the office on day one. A new hire's experience on their first day sets the stage (and their mind-set) for the rest of their employment. To ensure a positive first-day experience for new employees (contingent or full-time), and to lay the groundwork for an effective onboarding process, consider these best practices.

1. *Engage employees frequently*. It's important to make a good first impression with new hires. Hiring managers should reach out and introduce themselves to their new employees via phone or e-mail well before the employee's start day. Also, send the employee any relevant websites, Intranets, or forms they will have to fill out in advance, so they don't spend their first day filling out paperwork.
2. *Use technology to streamline the process*. If it's not possible to have new hires complete all paperwork prior to their first day, make the forms available online, so employees can complete this portion of the onboarding process more quickly.
3. *Get the managers involved and keep them involved*. Train managers how to handle the onboarding process effectively. Give them a comprehensive checklist to help them walk new hires through the process. Managers should make employees feel like they are contributing and adding value to the organization as early as possible in their employment.
4. *Create a strong mentor system from the beginning*. Relationships are key to making employees feel welcome and valued. If a new employee will be working in-house, arrange a comprehensive tour on day one. Assign the new hire a mentor or buddy to help them settle in, and introduce them prior to the start of the engagement. Also make sure that the employee's first few weeks are populated with meet-and-greets with key leadership, clients, and business partners. If your new employee is going to make an impact, they need to know who the players are.
5. *Educate new employees about the firm's cultural values*. Introduce new hires to the company's cultural values and weave those values into conversations, one-on-ones, and team meetings. Again, start this early and continue consistently throughout the employee's engagement.

6. *Establish clear performance expectations to engage employees*. Give employees their job descriptions and written outlines of their performance objectives upfront. Schedule regular performance conversations to formally discuss how they are measuring up to those objectives. Don't reserve feedback just for scheduled performance discussions—make it a frequent, spontaneous event.

While these practices are applicable mostly to larger firms, small and midsize firms can be less formal and perhaps more personable. Nevertheless, the key components of onboarding, including orientation, job expectations, and meeting key personnel, will still be essential.

Effective onboarding can enhance employee engagement, increase productivity, and ultimately lead to higher rates of retention. Don't take the standard sink-or-swim approach to onboarding new hires that fails so many firms. Start early and touch base often to give employees the kind of employment experience they won't want to leave.

THE BEST RECRUITMENT TOOL: TURNOVER REDUCTION

In any firm, even the best ones, people leave for reasons over which the firm has no control: A spouse gets a different job in another part of the country, or the employee moves to be nearer to family members or to lessen a commute. There's an adage in the business world that says, "Employees don't quit their companies, they quit their bosses." All too often, however, most people leave their jobs because of decisions "management" makes that directly affect them in adverse ways:

- Layoffs or downsizing that heap additional tasks, duties, and responsibilities on the employee, resulting in significantly longer workweeks to get the job requirements accomplished
- Cutbacks in administrative and overhead support, forcing professionals to spend a significant amount of their time performing clerical tasks
- Freezing raises and bonuses because of internal financial stress, especially if employees can earn significantly more money by going to work for a competitor
- Excluding staff from the decision-making process about decisions that directly affect their jobs and responsibilities
- Reorganizing staffing assignments, job descriptions, and reporting structures, creating a sense of uncertainty and discontent
- Failing to clarify goals, decisions, and expectations of projects or tasks, resulting in unacceptable work product and decreased employee morale and self-esteem
- Perceived or real favoritism that gives certain staff lighter workloads, better benefits, or more social involvement with superiors
- Relocating firm offices, forcing employees to significantly increase their commuting time and/or expense
- Promoting unqualified candidates to supervisory roles over those who are more experienced and/or better qualified
- Fostering a culture of internal competitiveness that sabotages collaboration and teamwork for the firm's greater good

At a general level, firm leaders can create an environment conducive to retaining top talent in the following ways:

- *Train effective managers*. If managers contribute to a lack of clarity about expectations, performance, feedback, or compensation, employees will feel undervalued and frustrated.
- *Encourage feedback*. Whether it is through an anonymous suggestion box or an organized feedback program, the ability of employees to speak their minds about anything related to the firm enables them to feel they have a say in their destiny and may result in some great ideas for the firm.
- *Encourage participation*. In one firm, an internal proposal specialist asked to go along on a client call where she knew the client. That established relationship enabled the firm to obtain much more information about the client's needs and eventually to win the project.

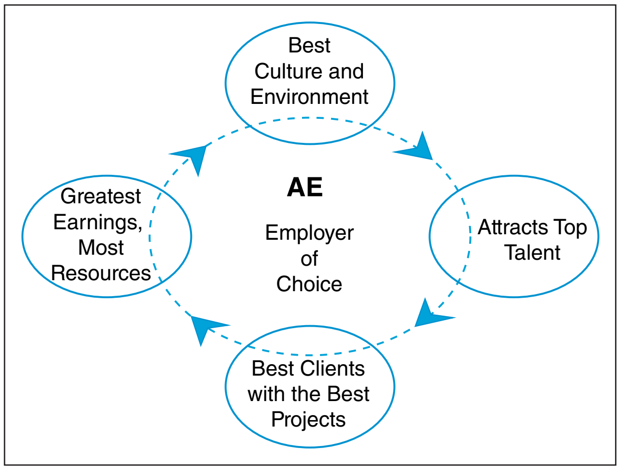
- *Encourage fairness*. If people observe preferential treatment due to religion, race, fraternity or sorority affiliation, or alma mater, for example, they will look for someplace that's a better fit.
- *Make people feel valued*. Someone in the firm should know about and recognize personal milestones—marriages, births, marathon races, charity events, illnesses. Acknowledging such things goes a long way in ensuring employee retention, especially in recessionary times when salary increases are rare.

CASE STUDY: CREATING A PEOPLE-CENTERED ORGANIZATION

By Michelle Smith, PHR, Luckett & Farley Architects, Engineers, and Construction Managers Inc.

Luckett & Farley is a midsize AE firm located in Louisville, Kentucky. "The Shift: A/E Employer of Choice Continuum" is used to foster a culture that makes the firm a great place to work, which is core to the mission of the firm.

There are four components to the continuum, as shown in Figure 8.4.



Luckett & Farley Architects

FIGURE 8.4 A/E Employer of Choice Continuum

At Luckett & Farley, we believe that if we create a better environment and culture, and reward structure than our competitor can or will provide to their employees, then we will attract and retain the most talented people. And they will attract the best clients. The best clients will offer the best projects and produce the highest profits. The profits will allow us to reward talented and hard-working employees, improve the firm's physical environment, and advance excellence in project delivery.

Since 2005, the firm has invested significant resources in making sure we have the best employees. Because of our commitment to this objective, we have attracted the attention of electrical engineers from Idaho, structural engineers from California, and mechanical engineers from Texas and Alaska. These people came to us for various reasons, but all of them had offers from several competitors and chose Luckett & Farley because of our culture and commitment to the "A/E Employer of Choice Continuum."

In addition to attracting top talent, in 2012 Luckett & Farley was named "Best Place to Work in Kentucky" for the fourth consecutive year. Many other local awards from newspapers and business magazines have recognized our firm for meeting the challenge of creating a better workplace environment.

CONCLUSION

In recruiting and hiring, finding the optimal combination of knowledge, creativity, personality, and technological skill must, by necessity, be a somewhat ambiguous process. Yet within the architectural arena, there exists an opportunity gap that can only be narrowed through honest, ongoing collaboration between the academic community that prepares graduates and the professional world to which they are then entrusted. While there are conflicting opinions about the concept of creating stars within the architectural arena, all parties agree on one thing: Like eagles, stars don't flock. They have to be identified one at a time.

For More Information

"Headhunter" Hiring Secrets: The Rules of the Hiring Game Have Changed…Forever! (CreateSpace.com, 2010) by Skip Freeman and Michael Garee.

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http://careercenter.aia.org/.
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BACKGROUNDER

SOCIAL NETWORKING IN RECRUITING ACTIVITIES

Mike Plotnick

Interactive online communities are broadening the architectural recruiting process by providing diverse opportunities to connect with candidates before, during, and after formal searches.

Mike Plotnick is principal of Plotlines LLC, a communications consulting firm. He formerly served as communications manager at HOK, where he led the firm's public relations and social media programs.

INTRODUCTION

Social networking plays an increasingly important role in architectural recruiting. As interactive online platforms such as LinkedIn, Facebook, and Twitter continue to grow in popularity and influence, these communities provide fertile opportunities to connect with potential candidates at every stage of the hiring process.

Although the economic downturn that began in 2008 necessitated a dramatic shift away from active recruiting for most firms, the emergence of mainstream online communities during this same period began to profoundly change the way individuals learn about and interact with potential employers.

Once limited primarily to social and entertainment activities, these platforms evolved into dynamic communities where a critical mass of people congregate, interact, gather information, and make important life decisions. Accordingly, they emerged as logical venues for architectural practices to identify, learn about, and communicate with candidates at all levels.

Regardless of whether or not a firm chooses to actively engage with potential employees via social media, potential employees are actively using these online communities to evaluate a firm's projects, people, culture, and reputation. Beyond the quality and impact of a practice's design work, individuals may be assessing its commitment to social responsibility, workplace culture, flexibility, and other intangibles.

By conducting a simple web search, architects can access diverse information about a firm, including a combination of company-sanctioned resources and those that originate from outside the firm. The most influential sources of information about a firm may, in fact, reside outside the confines of its corporate website. And the firm usually has limited control over the development and sharing of this information.

In this respect, everything that encompasses a firm's online presence—from an online portfolio to rumors posted in an informal chat room—plays an indirect role in recruiting efforts and helps shape opinions about that firm as a potential employer.

As practices adapt to the complexities of this new fragmented media landscape, they are challenged to determine if and how their traditional recruitment strategies should be modified. Firms that require candidates to follow a rigid application and hiring process, for example, may choose to rethink that process or expand it to encompass less formal ways of interacting with prospective employees.

Ultimately, firms that are willing to engage with architects in the communities that those individuals trust will be better positioned to compete for top talent—particularly as the economy improves and recruiting efforts intensify.

INTEGRATING SOCIAL NETWORKING INTO RECRUITMENT ACTIVITIES

Social networking can complement a practice's existing recruiting initiatives by expanding the reach and effectiveness of direct and indirect strategies. Most social platforms are free or extremely affordable, enabling firms to experiment with and adapt their approach to identifying and evaluating candidates.

In a broader context, social networking also provides opportunities for firms to position themselves as thought leaders in specific areas of expertise. Actively participating in online discussion forums, for example, contributes to a public, searchable record of a firm's perspectives on issues of importance to their future. Job candidates with a similar expertise or interest are likely to discover this activity during their online research.

The growing popularity and accessibility of social communities has opened up numerous opportunities for architectural practices to broaden their recruitment activities.

Identifying Candidates

Formal job postings can be shared on industry job boards, within specialized architectural communities, and on the firm's own social media pages and profiles (if they exist).

For positions that require candidates to have highly specialized skills or experience, firms can conduct strategic outreach via message boards, LinkedIn groups, or industry communities.

Evaluating Candidates

Search engines and other online tools can quickly uncover details about a specific candidate's professional achievements, reputation, and online influence.

A growing number of architects are creating their own websites or online portfolios to showcase their achievements and work. These resources also can illuminate a candidate's creativity and initiative.

Engaging with Candidates

Through the creation of affinity groups, such as fan pages, alumni groups, or student communities, a firm can invite interested individuals to formally connect and interact.

Active participation in industry forums, such as LinkedIn groups, can publicly demonstrate leadership and enthusiasm for specific industry trends, areas of expertise, or the profession at large.

BENCHMARKING AND SHARING IDEAS

A firm can easily follow the activities of its peers and competitors on their own social media profiles and through their participation in user groups or forums. Additionally, the activities and interactions of specific firms will be reflected in comments shared in various communities.

Because social forums encourage informal networking without recognition of conventional business boundaries, they are ideal communities for sharing ideas and experiences.

DETERRENTS TO QUICKER ADOPTION

Several challenges and perceived risks have limited the widespread adoption of social networking tools for architectural recruiting, including the following:

- Lack of resources and time to devote to building and sustaining efforts
- Difficulty in managing and controlling online activities and interactions
- Fear that allowing employees to actively engage in social communities may make them easy targets for poaching by other firms
- Traditional recruiting efforts generate plenty of qualified candidates for available positions, particularly during a weak economic period

While these issues reflect legitimate concerns, they don't negate the reality that social networking is quickly evolving into a preferred method for individuals to network and pursue jobs. The growing number of architects who choose to develop online resumes, portfolios, and personal websites is a testament to this fact.

Although no one can accurately predict the future role of social networking, online communities are expected to continue growing, diversifying, and influencing the decisions of current and potential employees.

Architecture firms can choose to ignore these trends or downplay their significance, but in doing so they risk missing significant opportunities to connect with qualified architects.

PART 2: FIRM MANAGEMENT

8.4 Professional Development and Mentoring

Deborah M. DeBernard, AIA, NCARB, Architect-AIBC, LEED BD+C

Firm owners concerned with building a strong future and providing a financial vehicle for firm continuity should understand the importance of finding, developing, and retaining staff that supports the firm's strategy and vision. Professional training, mentoring, and appraisal programs developed to support the strategic plan can help meet these goals.

Deborah DeBernard, with Dr. Tamara Moerer, developed The Leadership Institute, a year-long emerging leadership training program at Leo A Daly. She has held various positions including chief operations officer and head of human resources, legal, and information technology; and has developed training programs for emerging leaders, project managers, supervisors, technical, and support staff.

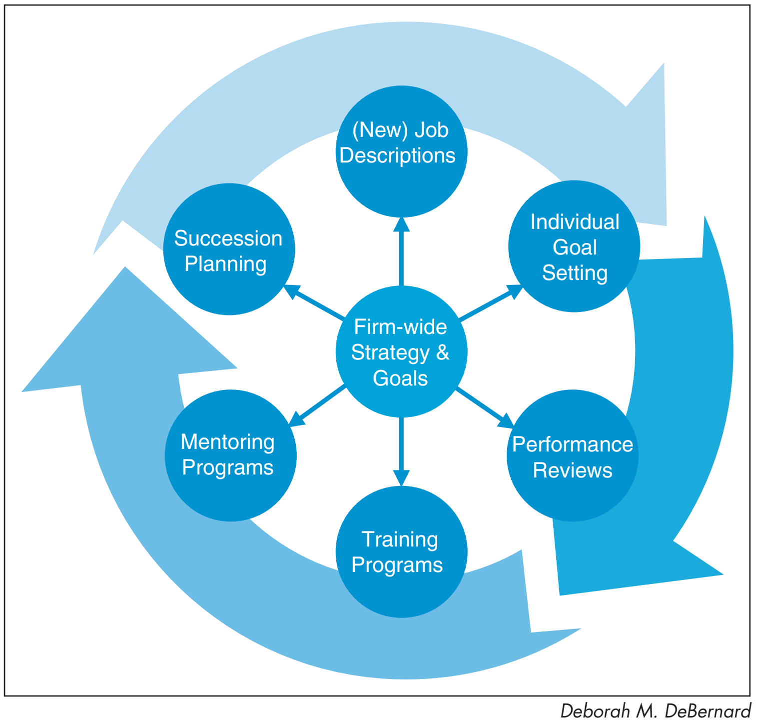
INTRODUCTION

▶ AIA Continuing Education System (3.4) discusses the AIA/CES program as a primary source of education specifically targeted to architects.

Architecture firm owners concerned with building a strong future, growing their firm, and providing a financial vehicle for firm continuity should understand the relevance and importance of finding, developing, and retaining staff that supports the firm's strategy and vision. Building internal capabilities for short-term and long-term goals requires a dedication to professional development. All architects should recognize that career development and lifelong learning are professional requirements that at a minimum will sustain an individual's career and with passion can produce firms that are innovative and well prepared for the future.

Completion of a university architecture degree program and the Intern Development Program (IDP) are the mere beginnings of what is required to advance over a lifetime in architecture. What starts with an exploration of new building materials, systems, and construction techniques soon becomes a study of business practices, risk mitigation, new building types, expanded services, and leadership skills along the path of one's career in architecture.

This professional development comes in many forms, beginning with an understanding of the specific position requirements, goal setting for individuals, providing feedback through performance evaluations, bridging knowledge gaps and accelerating growth through training programs, and shaping future leaders through mentoring programs and succession plans that identify career paths—all within the context of the firm's strategy and goals. This cycle is repeated (often) as professionals take on new positions along their career path. (See Figure 8.5.)



Deborah M. DeBernard

FIGURE 8.5 Professional Development Cycle

PROFESSIONAL DEVELOPMENT PROGRAMS

Regardless of size, most firms provide some training to employees. This can range from formal, robust firm-wide programs, often referred to as "Firm X University," to support in-office vendor presentations. Many firms offer training targeting particular areas of responsibility, employees with high potential, or skills for high-risk portions of projects, such as the following:

- Emerging leader training to groom employees with high potential to become future leaders of the firm. Topics may include self-assessment, attributes of leaders, leadership styles, strategic thinking, business development, negotiation skills, change management, risk management, financial management, legal issues, decision making, consensus building, and team building.
- Supervisor training to prepare and improve the abilities of employees who manage others. Topics may include linking goals to efforts, management principles, performance appraisals, communication, goal setting and prioritization, delegation skills, improving staff productivity, conflict resolution, and employee relations.
- Project manager training to prepare and improve the abilities of employees who manage projects and project teams. Topics may include leadership, risk management, quality assurance/quality control (QA/QC) principles, financial management, improving repeat business, contracts, team building, negotiation, communication, and project planning.
- Construction contract administration training to prepare employees to take active roles during the construction phase of a project. Topics may include QA/QC principles, contracts, RFI management, site practices, role of the construction schedule, conflict resolution, valuing the work, retaining documents, and closeout procedures.
- Business skills training to help employees succeed in the business of architecture. Topics may include strategic planning, business/financial planning, goal setting, time management, communications, networking, problem solving, collaboration, client relations, and meeting management.
- Presentation skills training to prepare and improve the abilities of employees to make presentations to clients, colleagues, consultants, and others. Topics may include presentation organization, visual aids, making persuasive arguments, engaging an audience, and preparing leave-behind materials.
- Writing skills training to improve the abilities of employees to effectively use written correspondence in many settings. Topics may include choosing the appropriate format, grammar, language, formatting, technical writing, specifications, proposals, persuasive communication, and contracts.

Whether providing an all-encompassing program or supporting single-topic presentations, it is essential to think about a training program in the context of the firm's goals and strategic plan. For example, if a firm has committed to increasing sustainable practices, selecting vendors to present to staff whose products align with this goal is useful. If one goal is to improve project documentation, partnering with subconsultants (e.g., MEP, civil engineering, lighting design) or general contractors to provide their insight to staff on a set of construction documents may prove valuable. Many firms offer incentives to employees who lead educational efforts within their firms as a way to encourage the active sharing of years of experience, case studies, and lessons learned.

► See the backgrounder accompanying this article, Professional Development: The View from Small Firms, for related information.

LEADERSHIP DEVELOPMENT AT LEO A DALY

LEADERSHIP INSTITUTE BACKGROUND

Recognizing the critical role that succession planning has for the long-term health of the organization, Leo A Daly set out to create an annual leadership development program that would help shape the career paths of architects, engineers, planners, interior designers, finance managers, marketing professionals, and information technology (IT) staff who had been identified as potential leaders. Deborah DeBernard, AIA, then Leo A Daly COO, and Tamara Moerer, Ph.D., CEO of The Image Business, were selected to design a course to address the firm's goals. Dr. Moerer's background as a businesswoman and as a graduate professor of organizational leadership not only qualified her for this consultant position but also made her the perfect partner to DeBernard's leadership experience and knowledge of the firm's inner workings. "The course is designed to significantly enhance the

(continued)

leadership development of the Leo A Daly 'rising stars' through a rigorous curriculum and real-world exercises, and to positively affect the retention of the firm's talent pool. Though management principles are interwoven into the curriculum, the focus is on effective leadership applications," explains Moerer.

Dubbed the "Leadership Institute" (LI), this intense year-long program is tailored for 10 to 12 emerging leaders who are hand-selected through a competitive application process. The application package includes past experience, education, leadership outside the firm, community involvement, and letters of recommendation. LI is open to all employees who have been recommended by their business unit leader for their potential to play a key role in the future of the firm, and have been employed by the firm for at least two years. All firm leaders, as well as past LI class members, are expected to encourage employees who show leadership potential to apply for the limited class spots. The LI Selection Committee uses great care to assemble a qualified and diverse class representing the many disciplines and office locations of the firm.

The course begins with an orientation meeting where a facilitated conversation takes place to articulate everyone's reasons for applying, expectations of the participants, expectations the firm has of the participants, logistics, and the complete list of homework assignments. Throughout the year participants are given assessment tests, reading assignments, and writing assignments targeted to the theme of each of the four in-person meetings as well as the three video conference sessions held between each of the formal meetings. Clearly expressing the firm's expectations has proven valuable to help reinforce the need for each participant to come prepared for the in-depth discussions, exercises, and assignments.

EXPECTATIONS OF THE LEADERSHIP INSTITUTE PARTICIPANTS

- Attend all sessions and participate fully in them.
- Expect excellence in everything.
- Be thoughtful and creative in discussions.
- Be willing to discover your full leadership potential.
- Be willing to be vulnerable.
- Leave "politics and personal agendas" at the door.
- Commit to applying lessons learned as we go.
- Complete all assignments.
- Be active in communication and presentations.
- Leo A Daly is investing in you—rise to the challenge.
- Be respectful and courteous.
- Practice becoming a lifelong learner of leadership skills.

To reinforce a culture of community service, each of the formal meetings begins on a Thursday evening where participants and presenters gather to participate in volunteer work such as helping in a local soup kitchen. The following morning, the session opens with an "ice breaker" designed to introduce the session theme as well as help everyone mentally prepare for the forthcoming discussions.

Each session is led by a pair of in-house "session champions" selected for their leadership skills reputation and their key role in the strategic planning of the firm. They are assisted by several in-house and outside subject matter experts who present their topic and become an ongoing resource to the class. In addition, Moerer and DeBernard have served as facilitators, mentors, and devil's advocates to spur thoughtful discussion and decisions by all.

The formal sessions are highly interactive with considerable dialogue, exercises, small breakout sessions, and presentations by the participants. The sessions are concluded on Saturday with a reflection of the material just presented, an evaluation of the current session, and a reminder of the homework assignments for the next video conference and formal session.

The interim video conferences are facilitated by an LI graduate from a prior year who is asked to lead a discussion on a business book, much as one would in a book club. This session is attended by the participants and the LI graduates only, giving much-needed time for the LI class to bond as a group and providing an occasion to ask the LI graduates questions about their experiences. It also provides the firm an opportunity to recognize LI graduates while asking them to exercise some of their newly honed leadership skills.

LEADERSHIP INSTITUTE CURRICULUM

The LI curriculum is designed to promote future firm leaders, discipline leaders, and team leaders. It begins with a series of self-assessments, communication tools, descriptions of what is means to be a leader, and leadership styles; followed by a history of the firm and various discussions ranging from strategic thinking, business development, public relations, and the power of persuasion to legal issues, business planning, and financial aspects of the firm. The course exposes participants to the inner workings of the firm, corporate and business unit leaders, and helps prepare participants for these positions. Dr. Moerer explains, "What is learned in the Leo A Daly Institute on the weekend can be applied to all the offices on Monday morning. The course design incorporates the Leo A Daly culture, management principles, and leadership philosophy and vision."

The course culminates with a probing session about how the participants see themselves as leaders and challenges them to continue their leadership journey with the development of a written plan for themselves reaching out one to five years and beyond. Each is also asked to establish a relationship with two mentors who will guide them throughout their career. This final session is held jointly with the firm's annual management meeting, where LI participants attend some of the management meeting and graduate in front of the assembled firm-wide leaders.

A written assessment of each candidate is prepared for the business unit leader who provided the initial recommendation. This helps these office leaders and supervisors to understand how the LI graduate did during the course, what strengths or weaknesses were identified, what recommendations the LI program managers have for their continuing development, and how they are viewed as fitting into needed future leadership roles.

Following graduation from the Leadership Institute, participants are invited to join the Futures Council, whose members lead initiatives for the firm, such as the development of a mentorship program or serving on a committee designed to improve working relationships between business units. In this role, they stay connected to strategic firm-wide issues and are advisors to the executive vice president.

The program has enjoyed continuous improvements, reacting to formal and informal feedback and the roles that Moerer and DeBernard have played as strategists and change agents for The Leadership Institute. From 2008 through 2012, 42 new leaders have graduated, greatly increasing the options for succession planning throughout the firm.

Sources for Training Materials

Sources for course materials that are developed specifically for one's firm can be abundant when they include the valuable experience of senior staff, allied firms, consultants, and construction partners. Courses developed by third parties expressly for the AEC community include conferences, "boot camps," online programs, vendor "lunch and learn" sessions, and AIA component continuing education programs. The AIA also has mature knowledge communities that can provide information and resources on particular topics such as practice management, project delivery, construction contract administration, and design, or for particular market segments such as health care, justice, and retail.

MENTORING

Training is important for developing skills that aid professionals in their professional growth, but a structured mentoring program supported by firm leadership will increase the speed at which new employees become productive team members who can support the strategic plans of the firm. Mentorship will also provide a vehicle for frequent and meaningful feedback, foster working relationships, improve recruiting success, provide the foundation for a succession plan, and ensure that a sense of professional stewardship becomes an integral part of the culture of the office. The benefits of building a firm through the professional development of staff, who work together toward the firm's strategic goals, cannot be overstated. The mentoring program helps a firm achieve its vision by supporting the following:

- Long-range strategic and business plan goals
- Values and culture
- Excellent client service
- Repositioning the firm to target markets or services
- Project performance and work quality improvement
- Succession planning
- Recruitment and retention of staff
- Increasing the number of licensed staff members
- Increasing staff recognition and personal satisfaction

A successful program begins with the commitment of firm leadership and a supportive culture that recognizes the importance of tying the mentorship program to the strategic goals of the firm. If the principals do not value mentoring, support it with words only, or allocate insufficient time and money, the program is likely to fail no matter how well intentioned. At a minimum, mentoring programs need the following:

- Definition of what is expected and how much time is required
- Communication to all firm members about the program
- Process to identify and match mentors and mentees

- Agreement from mentors and mentees on their respective responsibilities
- Training for participants
- Mechanisms for documenting and evaluating the experience and outcomes

Mentoring is often seen as a broad term encompassing supervisors, office or firm leaders, and outside resources, including respected family members. Many professionals recall numerous people throughout their career who provided valuable advice and knowledge on topics ranging from "How do I organize a sheet of details?" to "What do I need to do to become a project manager?" to "Should I change jobs?" Each of these questions requires an answer from a different source, ranging from a "buddy" to a supervisor to a trusted advisor, *and* not all of this falls under mentoring.

Mentoring Is Not...

Mentoring is not a human resources (HR) or onboarding program where a new employee can get answers to the basics such as normal work hours, pay dates, office or field attire, lunch protocol, supplies, computer login, e-mail, telephone, and the other issues that need immediate resolution in order for a new employee to perform their assigned work.

Likewise, it is not a job skills training program where an intern begins their path of understanding of how a building goes together, how to use the detail library, what to do on a job site visit, or how to write specifications.

Last, it is not a computer-training course where staff is trained for CADD/BIM software, using tablets in the field, inserting video into MS PowerPoint presentations, or maximizing the use of rendering packages.

Mentoring Is...

Mentoring is a program able to make sense of the firm's strategic plans, demands of work, financial pressures of projects, firm organization, and the challenging balance between work and personal matters. It is the place where mentors can offer advice on how to connect to the firm's big-picture goals, the importance of becoming licensed, why project assignments make sense, how to prepare for the next assignment/position, why the firm is organized the way it is, who are the best resources that can help with various situations, how to handle disappointments and successes, and the myriad issues that come up throughout a professional career. Over the years, one would be advised to have several mentors both inside and outside one's firm.

The Mentor Program

There are two common types of mentoring programs:

- *Informal*, where pairs spontaneously find each other through personal choice, individual circumstances, and personality. The learning experience is based on the situation.
- *Formal*, where individuals who can benefit from mentoring are identified and paired with others who have the appropriate experience and expertise. This is a management-supported program structured with formal commitments from both parties, planned learning opportunities, and an evaluation and feedback process.

The first step is to define the goal of the program by examining the strategic plan for the firm. Goals can be articulated by asking questions such as these:

- Are the firm's values known and shared by most employees?
- Has the firm identified the future leaders for all aspects of the firm, and are they on a path for leadership?
- How can the firm maintain a high percentage of repeat clients?
- Are recruiting, retention, and employee engagement a problem?
- Is quality or project delivery an issue?

TABLE 8.7 Mentoring Program Learning Objectives—Sample

Experience Level	Objectives
0–5 years	Complete IDP and registration process; understand firm culture, organization, and processes; work well in a team environment; communicate well with team members and supervisors; understand basic project approach
6–10 years	Demonstrate firm values; actively engage in achieving firm goals; lead small team; communicate well with team members, supervisors, firm leaders, and clients; take initiative on small but strategic efforts
11+ years	Continually reinforce firm's culture and values, be a role model and mentor for junior staff, play a role in developing both strategic and tactical goals for the firm, resolve conflict effectively, lead large teams, present effectively, take initiative on large strategic projects

- How would a mentoring program affect the way participants approach projects?
- How would a mentoring program fit into other training and orientation programs?

The answers to these questions will be a guide in designing a mentoring program that helps to improve areas of weakness and strengthen the transfer of the firm's tacit knowledge.

Next, identify the target audience and the associated objectives. While interns and junior staff are the natural target of many mentoring programs, a firm should plan to include more senior staff to help groom them for management and leadership positions in the firm. Different objectives can be assigned to various target audiences based on experience levels. (See Table 8.7.)

Who Can Be a Mentor?

Mentoring programs pair at least two people: a mentor who is a trusted, influential leader or expert, a good role model who inspires learning and invests time coaching others; and a mentee who is an interested participant with high potential, in good standing in the firm, and looking for self-improvement.

Mentors should be professionals who are acknowledged to possess competencies and expertise within the firm's strategic objectives. They should be strong champions of the firm's values, patient, teachers, listeners, relationship builders, positive, able to keep confidences, and willing to commit the time (sometimes extensive) required of a mentoring relationship. Potential mentors should evaluate what knowledge and experience they can offer in a mentoring relationship and whether they have the ability to provide honest, sometimes difficult, feedback to mentees about the alignment of a mentee's goals with the firm's goals.

Many architects have had a mentor who provided advice and career development counseling, someone who they admired or whose words, thoughts, or actions they emulated. Before volunteering, a mentor should consider these questions:

- What were some of the challenges faced in your career, and how did you overcome them?
- What educator or professional had a profound influence on your career?
- What did you admire about them?
- How did you learn from their examples?
- What valuable advice have you received during your career?
- How did this advice help shape your career decisions?
- What strategies did you implement to complete your internship and the Architect Registration Examination (ARE)?
- Do you model the behavior of mentors you have encountered in your professional and personal life?
- What can you learn from a mentee to support your lifelong learning commitment?

A mentor to someone going through the Intern Development Program (IDP) also needs special knowledge about IDP requirements.

▶ Intern Development (3.2) discusses the Intern Development Program (IDP) as an important component of the licensure process.

The Mentee

A mentee should be motivated, receptive to constructive feedback, willing to make mistakes and learn from them, and appreciative of the mentoring relationship. Regardless of experience level, a mentee should take time to determine career development goals. Write down the answers to the following questions, and bring them to the initial mentor-mentee meeting:

- What are your strengths?
- What do you enjoy in your current position?
- What do you find challenging in your current position?
- In what areas do you require further experience and development?
- What do you want to achieve this year, next year, and the following year? What are your career goals?
- What is your plan for achieving these goals?
- What steps have you taken already to achieve these goals?
- How much time will you need to achieve these goals?
- What resources will you need to achieve these goals?
- Whom can you ask for help to achieve these goals?
- How can you overcome challenges?
- How do you hope your mentor can help you overcome your challenges?
- What do you hope to gain from a mentoring relationship?
- What specific career development guidance are you seeking?

Mentor-Mentee Matching

The best mentor-mentee relationships are those that develop because of a natural affinity between two people, but formal mentor-mentee matching can be effectively done in various ways. The more important a firm considers the role of mentoring, the more importance will be placed on making and maintaining the match. Office leadership and HR can be involved in the process to determine both mentees and mentors and the match between, or mentoring can be a requirement of senior staff who then seek out a mentee—or there is the novel approach used by the Minneapolis office of Leo A Daly, likened to "speed dating."

MENTOR AND MENTEE MATCHMAKING

The Minneapolis office of Leo A Daly created an in-house mentorship program to further career development within the office. Mary Erickson, Senior Associate, Finance Manager at Leo A Daly, Minneapolis, explains, "Our program goal is to gain personal development and professional growth through the guidance of others. We want both the mentor and mentee to have a renewed interest and motivation in their work through the mentoring relationship."

"Our experience shows us that every mentoring relationship is unique because each person's experiences, personality, and professional and personal development vary. Successful mentoring involves a dynamic process where each person learns to respect and trust the other's commitment, expertise, and individuality," says Erickson.

With the support of the leadership of her office and the firm, Erickson formed a committee that created a mentorship program. Although only three years old, the program has already shown many benefits, including these:

- Strengthening corporate and office culture
- Improving job progression and succession planning
- Positively affecting retention
- Leveraging talent throughout the office
- Increasing "workplace satisfaction" of employees involved in mentoring
- Uncovering latent talent
- Improving communication within the company and office, particularly nonhierarchical

The program consists of two enrollment sessions per year. Each session involves the following components:

- *Call for mentors and mentees.* Before each session, individuals are asked to volunteer as a mentor or mentee. The mentors and mentees fill out a questionnaire to describe their interests and preferences.
- *Meet and greet.* The "meet and greet" is a round-robin type of event modeled after "speed dating" and an opportunity for the mentors and mentees to select a pairing. Each mentor completes a short biography which is distributed to the mentees beforehand. At the event, the mentees rotate around the room meeting with each mentor for four minutes. Everyone has a chance to ask questions and

determine the best fit for the mentoring relationship. This event has been well received and is a favorite of both the mentors and mentees.

- *Program kickoff*. The program is kicked off by the announcing of the mentoring pairs. Each learns more about the program, their roles and responsibilities, and the group events and activities. Personality assessments, such as the Leadership Q (see the "For More Information" section at the end of the article) are completed by both the mentor and mentee to help provide additional insight for relationship building.
- *Side-by-side mentoring*. Because the emphasis is on both the mentor and mentee experience, the program details are determined primarily by each mentoring pair based on what works best for them and what they hope to gain from their relationship. Erickson believes that side-by-side mentoring shows the participants that both the mentor and the mentee are valued and that the office is committed to providing opportunities for both to remain and grow within the firm.
- *Scheduled events*. Throughout the session there are several scheduled group events, which foster a sense of ownership and belonging and provide informal support for mentors and mentees. The events consist of learning opportunities or social networking activities such as the popular "fireside chat," which involves two to three invited speakers sharing stories from their careers and answering questions from the program participants.
- *Program conclusion*. This event celebrates and formally wraps up the current mentorship session. However, the program participants are strongly encouraged to continue their relationship after the formal session concludes.

"Our program supports the idea that a mentoring relationship is a partnership, with both people showing respect and support for each other. We are finding that mentoring enriches those who receive and fulfills those who give," explains Erickson.

Time commitments for the mentor and mentee should be understood and accepted by both. Ideally, a mentoring relationship should last for the duration of a mentee's career, but the formal program should last at least a year, and should have a series of regular (perhaps monthly) meetings for the mentor and mentee, as well as status and evaluative meetings (perhaps quarterly) for the mentoring program manager and office leadership to gauge progress toward the goals and objectives.

Mentorship Preparation

Once the goals, objectives, and participants are identified, it is time to start preparing the participants. The goal of this preparation is to define what mentoring is and what it is not, to set and record the expectation for mentors and mentees at the beginning of the program, and to establish the schedule for the first meeting of the mentor and mentee. However, the most important aspect is to confirm that both parties are able to make the commitment necessary for a successful mentoring relationship.

Mentees' expectations of mentors might include:

- Helping to understand the firm's goals and how to support those goals
- Helping to understand the firm's culture
- Identifying areas for growth and development
- Demonstrating a genuine interest in the mentee
- Encouraging exploration of new ideas
- Being an active listener
- Providing appropriate and timely counsel
- Building the mentee's ability to more effectively manage their time

Mentors' expectations for mentees might include:

- Appreciation of the firm's strategic goals
- Support the firm's culture and values
- Being hungry for new challenges
- Being open to learning and change
- Being willing to take a risk
- Gaining new skills and work habits

- Soliciting and accepting constructive feedback
- Acting on the mentor's suggestions and advice
- Prizing the value of the mentor's work experience
- Appreciating access to the mentor's network

The First Mentoring Meeting

The first meeting between mentor and mentee should begin with defining the goals the mentee and mentor have for the mentoring relationship. These goals should be seen within the context of the firm's strategy and aligned accordingly. Goals must be:

- *Written*: The process of thinking about and documenting a goal requires focus and is the first step toward achievement.
- *Specific*: Form a clear statement of what you want to accomplish. If your goal is unclear, it will be difficult to reach. For example, an unclear goal is to learn about project management. A specific goal is to learn three project management strategies for handling client conflicts regarding fee collection.
- *Challenging*: Provide some personal "stretch."
- *Measurable*: Include a defined measure of success, a "complete by" date, and how achieving this goal will apply to your professional growth.

Discussions should continue as mentor and mentees share resumes and background specifics such as prior work experiences, why they choose to work for this firm, what they like and don't like about their current work assignments, and other areas of interest. They should also agree in the first meeting on how often and when they will get together for subsequent discussions, including some special meetings for the entire mentoring group coming together to hear from firm leaders describing their career paths and best/worst days; or attendance at part of the annual strategic planning session. If the firm has a culture that strongly supports mentoring, these special events will be meaningful and plentiful. Some firms use a mentoring agreement form to document the goals and schedule.

MENTORING PROGRAM AGREEMENT FORM

Personal Development Plan (to be completed by Mentee)

Learning Objectives: Please check all that apply. Space is provided to add additional information.

- ☐ Licensure
- ☐ Career Development (explain) ______________________
- ☐ Other (explain) ______________________

Critical Dates (to be completed by Mentor and Mentee at first meeting)

Mentoring pairs agree to meet at least once each month for a 12-month mentoring period. Pairs are encouraged to meet more frequently to maximize program objectives. Mentee is responsible for leading at least one meeting. Periodically, mentees and mentors will provide feedback on mentoring program.

Start date:

End date:

Mentor/Mentee training (meeting set by Mentoring Program Manager):
(To be completed by Mentor and Mentee at first meeting)

Meeting #1:	Meeting #2:
Meeting #3:	Meeting #4:
Meeting #5:	Meeting #6:

Mentoring Program Evaluation Meeting (meeting set by Mentoring Program Manager):

Meeting #7:	Meeting #8:
Meeting #9:	Meeting #10:
Meeting #11:	Meeting #12:

Mentoring Program Evaluation Meeting (meeting set by Mentoring Program Manager):

We, the undersigned, agree and commit to the effort required to participate in this Mentoring Agreement. We further agree to meet the expectations of the mentorship program.

Jane Doe, Mentor Date Joe Smith, Mentee Date

Subsequent Mentoring Meetings

In subsequent meetings, a mentee should share successes and challenges faced on projects and in the office, ask about issues affecting the firm, share insights from their perspective, gain help on setting priorities, discuss issues facing the leadership and the profession, ask for suggestions for additional training and education, and confirm progress toward goals. A mentor is expected to frame the conversation in light of the firm's strategic goals with a view toward discovering how the mentee can fit within this context. A mentor is expected to listen well and offer advice or suggestions to questions without solving problems directly for the mentee.

Evaluating the Mentorship Program

The mentoring program should be evaluated regularly and systematically to ensure that the firm's strategic goals are being served, that mentoring is strongly supported by the firm's culture, that the mentoring matches are effective, and that individuals are able to see how they fit into the future development of the firm. Ideally, the firm's culture encourages open, constructive, and candid discussions where the program can be continually improved. A confidential online evaluation form is another effective way for participants to voice their opinions and observations about what is working and what is not. Periodically gathering all mentees to discuss progress, reinforce the firm's culture, and broaden the mentoring experience can help keep mentees engaged and surface the successes and failures of the program. Likewise, a separate session can be conducted for mentors to express their positive and negative experiences. The mentoring program manager is responsible for capturing input, reporting what is learned to each group and to firm leaders, intervening in mentoring relationships that are not working, and using all feedback tools to improve the program where needed. The mentoring program manager could be someone internal to the firm or a consultant who specializes in mentoring programs within the AE community.

A final evaluation of the program should be conducted at the end of the stated program period. This evaluation should provide open-ended questions that ask for suggestions and feedback for improving the program.

MENTORING PROGRAM EVALUATION FORM

To be completed by Mentor for each Mentee

Mentor's name: ______________________________

Mentee's name: ______________________________

Dates of mentoring relationship: __________________

1. Is the mentoring program achieving the learning objective established with your mentee?
   - ☐ Yes
   - ☐ No
   - ☐ Other (explain)
2. Evaluate each of the following (circle your response):

	Poor		Good		Excellent
Quality of meetings with mentee	1	2	3	4	5
Quality of program	1	2	3	4	5
Relationship with mentee	1	2	3	4	5
Commitment of mentee	1	2	3	4	5
Value of this experience	1	2	3	4	5

3. What were the two most important elements of this program for you?
4. What have you learned from participating in the program?
5. What most needs improvement in this program?
6. Would you participate again?
   - ☐ Yes
   - ☐ No
7. Who would you recommend as a mentor?

   ____

   As a mentee? ____________________
8. Would you like a personal conference with the program manager to discuss any issues?
   - ☐ Yes
   - ☐ No

Success Formula for Mentoring

Regardless of the size of a firm, there are key elements the mentoring program must have to succeed:

- Support by office leadership
- Clear program goals aligned with the firm's strategy and business goals
- Mentees chosen based on high potential, interest, and commitment
- Mentors selected based on willingness and ability to mentor
- Thoughtful pairing of mentors and mentees
- Preparation to align mentee and mentor expectations of each other
- Clear and agreed-upon goals for each mentoring pair
- Regular mentoring sessions
- Evaluation of mentoring relationships, with early intervention if needed
- Follow-through on improvement suggestions, broad communication about the program successes, and continuing high standards

The quality of the architecture profession and the continuation of most firms are dependent on providing strong and effective mentoring to new and rising professionals. Whether a formal or informal program is chosen, mentoring is critical to the long-term success of architecture firms. This important need is growing more and more acute as many firm owners today plan for their retirement.

APPRAISALS AND EVALUATIONS

Feedback is integral to growth and improvement. A primary tool for professional feedback is a performance appraisal. Regular performance appraisals and professional development discussions offer both the firm and the employee opportunities to take stock, assess the relationship, and make plans for continued improvement. Properly approached and carried out, performance appraisals provide the means to align staff activities with the firm's goals, challenge staff, provide recognition, create a communication link between supervisors and those they manage, and ensure that everyone has a common understanding of the requirements of the position.

The performance appraisal process begins by understanding the firm's strategy and culture. Once a supervisor understands the overall strategy of the firm, what the firm values and why, and what the firm requires for its long-term health, they can provide the everyday praise and constructive criticism that forms the backbone of a formal appraisal. Providing feedback to staff members, both positive and negative, on a regular basis increases the likelihood that staff knows and understands what is required of them to succeed. Unfortunately, feedback of any kind is often neglected. It can be difficult to tell an employee that performance on a given task has been unsatisfactory. Rather than using such situations as a learning experience, a supervisor may delay discussing an employee's performance until an accumulation of incidents results in dismissal.

Performance appraisals *should* be seen as an important responsibility that a supervisor has to an employee to help them gain confidence that the professional choices made so far are serving an individual well (or not), that there is a path in the organization that holds promise for an individual (or not), and that there are specific ways of improving and progressing in one's career (or not). Having a frank discussion with an employee about the pluses and minuses of their performance is a privilege that supervisors should exercise to help grow the profession, help the firm achieve its goals, develop strong architectural skills in others, and match individuals with career paths that take advantage of their innate strengths.

In general, the appraisal process is one part of career planning for the employee and implementation of the firm's strategic plan. The purpose of a formal appraisal is to improve performance by recording the strengths and weaknesses of a member of the firm; it is used to establish a plan for improvement or a path for accelerating growth.

More specifically, appraisals are an opportunity for both parties to communicate goals, expectations, opportunities for improvement, and progress. They help the firm identify and determine ways to develop management potential. They can become part of the process of determining promotions and, when necessary, layoffs. It is also an opportunity for employees to evaluate their managers and the firm in general, providing healthy and innovative two-way input for the firm's management.

Performance appraisals can achieve much, including:

- Communication of the firm's goals and priorities
- Clarification of an employee's roles, responsibilities, and expectations
- Encouragement and support of communication between managers and employees in both directions
- Recognition of accomplishments and needed improvements
- Identification of training and development needs along with plans to address them
- Sharing of input or feedback from others
- Setting of new annual goals and objectives
- Ability to serve as a basis for salary and promotion decisions
- Establishment of long-term professional goals and a path to achieve them
- Protection of the firm against potential employment litigation

What Is a Performance Appraisal?

Performance appraisal and professional development are two different processes. However, they are often conducted together, much to the confusion of staff members. It is important to be clear with staff about which process is being attempted, or if both processes are combined.

A performance appraisal or review looks backward at how an employee performed their work over the past evaluation period. The appraisal has two parts: the evaluation or judgment of the employee's past performance, usually measured against job descriptions or responsibilities; and second, the feedback provided to the employee about the evaluation.

Professional development looks forward at an employee's future goals and opportunities to grow along a career path. It can be used to correct minor deficiencies, set new goals, define new learning programs, and show staff how they might advance and grow within the profession.

Another area of discussion is whether the performance appraisal should contain a discussion about an employee's salary and promotions, or be limited to performance aspects only. One camp will argue that linking an appraisal with a salary review reduces the opportunity for a constructive review, as it is perceived as too narrowly focused, judgmental, and punitive. The other camp will argue that there should be a direct connection between performance and compensation so employees see that better performance results in higher pay and consideration for a promotion. The issue is most important when an employee is unaware of or in denial about their shortcomings at work. In this case, supervisors need to prepare for a (sometimes lengthy) constructive discussion about these shortcomings and when relevant, connect them to the decision for denying a raise or promotion.

Whatever a firm chooses to include in their performance appraisal process should be clearly communicated in advance to all employees to avoid poor alignment between expectations and reality. Likewise, it is important for the firm to spell out how the review process is related to the salary review program.

The best appraisals are those that:

- Determine whether the efforts of the employee are aligned with the goals, strategies, and tactics of the firm through a clear dialogue that defines what the employer wants the employee to do.
- Determine whether there are any performance gaps or areas where an employee has met or exceeded expectations through a discussion of how well an employee has performed. This discussion covers successes and failures, good outcomes, and mistakes.

- Describe how an employee can improve areas needing attention or accelerate their development.
- Are based on job performance and behavior using facts, specific examples, and quantifiable results rather than opinions, hunches, or generalizations.
- Are seen as constructive—where the reviewer serves also as a coach and counselor, not merely as a judge.
- Are based on information that is familiar to an employee, gleaned from the regular and consistent feedback given by their supervisor over the entire performance period. Nothing in the review should surprise an employee or be seen as new information.
- Reflect the work of the entire review period, not simply the current assignment(s).

Timing and Frequency of Appraisals

To be effective, appraisals and professional development planning should be done at regular intervals. Many firms conduct reviews once a year, although some management consultants recommend semiannual or even quarterly reviews. One approach is to review everyone during the same time period. Another approach sets review dates to align with the anniversary date of employment. There are advantages and disadvantages to both. Reviewing everyone in the firm in the same time frame allows for assessment of the full staff relative to each other, consistent messaging about the process, and an easy application of any salary adjustments to the business plan. Reviewing staff on the anniversary of their employment allows for better integration of the time to review employees with other supervisory responsibilities over the course of a year rather than all at once, and permits a ready means of marking the employee's hiring anniversary. Whichever approach is used, the emphasis should be on providing continuous feedback to staff on the progress of their career.

Performance Goals

Human resource director at Dewberry, Dave Francis, recommends establishing performance goals for each individual in the firm. "If you have a new employee, you should sit down with the employee within the first thirty days to create performance goals and objectives. It is very important that employees get off to a good start and understand what is expected of them in their new role. Goals and objectives should be developed jointly by the supervisor and employee and they should be SMART," said Francis.

The acronym SMART is used to set performance goals that are:

- **S**pecific
- **M**easurable
- **A**ttainable
- **R**elevant
- **T**ime-bound

During the performance appraisal, a supervisor is asked to give a description of the results achieved. Francis explains, "For each performance goal, a supervisor writes a description of how well the employee met the goal. Did they complete it fully? Was it on time and within budget? Were the clients satisfied with the results? Did they complete it in a way that exceeded what was required, or did they fall short of the goal? Examples are important, especially if you are giving someone a particularly high or low rating. Pay attention to the descriptors of the ratings, and make sure that the examples you are providing match the level of your rating. This description covers *what* an employee achieved during the evaluation period."

Equally important to *what* an employee accomplished can be *how* the results were achieved. Each firm should develop its own evaluation criteria that directly express its values, goals, objectives, and priorities. Criteria should relate to work requirements and not to an employee's personality traits. Evaluation criteria factors might include the following:

- Quality of work
- Creativity
- Embodiment of the firm's values and culture
- Communication skills
- Degree of initiative
- Staff relations
- Emotional maturity
- Potential for growth or leadership
- Adaptability to change
- Client relations
- Mentoring of others

The Appraisal Form

Some firms use appraisal forms that are unstructured, with only the barest of guidance to supervisors. These systems can be nothing more than a paper identifying the employee and a few fields to capture free-flowing ideas that summarize the past performance period and agreed-to actions for the next performance period. Other firms use a highly structured form that charts a path from firm-wide strategic goals, through tactics to the specific goals for each employee, so the individual can see exactly how their actions and results fit into the overall performance of the firm. The middle ground can be described as a rating system with a multipart scale ranging from "unsatisfactory" to "outstanding" for specific performance areas. Most rating systems approaches encourage or require additional comments for ratings at either end of the scale. Other forms may use essays (open-ended questions about performance), discussion of critical incidents (specific examples of commendable or poor performance based on a log of recorded incidents), or results-oriented evaluations (comparing results with goals established earlier).

Whatever system is chosen, it should be common for every employee, provide meaningful feedback, and be fairly consistent through time so that a collection of appraisals conveys a recognizable pattern or trend for the employee.

Appraisal Process

The appraisal process begins by assigning a reviewer to an appraisal assignment. In the case where multiple persons are assigned to contribute to an appraisal, it is recommended to have one person who is responsible for summarizing or incorporating all comments.

Step One: Many firms will then ask an employee to prepare a self-assessment. This self-assessment can mimic the evaluation format being used by the supervisor (e.g., rating scale, open-ended questions, forced-choice, etc.) or can be any combination.

Step Two: Once that self-evaluation is complete and reviewed by the supervisor, the supervisor's appraisal is written and usually reviewed and/or approved by office leadership. Francis adds, "This final review is intended to determine whether the performance appraisal is specific, whether the goals and objectives are clear, and if the employee will get a clear picture of what is expected for success. Approvers will want to confirm that the appraisal lends itself to a quality discussion and clear performance expectations, and if improvements are needed that a draft plan is provided. If an approver does not feel the appraisal is an accurate representation of the employee's performance or has questions about the consistency of the language and the ratings given, it should be sent back with a request for additional information. If an employee is given a particularly high or particularly low rating, clear justification should be provided. This is an opportunity to check for sufficient documentation, which is important for both recognition and reward as well as when there are performance issues."

Step Three: The next step is a meeting to discuss both evaluations prepared in steps one and two, set goals for the coming evaluation period, determine a course of action for any needed improvements or training, and sign or acknowledge the appraisal for storage in a personnel file.

Performance appraisal forms are merely vehicles to aid the actual performance discussion. The face-to-face session is the most important part of the process. Many supervisors plan on one to two hours for this meeting.

Like employment interviews, good performance reviews are a two-way street. Both the employee and the supervisor should come prepared with their understanding of the position responsibilities, goals, evaluation of performance based on the firm's appraisal program, and a list of specific topics to discuss. Comparing these materials is a good place to start the review. The comparison may reveal differing perceptions or even misunderstandings about the employee's performance goals and achievements. It can also provide an informed basis for discussion and goal-setting for the next appraisal period.

Performance Issues

If there are performance issues, the annual performance review can be seen as an opportunity to manage the responsibility that every supervisor has to address performance problems and set expectations for future performance. However, the best time to manage a performance issue is when the issue arises. Note that the first time a performance issue arises, managers should follow any coaching or disciplinary procedures outlined in their HR manual. The annual performance review can then serve as a checkpoint within a performance improvement plan. Regardless of when performance issues are brought to an employee's attention—even if the conversation is uncomfortable—remember that *no one* is well served by supervisors glossing over or ignoring performance issues.

In a face-to-face review where performance issues are present, a manager should explain the issue, making sure the firm's expectations are clear, get the employee's view, and ask the employee for their ideas for improvement. This should be followed by the development of an improvement plan that describes how the employee should go about correcting the deficiency, what support the firm will provide, what the employee should expect to be doing on their own time to gain improvements, consequences for continually underperforming, and when the next review will be to track progress against the plan. The manager should retain documentation of the discussion. This should not be seen as punitive but rather as an opportunity to improve performance.

If the problem remains or recurs, another discussion should take place. Document this meeting and send copies to the employee and their personnel file. It is best to have the employee sign the written document to acknowledge it has been received. This document should cover the following:

- What performance standards are not being met
- What has been done to assist the employee to date
- Dates of any previous performance discussions
- What expectations must be met to turn around the employee's performance
- A reasonable time frame within which change must occur
- The consequences of failure to meet the performance standard

COACHING TIP

Be courteous and respectful when you assume the coaching role. Use active listening techniques, communicate effectively, and attend to the nonverbal cues being used—both the employee's and your own. Avoid jumping to conclusions, and instead focus on helping the employee solve the problem rather than solving it for them. Be open to new information, negotiate when possible, and be firm when necessary. It is always desirable to reach a consensus, although it may not be possible in all situations. Set up a review time for later and follow through on all commitments. Document the exchange for a personnel file.

Discussions of unsatisfactory performance should be clearly documented in an employee's personnel file. A chronological record of unsatisfactory work is a useful defense against unjustified claims of discrimination or wrongful discharge following an employee's demotion or termination. However, be careful not to use the annual performance appraisal only as a documentation opportunity for poor performance. If this process becomes known as a dismissal tool, an environment of distrust can develop. Use the annual review process to reflect positive achievements and successes as well as poor performance.

PERFORMANCE IMPROVEMENT PLAN

Date: ________________________

Employee Name: ________________________

Manager Name: ________________________

Over the past [period of time], your performance has been below expectations. [If there have been past discussions with the employee regarding their poor performance, indicate this and the dates of the prior discussions. If the firm has tried to assist the employee in improving performance, indicate this.]

[Describe specifics of poor performance.]

Based on this information, you are being placed on a [indicate time frame] performance improvement plan. It is imperative that you improve your performance as outlined below. Failure to show immediate improvement may result in further disciplinary action up to and including termination of your employment.

In order to assist you in improving your performance, we have outlined an improvement plan.

[List specific action items that the employee must accomplish to improve his or her performance.]

[Insert employee name], it is our goal to assist you in improving your performance. We fully expect that you can make these adjustments.

Please sign below indicating you have read and received this memo.

Employee Name Date

CONCLUSION

Architecture is a profession learned over a lifetime, in which the details of design, construction, management, and leadership are garnered and honed through project involvement, client meetings, staff discussions, and consultant relationships. The use of training courses, mentoring programs, and appraisal systems is important in this learning process. Each of these tools can add positively to the development of individuals, set up new challenges, and allow for the continuity of the firms and the profession.

For More Information

Strengths Based Leadership: Great Leaders, Teams and Why People Follow (Gallup Press, 2008) by Tom Rath and Barry Conchie.

Strategies for Firms in Support of Emerging Professionals (AIA): www.aia.org/professionals/groups/epn/AIAS074942?dvid=&recspec=AIAS074942.

Mentoring Essentials for IDP Supervisors and Mentors (AIA): www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab090436.pdf.

The Survival Guide to Architectural Internship and Career Development (Wiley, 2006) by Grace H. Kim.

Architect's Essentials of Professional Development (Wiley, 2003) by Jean Valence.

Win-Win Performance Appraisals; What to Do Before, During, After the Review to Get the Best Results for Yourself and Your Employees (McGraw-Hill, 2012) by Lawrence Holpp, Susan Heathfield, and John Woods.

BACKGROUNDER

PROFESSIONAL DEVELOPMENT: THE VIEW FROM SMALL FIRMS

Jane Frederick, FAIA, LEED AP

Sole proprietors and small firms of fewer than 10 employees have unique challenges in professional development and mentoring. This article visits several small firms to explore how they approach mentoring and professional development.

Jane Frederick has been a small-firm owner since 1985, and was the 2012 chair of the AIA Small Firm Round Table. She practices residential architecture with her husband, Michael Frederick, AIA, in the Beaufort, South Carolina, firm Frederick + Frederick Architects.

Small firms might struggle to find enough time and money for mentoring and professional development for both the firm owners and their employees. Their challenge is to prioritize the available resources and decide whether to spend the money to go to a conference, for instance, or spend the time volunteering on a community planning board.

PROFESSIONAL DEVELOPMENT

Compared to a large firm where mentoring is institutionalized, mentoring emerging professionals in small firms is often less formal, even less recognizable, but usually very successful because interns working in a small office are exposed to all aspects of the profession. This is an important difference from larger firms. For instance, a former head of design in a large firm said that he did not know what happened to projects once design was finished and had never seen shop drawings until he moved to a small firm. Small firms can provide exposure to all phases of a project in a condensed period of time, as projects are generally smaller-scale and faster-paced. These experiences are invaluable to interns as they prepare for the architectural registration exam, licensure, and practice.

The continuing education challenge for small firms is to find really useful information at the right price. Lunch-and-learns sponsored by vendors can be tailored to specific needs or projects. Jeffery Rosenblum, FAIA, of Rosenblum Coe, a firm of seven people in Charleston, South Carolina, commented on the difficulty his firm was having finding the right sustainable adhesive for vinyl floors installed on a concrete slab. A product that he was interested in using was not available in his market, so he called the manufacturer for a lunch-and-learn to introduce the product to Charleston.

The AIA Webinars are the go-to source for continuing education for Lisa Stacholy, AIA, a sole practitioner with LKS Architects in Atlanta. For John Black, AIA, a partner in the two-person Honolulu firm Lapis Design, traveling to the mainland and participating in an AIA Knowledge Community symposium makes his AIA dues a wise investment.

John remarked, “The AIA Custom Residential Architect Network (CRAN) symposium is an opportunity to network with residential architects from around the country, attend seminars that are both entertaining and enlightening, visit great examples of vernacular architecture, and spend fun-filled evenings at local restaurants. The CRAN symposiums have provided me with more meaningful insights and valuable contacts than all of the architectural conventions that I’ve attended over the past 25 years.”

MENTORING EMPLOYEES

Small firms are also challenged to financially support the expense for interns to progress through the licensure process. There are several examples of how firms meet this need.

The philosophy of Van Pond, AIA, principal of the three-person Nashville, Tennessee, firm Van Pond Architects, is to treat his young employees how he wanted to be treated when he was an intern. Pond pays for his employees’ AIA dues, continuing education costs, and convention attendance costs, among other things. The employees earn two weeks of vacation a year, and the office is closed between Christmas and New Year’s. The firm’s structure is to work 41-hour weeks, which pays for the week during the holidays. The additional 10 hours are used for community and AIA volunteering, in the spirit of the Volunteer State.

Jean Dufresne, AIA, principal of Space Architects + Planners, a nine-person firm in Chicago, has a formal mentoring system. As with most small-firm principals, licensure of employees is important to Dufresne; his firm only hires emerging professionals who are interested in getting licensed. To that end, the firm supports the interns by paying for study materials, reimbursing test fees upon passing, and paying for licensing fees, IDP fees, and AIA membership. The firm offers regular lunch-and-learns and has a rigorous annual personal goal-setting requirement that must be quantifiable and measurable. The employees are reviewed quarterly, and the entire staff participates in an annual 360-degree review.

“Our firm pays half of the test fees upon passing each section, and after the intern passes the final exam we pay the balance of the fees plus a passing bonus,” said Rosenblum. He believes that this method creates an incentive for the interns to complete the exam faster and more effectively.

Stacholy mentors emerging professionals while they are still students. Georgia Institute of Technology has a program whereby local architects can hire students for a semester. Stacholy pays Georgia Tech, and the student works 13 hours per week learning from Stacholy.

MENTORS FOR PRINCIPALS

The need for mentoring is not limited to interns. Firm owners and senior architects need to find a source for their continuing development. Participating in the American Institute of

Architects, both in Knowledge Communities and in elected positions at the state and national level, is a primary source for mentoring for small-firm principals. Colleagues from other geographical areas who are not competitors are a wonderful resource. Rosenblum, a class of 2006 AIA National Board member, said that he is still in daily contact with board colleagues and that he has found firms to team with on projects through his AIA contacts. Stacholy has also developed mentors through the AIA Small Project Practitioners Knowledge Community. Stacholy says she identifies potential mentors by what they are doing and then approaches them to ask, "How are you doing x, y, or z?"

As a principal in a bigger small firm, Dufresne helps mentor his Chicago peers and extends resources into the architectural community. When Space Architects + Planners schedules a lunch-and-learn, they invite local sole practitioners to join the meeting held at either their office or the local AIA office. They also share their library with their peers, including resources that would be extremely expensive for a one-person shop.

Likewise, finding mentors outside of the architecture field is critical to expand a firm leader's realm of influence. Rosenblum has participated in a daily breakfast group for over 30 years; this group is able to mentor one another, offer advice, and provide a sounding board for issues and new ideas. Dufresne stressed the importance of community opportunities. While serving on the Chicago Association of Realtors' Commercial Committee, Dufresne suggested that the Chicago Zoning Commissioner would be a good speaker. As a small-firm owner, it would have been difficult for him to get time with the commissioner alone, but it was easy when Dufresne invited the commissioner to speak before a large group of city stakeholders.

CONCLUSION

Small firms need to be creative in solving the dilemma of limited resources for professional development and mentoring opportunities. There are resources available in most communities, such as SCORE, a network of retired executives that offer mentoring and confidential business counseling. The Small Business Administration has an abundance of information, as do local chambers of commerce. The American Institute of Architects, from the local component to the national component, has a wealth of information and opportunities to connect architects to knowledge, a mentor, and networking with peers.

PART 3

PROJECT DELIVERY

Architecture is a project-based endeavor, and architectural practice centers on project delivery. Project delivery methods change in response to economic trends, environmental concerns, and technological advances. Skill in project management and leadership increases in importance as projects become more complex and more integrated. Research in practice, quality management, use of technology, and understanding of the regulatory environment are ways in which architects manage complexity and improve effectiveness.

CHAPTER 9

Design Project Delivery

9.1 Project Delivery Methods

Phillip G. Bernstein, FAIA

The organization, strategy, and responsibilities of the key players in the building process—including the owner, architect, and contractor—comprise the project delivery method for the project. Multiple models are available, and can be chosen based on which project variables—cost, schedule, building quality, risks, and capabilities—are driving the project.

INTRODUCTION

A completed building results from a complex sequence of decisions made by the many participants in the design and construction process. For a project to run smoothly, someone must define responsibilities, organize and integrate the work of the participants, and manage the process by which the project is developed and delivered to the owner. The architect, who is deeply involved in most projects from inception to completion, may assume this role as the first construction professional hired by the owner, although this position is increasingly being assumed by construction managers and advisors. Nonetheless, the owner relies on the architect's expertise about delivery decisions, and the architect should help to determine which delivery method best suits the owner's needs. Since the project delivery model can dramatically affect the results of a

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building project, an understanding of delivery approach options is central to the successful practice of architecture.

Most delivery methods have evolved primarily in response to different roles assumed by the entity that constructs a building and the relationship of that entity to the architect. The roles and responsibilities of this player, variously known as the "contractor," the "GC," the "construction manager," or the "design-builder," can vary greatly in different delivery methods, and the information provided by the design team must be calibrated accordingly. In most variations of project delivery models, the roles and responsibilities of the architect are similar, but the participation of the builder varies greatly.

Up through the late 1970s, most projects were built under what was then known as a "traditional" delivery approach. Now termed as "design-bid-build," this approach assigns each player a clear, well-defined role. The owner hires and pays the architect to provide design services; the architect develops and places a set of contract documents into the construction marketplace for competitive bid; the general contractor assembles a collection of sub-trades and submitted bids for the project; and, in most cases, the lowest general contractor bidder is awarded the project. The contract for construction between the owner and the contractor incorporates the architect's construction documents (including the drawings and specifications) plus an agreement to build the design for the bid price, which is the basis for the contractor's selection.

Variations in project delivery approaches in the design and construction industry appeared in response to the desire by owners to optimize specific outcomes beyond lowest first cost. For example, the high cost of borrowed money during the credit crunch of the late 1970s accelerated typical construction schedules, catalyzed the creation of construction management, and gave rise to the increased use of fast-tracked schedules. The need for speedier project completion required not a single construction sequence but multiple individual packages that were bid as their design was completed, resulting in the asynchronous construction of individual project pieces in the field. In response, some general contractors marketed their services as "construction managers" adept at controlling these complex projects.

The liability crisis of the 1980s—characterized by an explosion of lawsuits—pushed architects further from job site responsibilities and pressed new risks on contractors, who in most cases were willing to assume such responsibilities in exchange for ever-larger pieces of the overall design-construction fee. As projects became more complex and failures became more dangerous and expensive, owners needed in-depth construction advice during design that architects were unwilling or hesitant to provide. Frequent and acrimonious disputes between architects and contractors, often fought out in court, led owners to consolidate design and construction responsibilities under a single entity. Large construction projects like hospital and airport renovations, which needed to operate during construction, required sophisticated management and construction planning beyond the capabilities or interests of architects and created new roles for professional program managers.

The building enterprise has evolved to include an even broader set of constraints and expectations that involve increasingly complex building forms, prefabricated construction subassemblies like curtain walls, integrated building control systems, and rapidly accelerating requirements for sustainable design. Building professionals have also realized that, despite extensive experimentation with delivery approaches, the outcomes of most construction projects remain unpredictable at best, and that traditional roles and responsibilities of the players bear further scrutiny. A new class of delivery models known today as "integrated project delivery" has emerged, which posits closer collaboration and open sharing of information between the key constituents of the building enterprise, underpinned by the power of Internet-based digital design information and technology that uses "building information modeling."

All in all, projects are ever faster, riskier, and involve far more participants than those of even 20 years ago. Choosing an appropriate delivery model is often the key to success—or the source of failure.

PLAYERS IN THE PROJECT DELIVERY PROCESS

Regardless of how they are structured, all delivery methods involve three elemental parties: owner, architect, and contractor. Their discrete roles, expertise, and expectations are described in Figure 9.1.

The Owner

The owner (or client) initiating a building enterprise is usually the eventual owner or operator of the finished building. The owner can be an individual, organization, or other entity that has initiated a design project. For purposes of understanding delivery methods, the owner is the entity that holds one or more contracts with the architect and contractor and is responsible for making payment to these participants. The owner is also responsible for paying for the construction of the building.

An owner's expertise in design and construction can vary widely, usually in proportion to the breadth and complexity of projects the individual or company has undertaken. Owners generally have similarly broad expectations of the other players in the process.

The Architect

The architect is the licensed design professional who, acting as an agent for the owner by providing architectural expertise, generates a design concept for the project. While the specific role of the architect varies greatly according to delivery method, it is the architect who designs, documents, and administers the contract(s) for construction of the project. The "architect" can be an individual or a firm and may contract with consultants such as engineers who augment and support the design effort. In all delivery methods, the architect generates documents that describe the design intent. The contractor uses these documents to build the building.

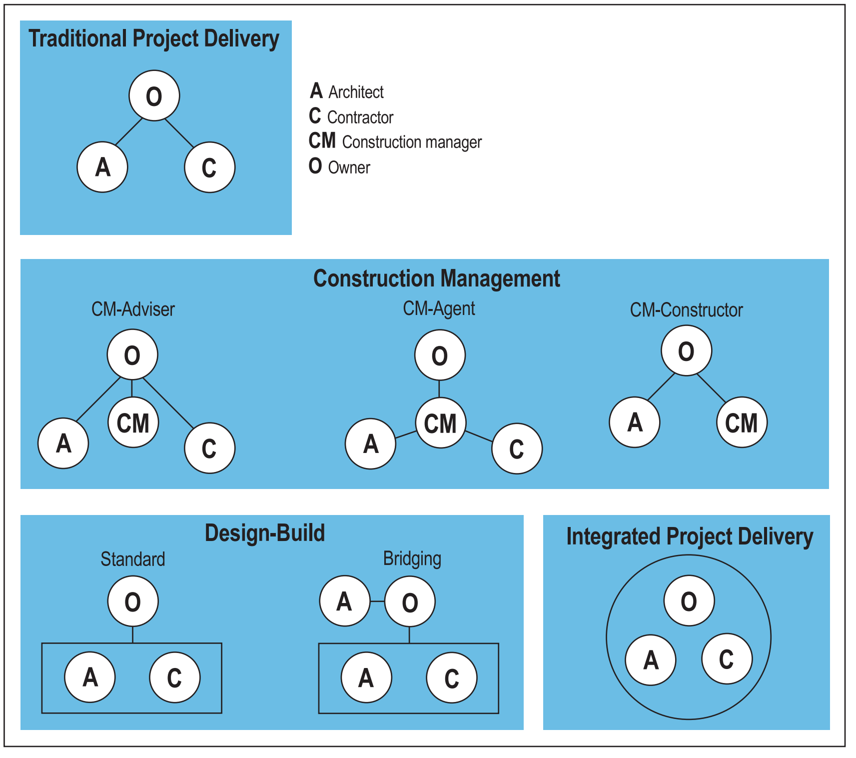

FIGURE 9.1 Relationships of Project Participants

Design Team Consultants

While architects are broadly experienced in the various subdisciplines necessary to complete a project, they typically contract with a wide array of specialty engineers and other consultants, depending on the scope of the project. On all but the most straightforward projects (like small private residences) the architect will subcontract responsibilities for structural and mechanical/electrical/plumbing engineering, and may require other services from additional engineers (such as geotechnical engineering) or special consultants (such as lighting, acoustics, or code/life safety for complex projects). In addition, the owner may bring specific consultants to a project to augment the overall project team, most commonly constructability assistance by construction managers, attorneys, or other consultants. It is important to understand and define the role of every consultant on a project.

▶ Project Team Agreements (17.2) further discusses the agreements that result when architects form teams to pursue projects, engage consultants, or establish joint ventures with other firms.

The Contractor

The contractor is responsible for the actual construction of the project. Typically known as the "contractor" or "general contractor," the contractor's team may include a variety of subcontractors, suppliers, and fabricators who together execute the design intent of the architect's documents. The contractor typically agrees, at a prearranged point in the design process, to construct the project for an agreed-upon sum. The determination of that moment and the resulting responsibilities of the contractor is one of the key differentiators of various delivery methods.

PROGRAM MANAGEMENT

Some large, complex projects have multiple building elements and complicated sequencing. One example is construction of a new airport terminal, with associated roadways, garages, and airfield, adjacent to existing facilities that must be kept in continuous operation. For such projects, an owner may elect to hire a "program manager" to oversee and coordinate the project. Program managers support the owner's interests and, for all practical purposes, *are* the owner in some cases. Such services are usually provided by large construction management entities; however, some architects have now begun to provide program management services.

Subcontractors, Fabricators, and Suppliers

Like the architect, the contractor requires an array of subcontractors to complete a building project. Since most contractors do not self-perform the vast majority of the work, they contract with (thus the term "contractor") necessary companies, tradespersons, suppliers, and fabricators that are then coordinated by the contractor to achieve the built project. Typical subcontractors might include structural steel assembly, sheet metal and systems installers, curtain wall suppliers/installers, sheetrock and interior finishes subcontractors, and electrical subcontractors. Larger projects can have tens or, in the largest project, hundreds of such participants.

Other Participants

Although different in each project, other key players in the process must have explicit relationships to project. Regulatory agencies (like building or zoning officials), external constituents (like local property owners), lending entities (like banks), and even local community groups may affect the project and should be understood in the context of the overall project structure. And while having no defined role in a project structure, the architect's obligation to protect the public's health and safety makes all users of a project—whether affiliated with the client or just walking through the halls—an implicit "client" of the job.

KEY VARIABLES AFFECTING DELIVERY CHOICE

Once only the cost of construction drove the delivery approach of every project: With little exception, the contractor submitting the lowest bid was selected. Other methods have emerged to optimize, other key variables to drive the selection of a delivery approach. These include construction cost, schedule, quality, risk, and owner capabilities. A correlation of driving selection factors for various delivery methods can be found in Figure 9.2.

Construction Cost

As the owner's greatest financial obligation for a project, construction cost is frequently the central concern of design and construction. Buildings are very expensive, and

		Driving Factor: Cost	Quality	Time	Scope	Risk	Construction Cost Determined	Number of Construction Contracts
Traditional	Design-bid-build	■				□	After design	One
	Negotiated select team	□	■				After design	One
	Cost plus fixed fee				■		At completion	One
Construction Management	CM-adviser		□			■	N/A	Many
	CM-agent			□		■	At completion	Many
	CM-constructor	□		■		□	After design	One
Design-Build	Standard	□				■	Before design	One
	Bridging		□			■	After design	One

■ Primary driver
□ Secondary driver

FIGURE 9.2 Characteristics of Project Delivery Methods

owners rarely have infinite funds with which to pay for them. Fixed budgets create clear and definite obligations for the architect and the contractor. Meeting those budgets is a high priority for every member of the project team.

Schedule

Most projects include a time frame in which the project must be complete and ready to occupy. When a building's primary function is critical to an owner's mission, meeting a precise schedule may be the most important consideration in determining how a project will be built. Examples of such situations include academic projects, which must be synchronized with the academic calendar, or performing arts centers that schedule events years in advance. Schedule compliance (and acceleration) is critical when interest rates are very high and capital for building is scarce, as even small delays raise the cost of construction financing dramatically. Orchestrating the design process with a specific schedule may include not just meeting a final deadline but also choreographing design deliverables with intermediate approvals and construction milestones.

Building Quality

▶ Bidding and Negotiation (10.8) covers the processes involved in selecting a contractor.

The demand for particular standards of performance in systems, finishes, enclosures, and other building elements is directly related to decisions about schedule and construction cost. The architect typically establishes a clear relationship between a project's level of quality, budget, and program, where an increase in one parameter may imply a change in another. An owner may be willing to accept lower levels of quality to save construction cost or to allow a project to be completed in a shorter period of time. Conversely, projects with long anticipated life spans (e.g., civic or institutional buildings) may emphasize levels of quality for which construction costs and schedules must be calibrated accordingly. Sustainable design considerations—a building's relationship to the environment, particularly its long-term use of energy and indoor environmental performance—are a significant component of its planned quality. Establishing a common understanding among project participants about all such levels of quality is critical to successful delivery.

Project Scope

Rarely is the project scope completely understood or precisely fixed during the course of a project. A building's characteristics are never completely resolved until its completion. Until that time, its scope—the combined characteristics of size and quality—may be indeterminate and the services provided by the architect must acknowledge this inherent ambiguity. The project's scope is successively refined during design, and subsequently during preparation of shop drawings and then in actual construction. Changing conditions, usually comprised of changing owner demands, market conditions for materials and construction trades, and even unexpected site or existing conditions on the project site, will affect the project scope as it unfolds. Delivery models should explicitly acknowledge the relative fixity of the project scope.

▶ Defining Project Services (15.1) addresses the centrality of scope definition to developing effective agreements for professional design services.

Risk

Risk is perhaps the most intractable variable in the building process. Players in the project make their best efforts to manage, reduce, or transfer their exposure to liability as the project unfolds. Key risk considerations include the following:

- *For the owner:* Can the project accomplish its goals within the constraints of time and budget? Does the owner have the capability to understand the project and support the decisions necessary to complete it?
- *For the architect and the architect's consultants*: Can the project be accomplished within the standard of care at an acceptable level of quality, within the owner's parameters, the architect's own capabilities and skill, and the strictures of the fee?
- *For the contractor and the contractor's subcontractors:* Is it possible to complete the project within a contractually stipulated time frame and/or cost, given market conditions, availability of subcontractors, and the contractor's experience and capabilities?

▶ Risk Management Strategies (16.1) discusses how to first know one's risks, and then how to manage them.

Client Capabilities

The internal capabilities of a client organization can significantly affect the roles the client, architect, and general contractor play. The degree to which design, documentation, construction administration, and management are outsourced, as well as the relative importance that each team member plays, frequently depends on the strengths, weaknesses, and preconceived notions of the owner. Owners may have substantial construction experience and in-house capabilities to understand and participate in a project, or may be embarking on their very first project as a client. Their preconceived notions may also affect the roles and responsibilities of the project participants. Each has a different relationship to delivery approach.

Project Team Capabilities

While any architect who participates in a project must meet the standard of care, levels of experience and capabilities of the team may vary by project type. Teams with greater degrees of experience and confidence in a particular type of project may be more comfortable with more complex, aggressive, or experimental delivery models. Generally speaking, teams with less experience should adhere to well-understood, standard models and associated typical contracts.

METHODS OF PROJECT DELIVERY

The relationships and responsibilities of the players and how they will share information, combined with an explicit understanding of construction cost, schedule, level of quality, and resulting allocation of risk, together define the project delivery method. The characteristics that identify a delivery method can be defined by answering questions for the following issues:

- *Driving factor*: What is the most important outcome driving the project for the owner—cost, risk, quality, or schedule?
- *Architect's role*: What are the responsibilities of the architect, and how do these apply to each successive design and construction phase of the project?

- *Contractor's role*: Who is responsible for building the project, and when in the process is that player selected?
- *Establishment of construction cost*: When is the actual cost of construction definitively established contractually between the owner and the contractor?
- *Number and type of design and construction contracts*: How many individual contracts for design and construction are necessary to accomplish the project?

▶ Integrated Project Delivery Overview (9.3) details methods that enable project stakeholders to share, to varying degrees, the risks and rewards involved in design and construction.

Answers to these key questions, combined with an explicit strategy about cost, quality, schedule, and risk, provide the information necessary to select and implement a project delivery approach.

Delivery models are typically based on one of three typologies: design-bid-build, construction management, or design-build. A fourth typology, integrated project delivery, is now evolving and discussed elsewhere in the Handbook.

Design-Bid-Build

Once known as the traditional approach, this delivery method involves a linear design sequence that results in a set of construction contract documents against which contractors submit fixed price bids. In design-bid-build approaches, the lowest-bidding contractor whose proposal responds to the requirements of the contract documents is usually selected to build the project. Many projects in the United States are constructed under this approach, and many of the business models that drive the construction industry, including contracts, fees, and risk management strategies, are derived from the design-bid-build method.

A variation of design-bid-build is the "negotiated select team" approach, in which the contractor is selected early in the design process and certain contract terms (such as overhead and profit multipliers) for the contractor are determined prior to completion of the construction documents. Subcontractors are then selected and the final contractor team is assembled once the construction documents are complete. The final contract amount for construction is determined based on the final documents and calculated using the pre-negotiated terms. Selected portions of the building that may be particularly difficult to fabricate or construct may be accelerated under "negotiated select team."

Another variation of design-bid-build method is known as "cost plus fixed fee." In this approach the contractor is selected at the completion of contract documents, but the scope of construction is unpredictable (due in part to unknown factors such as existing conditions). Under a cost plus fixed fee contract, the contractor is paid actual labor and material costs plus overhead for construction for coordination of trades on the site plus a fee that represents a fixed amount of profit that does not vary according to the total project cost, disconnecting the contractor's profit from any increase in project costs. Added incentives may be added to the fee if the project finishes early or under the original budget.

Construction Management

▶ See The Architect's Role in Construction Manager-Constructor Project Delivery (9.2) for more about CM project delivery.

Owners have increasingly demanded detailed construction and technical advice earlier and earlier in the design process. The building community has accommodated this need by creating the field of construction management. The construction manager (CM) can play one of three roles:

- *CM Adviser*: The CM as adviser acts only as a constructability and cost management consultant to the owner during the design and construction process, but will not build the building. CM-adviser projects can be delivered under any of the methods previously described.
- *CM-Agent (CM-A)*: The CM as agent provides early consulting and may act on behalf of the owner in assembling and coordinating the construction trades prior to and during construction. CM-agents typically provide their services for a fixed fee

and assume no risk for the actual construction costs themselves but pass on both savings and overruns directly to the owner.

- *CM-Contractor (CM-C)*: The constructability and cost adviser role of the contractor during the project's design phase transitions at a predetermined moment to the traditional role of design-bid-build contractor for the project. CM methods of delivery frequently include the use of a "guaranteed maximum price," or "GMP," which is a commitment by the CM-C to build the project for a specified price based on early design documents (typically those available at the end of design development). This places the CM-C at risk for the construction cost of the project. An inherent difficulty in CM-C arrangements stems from the CM's dual role as contractor and estimator, as cost decisions made early in design directly affect the CM's cost (and profitability) later in construction. Owners considering this approach should be aware of this fact.

In general, the construction management industry presents itself to owners as an essential project contributor when complexity, schedule, or commitment to budget objectives are critical. Because it is rare that one or more of these issues are not important to a project's success, construction managers are involved in many large building projects. However, architects with sufficient experience (and willingness to expand their work) are increasingly offering construction management services.

GUARANTEED MAXIMUM PRICE (GMP) APPROACHES TO CONSTRUCTION MANAGEMENT

In the past, the establishment of a guaranteed maximum price (GMP) suggested a commitment by the owner and CM-contractor to a construction cost based on partially complete design documents. The price established was understood to account for the "risk" inherent in using these documents. Many CM-based projects now invoke a GMP as an evolving cost target for the project but sustain it through the completion of construction to maintain flexibility with the owner about the final cost of a project. It might be argued that a GMP, carefully developed and refined based on construction documents, is actually a "hard bid." Care should be taken to understand and define this term when it is used to describe construction cost commitments after the design development phase.

► For more on architects as constructors, see Architect-Led Design-Build (9.5) and the accompanying backgrounder, Architect-Led Design-Build and Architect as Construction Manager for Small Firms and Small Projects.

► Contractor-Led Design-Build (9.4) further discusses traditional design-build project delivery.

Design-Build

This delivery method provides the owner a single-point responsibility for both design and construction. The design-build method sprang from clients' growing dissatisfaction with the inherent tensions and conflicts of delivery approaches that place architects and contractors in adversarial roles. Under design-build, a single contract is established between the owner and the design-build entity having both design and construction capabilities. Typically, that entity is a contractor with the architect as a subconsultant for design services. This contract typically includes a fixed price for both design services and construction cost. Design-build approaches require an explicit determination of the roles and responsibilities of the design-build team.

An interesting issue in design-build projects is the mechanism by which the owner establishes and enforces the performance and quality parameters of the project, a role typically assumed by the architect as an agent for the owner separate from the contractor. A variation on the consolidated approach of design-build is "bridged design-build," which is derived from project teams that include both a design architect (who establishes the design concept) and a production architect (who determines technical criteria and generates the construction contract documents).

These two architects work in concert to develop and execute the design, as follows. The first is a design architect who prepares a preliminary design for a building and establishes, typically through a performance

DESIGN SEQUENCE

The typical phasing of a design-to-build process includes standard phases of design resulting in a single package of construction documents. The emergence of fast-tracked construction in the 1970s changed this approach. Most projects today, however, are under significant schedule pressure, and the typical linearity of design phases—SD, DD, CD—is fast giving way to hybridized approaches where bid packages for individual building components are generated based on their schedule requirements or other market constraints. Irrespective of delivery model, projects rarely operate in a strictly linear fashion. There is some speculation that, as integrated project delivery methods and digital design technology become better understood and adapted, typical design phasing may give way to new definitions of design deliverables and project sequencing and phasing.

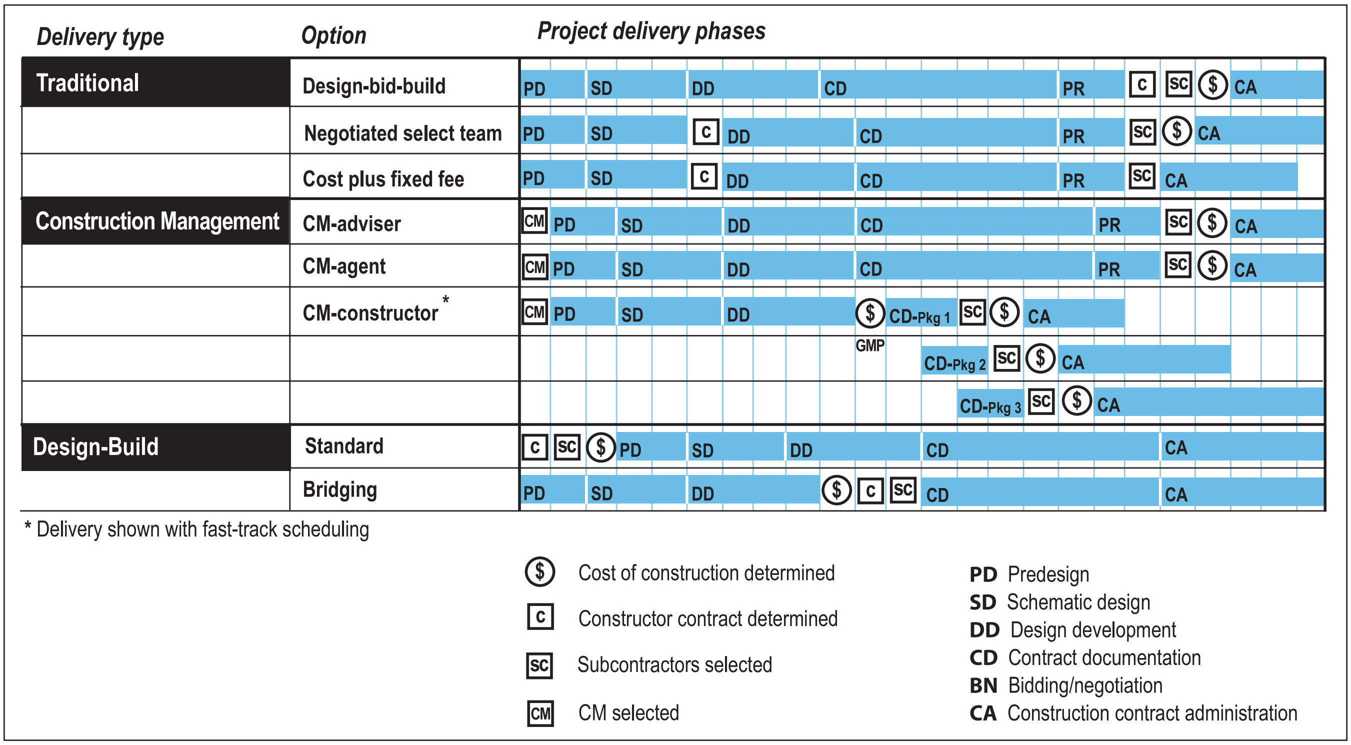

FIGURE 9.3 **Sequences and Key Decisions by Project Delivery Method**

specification, detailed criteria to which the ultimate design must conform. The completed design concept and criteria package (typically based on design development drawings and specifications) are then issued to design-build teams that offer both technical architectural and construction capabilities who bid on the work.

The "bridge" between concept and technical design is the juncture at which design-build teams bid on a project, and a team is selected based on the consolidated costs of technical documents and construction. The design architect remains in an advisory role to the owner, reviewing and critiquing the evolving design and construction based on the design and criteria package. The technical architect who is part of the design-build team provides detailed technical documentation for construction. This approach takes maximum advantage of a traditional architect-owner relationship with the participation of the design architect and simplifies the contractual responsibilities of the design-build approach. It might not be suited, however, to projects that require extensive interaction between the architect and owner during the entire design and construction process, since a portion of the design team is contractually tied to the building contractor.

OTHER DELIVERY MODELS

The construction industry is increasingly coming to grips with the challenges of delivering results with predictable outcomes. Too often projects fail to meet expectations of budget, schedule, or quality, three factors the architects must carefully balance as they guide the owner through the design and construction process. The project delivery models described above, and in more detail in other articles in this chapter, have evolved in part as attempts to address these challenges, each optimizing a different project variable or player capability to yield better results.

Some interesting variants are emerging worldwide that exhibit "integrated" characteristics but don't follow the exact strictures of IPD as commonly defined. Among them are privately financed initiatives and project alliances.

Privately Financed Initiatives

In Great Britain, consolidated design, construction, development, and building operation teams compete to deliver and operate completed buildings for extended periods as long as 50 years. The architect is one member of such teams. Owners pay a yearly fee in exchange for the use of these buildings. Many health care projects in the United Kingdom are using this model, notably when the government's Health Services does not wish to spend capital on building construction and operation. The *build-operate-transfer* model in Canada is a similar model. In the United States, developers are creating "lease-leaseback" arrangements, where projects are delivered for a client by a third party and then leased back to the client for a set period, with ownership reverting to the original client after an extended period, often 99 years. There are other variations on private-finance schemes, where private funds for construction of private projects have evolved as alternative financing strategies for projects; such schemes are sometimes, but not always, accompanied by consolidated design-deliver-operate project teams.

Design Assist

The increasing technical complexity of many projects, particularly those with high-performance enclosure or mechanical systems, demands the early involvement of key subcontractors and fabricators during the design phase. A new model called "design assist" has evolved accordingly, in which shop drawings generated by these subcontractors are incorporated directly in the architect's construction documents, and the architect is not required to document those systems as traditional "design intent" deliverables. This model purportedly creates more accurate and efficient working drawings, as well as improved cost control and construction operations.

Project Alliance Models

In Australia, the industry is experimenting with a radical delivery model called Project Alliance in which the entire project team—designers, contractors, and subcontractors—are bound together in a single contract that holds each jointly responsible for the project and rewards all for its success. Of interest in the Alliance model is the requirement that each project member fully support the efforts of the other, since their financial success is tied to mutual cooperation. The owner in these projects establishes measurements of this success—budget, cost, or quality, for example—and rewards the entire team based on how well these aims are achieved. Principles of Project Alliance have strongly influenced the development of Integrated Project Delivery (IPD) here in the United States.

CONCLUSION

Like many professionals anticipating the challenges of practice today, architects face increasingly complex decisions that drive the very basis of how projects will be designed and built. Advising owners intelligently about delivery options requires an understanding of the players in the building process and their roles, the key variables that affect the choice of delivery method, and, finally, the range of choices available in the current design and construction marketplace.

▶ Emerging Issues in Project Delivery (9.7) covers particular project-delivery issues that have arisen in relation to building information modeling (BIM), IPD, and sustainable design.

The other articles in this chapter illuminate in detail the methods of project delivery in common use as of 2012, and methods that are emerging as more frequent choices by owners, architects, and contractors. These include construction management, integrated project delivery, design-build—both architect- and contractor-led—and architect as developer.

A new generation of delivery models based on principles of integration is coming into view. To maintain a central role in the building enterprise, architects must strive to understand, master, participate in fully, and, when necessary, invent such methods. The chapter concludes with an article detailing these emerging trends and methods.

For More Information

The Handbook on Project Delivery (AIA California Council): http://aiacc.org/resources/project-delivery/handbook-on-project-delivery/.

AIA Contract Documents: http://www.aia.org/contractdocs/index.htm.

The Owner's Dilemma (Greenway, 2010) by Barbara White Bryson, FAIA.

Managing Project Risk: Best Practices for Architects and Related Professionals Managing Project Risk (Wiley, 2008) by James Atkins, FAIA, and Grant Simpson, FAIA.

"Collaboration, Integrated Information, and the Project Life Cycle in Building Design, Construction and Operation, CURT WP-1202 (Construction Users Roundtable, August 2004): http://aia.org/aiaucmp/groups/aia/documents/pdf/aias077892.pdf.

PART 3: PROJECT DELIVERY

BACKGROUNDER

THE NEED FOR INTEGRATED PROJECT LEADERS

Barbara J. Jackson, Ph.D., DBIA

Leading integrated projects and teams requires a unique set of skills and talents. Being an architect, contractor, or engineer does not qualify or prepare a person for leading integrated projects. In addition to discipline expertise, Integrated Project Leaders (IPLs) must possess a disposition for collaboration across disciplines, demonstrating appreciation, enthusiasm, and empathy for what others contribute.

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THE LEADERSHIP IMPERATIVE

The one common denominator among all integrated project delivery approaches is the expectation for the team—owner, architect, and contractor, and others as assigned—to act "as one," thus capturing the collective knowledge and expertise of the multidiscipline perspective to deliver comprehensive, integrated solutions. Given our industry's historical segregated services mentality and isolated operational model, achieving such a collaborative, interdisciplinary teaming arrangement is a tall order, and certainly one that is not going to happen by accident. It takes a unique leader with unique leadership skills to elicit such results. Unfortunately, these required leadership skills are not readily taught in architecture, engineering, or construction management schools, and yet architects, engineers, and contractors are typically the individuals who are charged with leading these integrated project approaches.

Being well trained in the disciplines of architecture, engineering, or construction project management does not usually properly prepare a design or construction professional for the task of leading a multidiscipline team of individuals with different skills and motivations. The challenge is, when bringing this diverse group together to work on an integrated project solution, if each team member only contributes their single-discipline perspectives, it's very difficult for them to view solutions from an interdisciplinary viewpoint.

What tends to happen on many projects is that each individual discipline presses for its own point of view. Architects press for enhanced design, contractors press for budgets and schedules, and each party may feel threatened by the other's point of view. While the discipline that is "leading" the team is most likely to succeed in forwarding its approach, the fact remains that the owner wants it all—an integrated solution that enhances design as well as the budget and schedule. An Integrated Project Leader (IPL) must rise above any single discipline perspective and develop a disposition for collaboration across disciplines, demonstrating appreciation, enthusiasm, and empathy for what others contribute.

THE INTEGRATED PROJECT LEADER

Most would agree that the true leader of the project is always the owner, who sets the goals, objectives, and purpose for their projects. But from a practical perspective, the owner doesn't lead, coordinate, monitor, and manage the design and construction efforts that deliver the intended and expected goals, objectives, and purpose for the project. As more projects are executed as integrated efforts between designers and builders, the question of who is best suited to lead the integrated project must be considered. Should it be the architect? Should it be the contractor? The most accurate answer is probably neither, if their discipline expertise is all that they can bring to the leadership challenge.

It is common wisdom within the construction industry, in 2012, that there exists generally significant skepticism and distrust between the design and construction disciples. Both are skeptical that the other has adequate understanding, knowledge, or appreciation of elements and issues associated with their contributions, and each therefore lacks trust that a project leader of the other discipline will give them proper consideration. Anecdotally, both parties, when working together on teams, have voiced these very concerns regardless of the contract model, and whether in separate firms or integrated firms.

Successful leadership of any integrated approach to project delivery requires a new mental model for working together collectively and collaboratively. Integrated projects require individuals who can rise above their discipline bias and become the integrated project leaders that owners will need to fully leverage the collective ability of their multidisciplinary team. The integrated project leader must create an environment in which every participating party succeeds, and a comprehensive, integrated solution is achieved. In addition to managing the distinct design and construction functions as an integrated process, which poses a substantial challenge in itself, the IPL must also create and manage a teaming culture that produces the results the owner is looking for.

The IPL must create an environment in which each team member feels valued, appreciated, recognized, and successful. This is a critical task for an IPL, because if the leader can change the experience for the individual team members, then their beliefs about the people and the process will change. If their beliefs change, then their actions and behaviors will change. And if their actions change, then the results will change. This change in experiences, beliefs, actions, and results is at the heart of any integrated project approach and therefore is at the heart of successful integrated project leadership.

An integrated project leader requires certain affective skills and talents that are not typically taught as part of any architecture, engineering, or construction management program. Nevertheless, IPLs can and do come from any of the AEC disciplines. However, there do appear to be some common traits among successful integrated project leaders:

- They listen and inquire first, and then ask direct questions that get at the facts of an issue, void of judgment or opinion.
- They are proactive in everything they do. They focus on getting in front of situations before they become problems.
- They address upsets and issues head-on and immediately. They do not let issues fester and get out of hand.
- They are highly engaged with the team and manage from the middle and not from the edges.
- They prefer dialogue to debate, understanding and appreciating the values and rationale beneath an opinion instead of arguing over competing opinions.
- They offer comprehensive, well-thought-out answers rather than rash, reactionary comments.
- They are highly skilled in facilitation methods that lead to the synthesis of multiple perspectives into a shared understanding that all can buy into.
- They do not command or direct but rather respectfully elicit the insights, creativity, and wisdom of others before making decisions.
- They are informed by their own discipline expertise but clearly recognize the limited perspective it presents in achieving a comprehensive, integrated solution.
- They have focus that goes beyond the owner's program, product, or process. They focus on the owner's "purpose" for the project when making all decisions.

CONCLUSION

Those who come by the talents and skills needed to be an effective integrated project leader naturally seem to be few and far between. With the upsurge in the use of project delivery methods such as design-build, CM-constructor, and integrated project delivery, there are clearly not enough IPLs to go around.

The first challenge for the industry is to recognize the need for uniquely trained and prepared individuals who have the skills and talents necessary to become effective IPLs. The second challenge is to clearly recognize that the talent for leading integrated project teams is not associated with any given discipline, but is instead available across all the disciplines of the built environment. The opportunity is to nurture, develop, and respect this skill set wherever it is found. Third, to recognize the need for specialized training in project leadership and the void in these educational offerings at most schools of architecture, engineering, and construction management and in existing continuing education programs. Meeting these challenges is essential to make ready a new generation of integrated project leaders to serve the AEC industry, and its clients, in successfully practicing an integrated project approach and delivering on its promise of superior results.

For More Information

Center for Integrated Project Leadership for the Built Environment: construction.calpoly.edu/cipl.

9.2 The Architect's Role in Construction Manager-Constructor Project Delivery

Mark Hesselgrave, Architect

The construction manager has become an integral part of many project teams. When the CM is also the constructor, the architect can best serve the owner and the architecture profession by understanding and helping to define roles and responsibilities of all participants in a CM-constructor project.

Building projects are increasingly complex and demanding. In all but the smallest projects, employing some variant of construction management has become a common method of project delivery. With CM involvement, the project team can gain important insights into construction cost and schedule crucial to the success of the project. To achieve the best results for the project, the architect's responsibilities will shift to align with the tasks assigned to the CM.

CONSTRUCTION MANAGEMENT PROJECT DELIVERY

▶ See Project Delivery Methods (9.1) for an overview of the types of construction management.

The title "CM" has become the generic label for any individual or group managing a project during the construction phase. However, there are numerous variants of construction manager, and the Handbook describes the distinction between those different forms. This chapter focuses on the CM-constructor.

The *CM-constructor* (CMc), also called CM-at-risk, places the CM in a role similar to that of the traditional general contractor. Capable of providing valuable pre-construction services of cost estimation and scheduling while the architect is developing the design and its deliverables, the CMc shifts focus to building the project at some point prior to construction. In the simplest terms, they are bound to the contract documents, the cost estimate, and the schedule that they themselves help establish. In many ways, the CMc is a mirror image of the *design-bid-build* (DBB) method of delivery, with all the dangers and conflict that accompany it. However, there are important distinctions, described below.

DESIGN-BID-BUILD VERSUS CMc

DBB was conceived as a way of introducing competition between numerous trades so that the owner would realize a cost benefit. Building conventions were well understood and universally practiced, so an owner could be reasonably confident that they would receive the same product from a variety of bidders; the competitive bid gave that product to them at the lowest competitive cost. Over time, changes in construction methods as well as financial management moved faster than convention could accommodate. The AE documents rather than building conventions became the primary determinant of scope; if not shown in the documents, a given component wasn't provided. DBB no longer yielded desired results for owners. Expanding supplies of "equal" products that did not truly perform as equals fueled the deterioration of building quality, as did cost-cutting shortcuts in construction means and methods. Gradually, construction management was developed as a way to address specific weaknesses of design-bid-build.

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Conflict Resolution

The traditional design-bid-build delivery is a process fraught with conflict. The stage is set when contractors vie against one another to win the bid. Aggressive bids may allow for only the slimmest profit margins, leaving the contractor to fight any decisions that could turn profit into loss. Further, competitive bidding encourages a contractor to take the most economical approach that can be interpreted from the documents. When that interpretation does not align with the design intent, conflict can ensue.

Some owners, as well as architects, think that this conflict is good. Their view is that the documents are tested against precedent and reasonable expectation in a trial of constructability. When things don't go smoothly, both parties—builder on one side, designer on the other—argue their case. The conflict keeps both parties honest. At least, it does so in theory. In practice, owners have seen project teams dissolve into a sea of excuses and incrimination, leaving no one to deliver the owner's project. With a CM as constructor, the old divisions established in a traditional project delivery are unbound. When successful, the owner-architect-CM relationship will create a team that works toward consensus rather than as adversaries, allowing them to concentrate their full attention on delivering the project.

Construction Experience

Construction managers are expected to have experience building buildings, but buildings are not widgets. Every project is unique, built without benefit of a prototype. Still, there are ways of executing specific project types that are best learned through experience. For example, a basic office building requires the CMc to coordinate essential trades such as electrical, mechanical, concrete, steel, etc. The most critical skill may be the ability to accelerate the schedule. CMc involvement in the design phases can help the team organize bid documents for multiple packages.

More complex projects, like performing arts buildings, have different requirements. Not only are there more demands on the essential trades to meet acoustic criteria, there are also added designers and trades that need to be coordinated. The complexity rises geometrically. Therefore, prior experience with projects similar in size and function to the one proposed can be of great benefit in both design and construction phases. A CMc who is actively building similar projects can offer advice to the AE team during the design phase, and will be able to anticipate critical activities during construction.

While "prior experience" could be applied as criteria for a design-bid-build project as well as a CMc project, the effect would not be the same. Early involvement in the project helps the CMc to understand design intent to ensure that the scope is fully realized. The exchange of insight between architect and CM during design is one of the primary benefits of a CMc arrangement.

Cost Analysis

Most projects must adhere to a budget, and the budget is best established no later than the schematic design phase. Cost estimates performed at design milestones track the construction cost; the subcontractor bids test whether the estimates were accurate. An independent cost estimator can provide this service to the team, and can do so without bias. Another approach is to employ the constructor as the estimator. The CMc can advise on current market conditions and labor costs to help the AE team design cost-effective building options.

Schedule and Coordination

Under DBB, a single package of documents is delivered to bidders, with the package coordinated by the AE team. This is the simplest method of delivery, but not the fastest. To deliver a project quickly, document "bid packages" are released depending on their place in the overall schedule. Unfortunately, multiple bid packages released over time add uncertainty and may require changes as the documents progress. A CMc is charged with the responsibility for seeing bidders receive the appropriate information at any given time, and that the work is coordinated as it proceeds.

Matters of construction experience, cost estimation expertise, scheduling, and construction coordination expertise are discussed further below, and are essential considerations when selecting the CMc.

SELECTING THE CMc

Selecting the right CMc for a project is an important task, and the owner may ask the architect for advice and guidelines. The architect's experience on previous projects can inform the owner not only about qualifications of specific firms but also about the scope of work that should be requested when soliciting qualifications. Most importantly, the CMc will be part of a team, and the involvement of the AE team in the selection process may help promote team harmony.

Why CMc Delivery?

Before launching into the selection of a construction manager, it is important to understand what is motivating the client to do a CMc project. Is the schedule for completion aggressive? Is the cost critical? Is the scope unknown? Any of these factors could lead to the decision to choose CMc delivery.

With the driving factors known, the owner should include in the RFP a detailed description of the CM's expected scope of services.

Define the Scope of Work

The AIA Contract Document A133™–2009 can be seen as the base agreement between Owner and CMc. Although this may not be the agreement those parties use, the architect should study that document to understand not only the responsibilities of each party but also matters of payment, dispute resolution, and how the cost of work is to be established.

▶ See The AIA Documents Program (17.5) for more detail on the CM family of AIA Contract Documents.

The scope of work expected of the CMc should be clearly defined in the request for qualifications/proposal. A detailed description of the project, including size, program, and materials, to the extent that they can be defined, should be included. In addition to the description of the project, AIA Document A133™–2009 can be used to set out contractual requirements for the scope of work that can be expected. The owner should make any adjustments necessary to align that agreement with their specific project, and, if necessary, any general conditions of the owner's contract for construction. In the best case, the architect will meet with the owner and discuss the scope before it is released. That way, the owner can avoid contradictions between architect and CMc agreements. Also, the architect can suggest language that may clarify what, in their experience, may have been sticking points in the past.

Basic services for the CMc might include the following:

- Preconstruction phase:
  - Perform a preliminary evaluation of program, schedule, and budget.
  - Maintain ongoing consultation on matters pertaining to construction, constructability, and materials and labor availability.
  - Prepare and periodically update the project schedule.
  - Provide recommendations for phased construction.
  - Provide preliminary cost estimates. As the design develops, the estimates will be updated with increasing detail until a guaranteed maximum price can be established.
  - Develop subcontractors and suppliers' interest in the project. Where demanded by schedule and market conditions, pre-purchase materials for the project.
- Guaranteed maximum price: When mutually agreed by owner, architect, and CMc, the CMc will prepare a guaranteed maximum price (GMP) proposal. The GMP will be the sum of the CMc's estimate of the cost of the work, including contingencies and the CM's fee.

- Construction phase:
  - Solicit and obtain bids from subcontractors for the work. Review with the owner and architect to determine which bids should be accepted.
  - Administer the work of subcontractors in accordance with the contract documents.
  - Schedule and conduct meetings to discuss procedures, progress, coordination, scheduling, and status of the work. The CMc will prepare and distribute minutes to the owner and architect.
    - The owner's representative and the architect should also attend these meetings on a regular basis. The CM's ability to direct the subcontractors often relies on the involvement of the design team to clarify the documents and their intent.
  - Maintain a schedule of the work, including submittals to the architect.
  - Track the cost of work measured against the GMP.

This list paraphrases the scope found in AIA Document A133™–2009. It is only the starting point. Discuss with the owner how best to serve their project. Once a CMc is selected, they too may have suggestions for their scope.

Interviews

A successful team is not determined by technical qualifications alone. Team chemistry greatly affects the ability of professionals to work together toward a common goal. The CMc selection process should include an interview where the CM presents their qualifications and their team. The architect should request to be a part of those interviews. Though it should not be the primary measure, good team relationships will influence project's success.

SAMPLE: CONSTRUCTION MANAGEMENT SERVICES

- **Team meeting leadership**. Lead regularly scheduled project meetings with members of the project delivery team for the purpose of continually assessing project status, and coordinating design and budget issues. Prepare and distribute minutes of all such meetings.
- **Action log**. Maintain the project team action log to drive and track outstanding issues and ensure timely completion.
- **Decision-making process**. Coordinate interaction and decision making among USD 443 architects, engineers, user groups, and others necessary to project decision making. Meet regularly with USD 443 to continually address key decisions required and other project issues. Includes coordination and assistance with contract negotiations for construction services.
- **Code official review**. Participate in review meetings by AE team with building official to develop a permit procedure for project.
- **Owner purchasing**. Work with USD 443 to incorporate, where possible and appropriate, to aggregate cost with other USD 443 projects and assist and advise the owner regarding owner-purchased items.
- **Cost control**. Provide an overall cost control system for the project, including monthly reconciliation with USD 443. Maintain a parallel record of project costs for review by USD 443 to serve as a permanent record. Develop and update a cash flow forecast for the duration of the project.
- **Department interface**. Coordinate interface with key USD 443 departments, including engineering, telecommunications, security, etc., to encourage participation with the project design team.
- **Documents review**. Review all design phase documents and comment on constructability, coordination, and value engineering (VE) issues. Coordinate all value engineering efforts on USD 443's behalf including facilitation of work sessions with the project design team, evaluation of proposed constructability/VE items, etc. Monitor completion of design documents to ensure constructability/VE items are incorporated as the project progresses.
- **Presentations**. Participate in other presentations, as necessary, to provide updates as to the project status. Such other presentations may include the USD 443 board or presentations to local governmental agencies.
- **Design process documents**. Monitor design documents relative to compliance with the approved functional program and USD 443 project objectives. Perform periodic drawing reviews to track status of the design progress and inclusion of VE objectives.
- **Conflicts and disputes**. Assist in the resolution of all project-related conflicts and disputes including coordination with USD 443 legal counsel, as required.

DEFINING TEAM ROLES

In the traditional design-bid-build project delivery method, there is a clear line demarking the roles of designer and builder. While the project design is under way and documents are being prepared, management of the project is the responsibility of the architect. After the documents have been bid and a general contractor selected, management of the project passes to the contractor, although the architect remains the manager of the design team.

When both architect and construction manager are on the job, there can be some conflict as to who's running the show. Both are experienced in leadership roles, and both have significant liability for their team's performance. Taking the time early in the project to clearly establish the team members' roles can improve communication and help avoid frustration. As the architect and CM have no contractual relationship, the owner must be a party to establishing team roles. Therefore, the owner/architect agreement must be aligned with the owner/CMc agreement.

The architect should consider amending their contract to align with the owner's contract with the CM and their expectations. Included in both contracts should be a matrix or narrative description that clearly and concisely defines team roles. As always with contracts, obtain appropriate legal advice and consult with the firm's professional liability insurance provider.

Once team roles are established and documented, this documentation can be referenced throughout the project. For the CMc, two responsibilities will overshadow all others: construction schedule and construction cost. When construction begins, the architect too will be driven by schedule and cost. How those factors are defined and monitored are of crucial interest to the design team. Still, before construction starts, the CMc will make their presence known in the design phase, sometimes to the architect's chagrin.

DEVELOPING THE DESIGN

The AE team has primary responsibility for the design phase. The owner looks to them to set the schedule and to coordinate the work. At the same time, CMc input into matters of construction can help the team make informed decisions as the design develops.

Constructability Expertise

The design team should draw on the CMc's expertise in understanding the realities of actually building the design as it evolves; in other words, the design's *constructability*, which might include the following:

- *Local building conventions.* An architect may be aware of local building conventions and design standards, but not know the details of current market conditions and how they affect the local labor force. For example, while stucco might be a cost-saving alternative for exterior finish in California, the scarcity of qualified installers in Connecticut could raise the price dramatically.
- *Building systems.* While the project engineers are experts in designing building systems, current market conditions will impact the cost of the components specified. The CMc can advise the team as to which system will be most cost-effective at the time of construction. For example, the structural frame is often subject to this analysis; concrete is weighed against steel to determine which system is preferred when measured in terms of cost and schedule.
- *Site selection.* Drawing on their experience of coordinating the workforce, the CMc can offer their analysis of potential building sites. Constrained sites can be evaluated for the cost of material delivery, staging, laydown, and workforce deployment.
- *Scope limitations.* The CMc can provide oversight on the overall project scope as it develops, warning the team if it seems to be growing beyond budget or schedule

limitations. The architect will need to assert their design authority if they feel that scope is being restricted without fair consideration of the owner's program.

Specifications

Final construction documents are comprised of drawings and specifications. During the early phases of design, SD and DD, the architect depends heavily on drawings to convey design intent to the owner. Unfortunately, as clear as the drawings may seem to the architect, they do not define the scope of construction in enough granular detail to ensure accurate pricing from the CMc. Product data, material properties, testing requirements, and quality assurance are some of the details that are too cumbersome to include in drawings. The design team must use additional tools to describe the building, pointing to the importance of specifications to establish design intent for the CMc early in the process.

- *Outline specifications* are a simple way to define building components at the schematic level. Generally organized by CSI division, the outline should include material descriptions and quality level, as well as actual proposed product data whenever possible. Periodic expansion and updating of the outline will ensure that the design intent is well described and accurately priced.
- *Performance specifications* describe products by how they are to perform rather than narrowly defining a manufacturer or material. This approach works well for technically driven subcontracts, such as air handlers, chillers, transformers, and other mechanical or electrical equipment. With a performance specification, the CMc can obtain pricing from contractors who specialize in the work described.
- *Narrative specifications* describe work in words rather than in drawings or in the more technical language of the CSI format. The narrative can describe finishes in the various rooms of the building without providing a complete room finish schedule. The descriptions can be easily revised, but the narrative provides enough information to compile an early cost estimate.

The project team must agree on when the method of specification is adequate to meet the level of estimate required of the CMc for each phase of the project. Similarly, the CMc should commit to incorporating the information delivered by the preliminary specifications. Just as with the final documents, *all* design documents—drawings and specifications—make up the design intent, and should be priced accordingly.

► See Construction Specifications (10.7) for more detail on specifications in traditional project delivery.

LEED Certification

It is critical to have CMc involvement in early design phases to meet LEED goals. LEED scoring requires certain construction practices if a particular point is to be gained. Equally important to the project is the cost benefit of obtaining a particular LEED point. The CMc will incorporate the cost of the LEED measures proposed by the team so that the project budget reflects the design intent.

Checking the Documents

As noted above, construction documents are by definition not prescriptive construction instructions, and at early design phases the project scope is only vaguely defined. Therefore, it's important that the architect establish the level of scope information that CM can expect for each milestone so that the CMc's advice can be calibrated accordingly. Once set, the architect can tailor their deliveries to that level, and the CMc will have the information they need to provide cost estimation and scheduling services appropriate to the phase. In addition, the scope definition by phase can act as a check list for the design team.

The CMc can also provide, as part of their work, periodic document check to augment the architect's quality management procedures. With their knowledge of construction services and their understanding of contractors' expectations, the CMc

CMc involvement in quality control should not be a substitute for the design team's own quality management plan. Rather, it is a value-added service.

provides insight into how the design documents will be read in the field. Any perceived gaps in scope can be filled before final documents are released for bid.

▶ See Chapter 12, Quality Management, for more on quality management processes in practice.

Conflicting or uncoordinated scope can be as damaging to cost and schedule as missing scope. The CMc can also be asked to verify that drawings are coordinated internally and with other consultants' drawings. Well-coordinated documents with adequate scope definition will go far toward meeting the design team's best contribution to meeting the project schedule.

PROJECT SCHEDULE

In the traditional design-bid-build project delivery method, responsibilities for schedule are clear. The design team is tasked with delivering a set of documents by a certain date, after which the documents are printed and issued to general contractors. The burden of schedule then shifts to the selected contractor. The design team still has schedule performance obligations, as the designers are required to turn around shop drawings and clarifications in a specific time allotted by the general conditions. But beyond that, the design team has little or no ability to affect the schedule. Similarly, prior to bid, the general contractor has no input on the design project schedule, since it is not chosen nor involved in the project until after the completion of the documents. Such is not the case when the CMc is involved.

Under CMc project delivery, the CMc has the responsibility for developing and coordinating the overall project schedule, including design phases, owner decision milestones, and work periods that include design and drawing time. The consolidated schedule is assembled, tracked, and maintained by the CMc for the duration of the project. Since many owners choose the CMc delivery method specifically to drive the project to a schedule, what unique skill does the CMc bring to a project to achieve that goal? In short, they bring the ability to accelerate the project delivery schedule.

Fast Track Schedule

Fast track is a method of delivery that allows AE documents to be issued in multiple stages, or bid packages. While this strategy can be complex and therefore challenging, it can be of great benefit to the owner who wants to compress the project schedule. Rather than wait for a completed set of construction documents, work can begin with partial documents for the trades along the critical path. Fast track delivery has become very common in commercial and institutional projects with accelerated schedules. Unfortunately, the risks involved in that method are not always well understood by the parties involved.

The team must have a clear understanding of how the scope definition should proceed to best allow for accurate cost estimation and, if anticipated, phased bid packages. This approach may be antithetical to the creation of a cohesive design whole, but the need cannot be ignored. The architect must maintain a coherent approach to the design even as pieces of the project are developed asynchronously in fast-tracked packages. For example, if the estimator needs details of a copper roof early in design development, the architect will need to provide them, even if they normally would not have resolved that portion of the design until much later in their process. Or if curtain wall details must be delivered months before floor plans are finalized, the team must work toward that goal. It is critical that the structure, schedule, and milestones for individual bid packaging requirements be established at the outset and properly reflected in the architect's scope of service and fees. An unclear packaging strategy will subject the design team to starts and stops that will compromise the quality of the documents, and project schedule and cost will suffer.

The CM will include the design team's schedule in their project schedule. It is important that the team not accept an unrealistic time frame that conflicts with their professional duties.

The architect must have a clear rationale for the design components of the schedule and be prepared to explain their schedule requirements. While there is no benefit to the CMc in a lengthy design period, the architect must be given sufficient time to complete their work. The CMc may pressure the architect to accept a shorter design or documentation period. Be wary of such pressures.

Bid Packaging

Traditional DBB allows for the straightforward production of documents, giving the design team the opportunity to coordinate documents fully before releasing them to bid. CMc with fast-track delivery introduces complexities that go far beyond producing the documents. Rather than a single set of documents, a number of sets, or bid packages, must be assembled and issued over a period of time.

Obviously, the work to customize the drawing set and release it a number of different times and ways exceeds the normal basic services that an architect provides. If it is known from the outset that the construction delivery will involve the production of multiple bid packages, make sure that the owner/architect agreement reflects that work. If multiple bid-package delivery is introduced later in the design process, the architect must negotiate with the owner to modify the contract.

Even if the design team expects and produces unique packages for each bid, there will be areas where two or more bid packages overlap. The danger of redundancy or conflict increases when the same (but revised) drawings are issued at two different times to two different contractors. It is critical that the management team know which drawings on the job are current and who is involved with the work. Both the architect and the CMc should establish document tracking procedures that will ensure that only current drawings are on site, and that all contractors have received them.

As part of bid packaging, the CMc will include a written scope of work to accompany the design team's documents. This document in effect modifies the construction documents. While it is tempting to the designer to stand with the documents alone, that will do the project no good when the work is in progress and a piece of scope is missing. Therefore, the design team should include in their agreement time to review the CMc's scope descriptions prior to their release for bid. The architect should provide a written report on the bid package scope, noting in particular areas where the scope description doesn't appear to align with the design documents.

Release of early bid packages comes with the risk of subsequent changes that will be required when the design is further developed. As there is no fixed document set until all packages are bid, the architect may be responsible for ongoing document coordination with "as bid" conditions. Furthermore, the bid must align with the documents' intent, or a change order with accompanying additional services is in order. It should be clearly defined in the owner/CMc agreement that any deviation between the winning bid scope and the design documents be communicated—in writing—to the design team.

▶ See Bidding and Negotiation (10.8) for more detail on construction procurement in traditional project delivery.

CONSTRUCTION COST

An architect's ability to accurately estimate construction cost is limited. At best, a firm may have in-house expertise in quantifying materials, which the architect can then extrapolate into material cost for a building. Determining labor cost is a different matter. Special expertise is needed to analyze local market conditions, not only for payroll but also for production capabilities. For this expertise, owners turn to an independent cost estimator or, very often, the CMc.

CMc as Chief Estimator

Over the last few decades, owners have increasingly turned to construction managers for cost estimation services. The reasoning is as follows:

- The CM is experienced in the valuation of construction processes and materials.
- The CM is already providing other preconstruction services.

- The CM has business relations with subcontractors that can assist in fine-tuning an estimate.
- Where the CM is constructor, they will have an incentive to provide an accurate estimate.

While these arguments are valid, they don't take into account the specific cost management challenges with the CM as constructor. Such challenges include the conceptual mind-set of the design team as opposed to a more linear ideation of the builder; more important, there is an underlying conflict of interest inherent in this system of cost estimator as constructor.

A project cost estimate in a CMc project becomes, rightly or wrongly, a key measure of the CM's competence. Thus the temptation can arise, even unconsciously, to inflate line item values to ensure that the estimate "looks good" when measured against the bid values. Conversely, the CMc may artificially lower the estimate in response to owner pressure, confident that they will find cost savings during the course of bidding and negotiation that will bring cost of construction down. As a result of these manipulations, the project can suffer in one or more ways:

- Scope that should have been included in the project is cut due to cost, albeit artificially inflated.
- The inflated estimate is leaked to bidders, who then raise their bid in response, thinking that perhaps they are missing some scope.
- The suppressed estimate goes to bid, and when the numbers come in the extent of the budget shortfall is revealed, leading to a delayed start while the team scrambles to reduce cost.

A conflict also arises for the CMc after the bids come in. If the bids exceed their estimate, a misguided CM may make behind-the-scenes side agreements with subcontractors in an attempt to bring the bid down. Loss of project quality and divergence from the design intent are the usual consequences of these deals.

Internal conflict need not result from CMc estimation. Contingencies can guard the budget against indeterminate costs. Still, the system suffers from lack of precision, with the worst culprit central to the estimate: the guaranteed maximum price.

Guaranteed Maximum Price

The guaranteed maximum price (GMP) is the amount that the CMc sets for the cost of construction based on in-progress documents provided by the architects and engineers. It is designed to allow the CMc to commit to a price while the design—often during a fast-tracked process—is still underway, giving the owner price certainty. The CMc brings the estimate to a level that aligns with the design, anticipating all materials and labor needed to complete the building, even if those pieces are not yet shown in the documents. The closer the documents are to completion, the less anticipation will be required, and the more closely the GMP will align with the final bid. Once set, the CMc "guarantees" that this cost will not be exceeded. The moment when the GMP is "set" is thus critical.

Two competing interests are in play. The first is the desire to establish the GMP as early as possible. This locks the construction cost down so that the owner is sure their budget is met. However, when the GMP is set early, it must be based on assumptions for scope not yet defined in the documents, as well as projections of future costs of material and labor when the project finally does bid. Therefore, the CMc may push GMP close to, if not into, the bid period so that the owner's budget is set to actual construction costs. At that point, the at-risk component of the CMc's work is minimized.

No matter when the GMP is established, the CMc runs the risk of the estimate not meeting the as-bid amount. If the owner's budget is exceeded, there must be strategies in place to reduce the construction cost while allowing the project to proceed.

Value engineering (VE) is a critical service that the CMc provides. When correctly done, the VE process introduces materials and products that will achieve the design intent at a lower cost.

Cost-cutting suggestions should not be confused with value engineering. The CMc may combine the two, but where VE achieves the same intent at a lower cost, cost-cutting will change the original design to something the CMc hopes is similar but costs less.

The CMc is charged with the task of holding the GMP as construction proceeds. With an accelerated construction start combined with multiple bid packages, the bid documents can become dangerously unraveled, with later releases diverging from early ones. Ensuring that the GMP represents the documents, and vice versa, is a crucial part of the CMc delivery.

CMc DURING CONSTRUCTION

Releasing design documents in multiple bid packages often leads to changes in work "as bid" when the design is further developed. Another force is cost; as-bid packages come in and are compared to the estimate, the CMc will get a better idea as to whether the budget will be met. If bids come in high on early packages, the design team may need to scramble in an attempt to cut costs. It is very difficult to cut costs so late in the bid process, but the team must be prepared to try. Again, meticulous tracking of documents will help ensure that only the most current design is in the field.

Construction Phase Services

An architect's responsibilities in a CMc project parallel those in a traditionally delivered project, with specific changes that anticipate the unique role of the CMc, particularly with regard to fast-tracked projects and the GMP. The architect's contract and scope must anticipate the additional complexity and risk of both approaches and fees should anticipate additional effort by the architect during a CMc project. Owners often find this idea counterintuitive, assuming that the CMc is providing services during construction that might have otherwise been performed by the architect, but quite the opposite is the case. CMc projects are often more complicated, and that means more work for the architect.

A typical example is cost management during a CMc project. Should the cost of the job begin to drift above the budget, the CMc may use various maneuvers to meet budget. "Value engineering," cost-cutting, and bid scope descriptions are ways that the CMc may stray well into the design team's territory during construction. If the team collaborates, changes can often be made and the design intent maintained. However, unilateral changes by the CMc often compromise that intent, and the architect needs to continue to act on behalf of the owner to see that the project is constructed in accordance with the contract documents.

CHOOSING CMc PROJECT DELIVERY

An experienced and reliable CMc can provide real value to a properly configured and staffed project. Such benefits might include the following:

- Up-to-date cost estimates with real-world numbers that reflect the CMc's insight about market conditions.
- Constructability advice that can reduce requests for information during construction.
- Document review to help reduce change orders during construction.
- Advice on packaging documents for multiple bids to make the AE team's work more efficient.
- With multiple bid packages, the ability to deliver a project much more quickly than would otherwise be possible. This is one of the CMc's greatest contributions to the owner.

But experience suggests that the architect should be aware of the following potential pitfalls with a CMc delivery model that is not operating smoothly:

- CMc proposal of an unrealistically fast schedule in order to reflect the owner's deadlines
- Unfamiliarity with the building type retarding realistic constructability analysis during design
- Cost estimates that are not based on careful design documents
- Adjustments to the GMP that don't reflect agreed-upon design intent
- Lack of coordination between fast-tracked bid packages
- Undocumented subcontractor direction, before or after bids, not aligned with design intent
- Lack of adherence to the GMP without ramifications

THE FUTURE OF CMc DELIVERY

CMc delivery is used in a substantial number of projects, particularly those where schedule challenges are paramount or the owner has a consistent business relationship with a builder with whom there is confidence in a CM approach. The advent of building information modeling (BIM), combined with integrated project delivery (IPD) methods will affect the processes and procedures of CMc. Since BIM is likely to become the basis of design process for future buildings, the entity that develops and manages the model can capitalize on their skill set in providing services to the owner. Collaboration on building projects will be based on shared access to the building model and transparent construction costs. This is an opportunity for architects and construction managers to work together toward the best possible projects for their clients. As that approach matures, architects can assist the owner in selecting a CMc that will provide the benefits of a CMc delivery, while avoiding the pitfalls.

9.3 Integrated Project Delivery Overview

Randy Deutsch, AIA

Integrated project delivery (IPD) methods enable project stakeholders to work together in a unified effort that shares, to varying degrees, the risks and rewards involved in design and construction. This article describes IPD as it is understood and practiced in 2012.

The building industry is inefficient, with almost a third of projects missing either budget or schedule targets. Designers and builders are separated by traditional delivery structures and contracts, creating distrust and preventing construction insight from making design more effective.

According to the AIA's research for the AIA Council of Architectural Component Executives (CACE), almost 40 percent of projects end up behind schedule and more

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than 60 percent over budget using traditional delivery models, but that percentage reduces by half for collaborative delivery models.

Owners expect significant improvements. One alternative to traditional design-bid-build or CM delivery models is an integrated approach that encourages the early involvement of project stakeholders, information sharing, and collaboration. One such response is the emergence of integrated project delivery (IPD).

▶ For other detailed discussions of project delivery methods, see the other articles in this chapter.

In integrated project delivery methods, the project team works together to define issues, identify potential conflicts, establish performance criteria, and increase efficiency. The ultimate goal is to create a collaborative environment that produces a positive outcome for all stakeholders, improves the quality of our built environment, reduces waste, and delivers more value to the owner.

IPD DEFINED

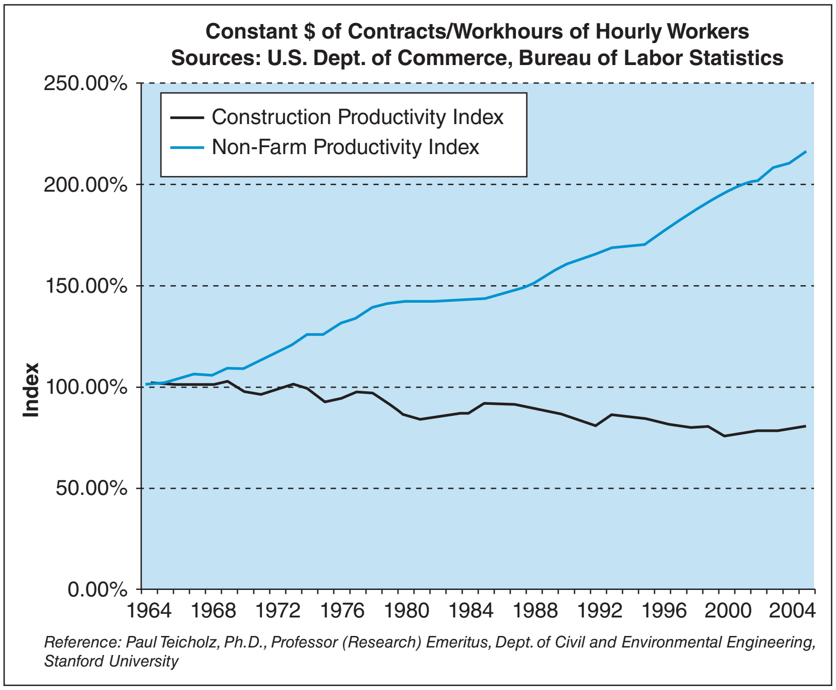
Integrated project delivery bridges the divide between design and construction to improve communication, better coordinate documents, and increase collaboration.

The American Institute of Architects defines integrated project delivery as "a project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction" (AIA/California Council, 2007).

As shown in Figures 9.4 and 9.5, construction productivity has not kept pace with labor productivity in other industries. IPD methods are seen as one way to address these negative trends.

If IPD were only a project delivery method, we would measure its success based on the criteria of cost, time, quality, and how the project ultimately meets its intended purpose.

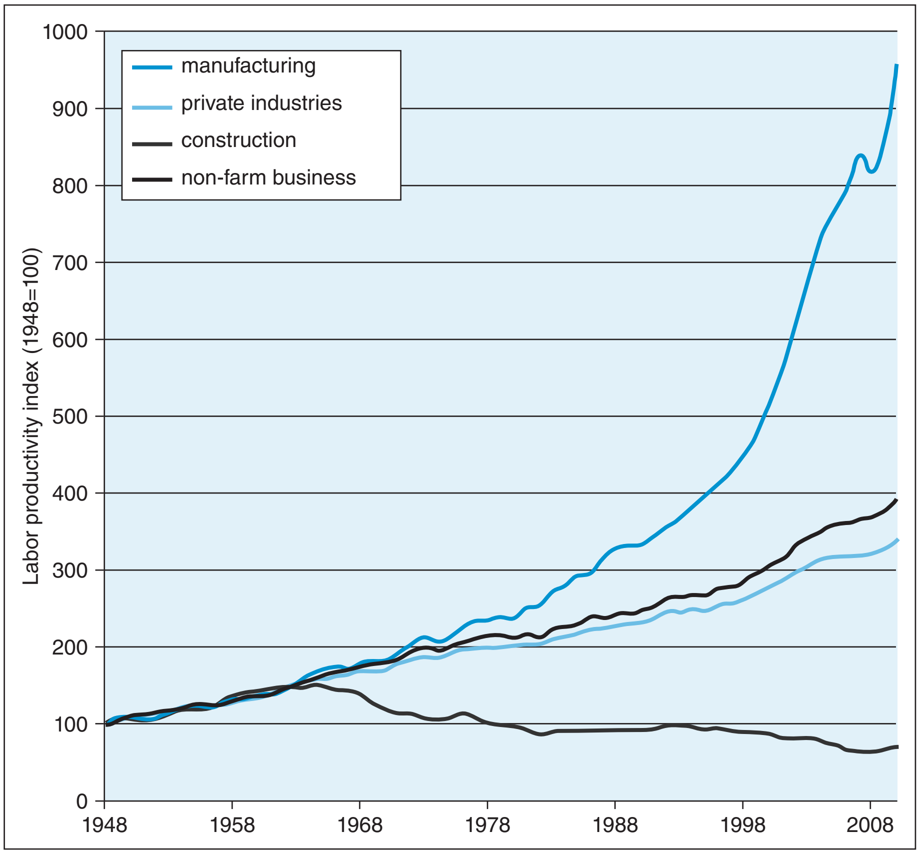
But IPD is also a contract strategy and a set of recommended behaviors—integration strategies sometimes informally referred to as IPD-lite or IPD-ish to distinguish them from "pure" IPD—and so the definition of IPD continues to evolve, depending on a project team's goals and tolerance for risk.



Randy Deutsch

FIGURE 9.4 Construction Productivity Index

PART 3: PROJECT DELIVERY



Randy Deutsch

FIGURE 9.5 Labor Productivity Index

Defining Characteristics of IPD

Integrated projects are uniquely characterized by these elements:

- A formal, binding multiparty contract structure that includes, at minimum, the architect, owner, and builder
- Shared risk and reward by these stakeholders
- Support of key IPD principles
- Participation of all project stakeholders early in the design/decision-making process
- Design and construction processes focused on optimal outcomes
- Collaboration among the owner, architect, and contractor
- Indemnification from litigation for those on the project delivery team

In fact, by agreeing to not sue each other, primary stakeholders help create a safe working environment for the project. Traditional delivery methods often encourage self-protective behavior designed to shift or avoid risk; such behavior discourages collaboration.

Fundamental Principles of the IPD Approach

There are 10 fundamental characteristics of IPD.

1. Mutual Respect and Trust

In an integrated project, the owner, architect, contractor, subcontractors, suppliers, and consultants contractually pledge to respect each other and commit to working in the best interests of the project.

Participation in IPD requires trust in its systems and processes and a belief that information sharing during the design process leads to improved results. IPD also depends on trusting relationships that are open and transparent throughout the project.

Because it takes time and face-to-face interactions to build trusting relationships, teams that have worked together before often have the best chance of success for IPD. Collaborative organizations and teams rely openly on trust, on the belief that project team members are fundamentally capable of drawing the best from people and providing them with the means to succeed (David H. Hart, "Developing Trusting Collaborative Relationships," Oct. 25, 2007, blog.aia.org/aiaarchitect/2007). In integrated delivery, the owner sets the stage for a trusting project team environment by transparently sharing project-related information, valuing input from all project stakeholders, and trusting their own project team members to successfully get their work done.

2. Mutual Benefit and Reward

IPD is designed to align the interests of the project team so that everyone mutually benefits from project success. According to AIA/CC, IPD compensation structures recognize and reward early involvement based on the value added by each team member. In multiparty agreements, incentives are sometimes tied to achieving project goals and to rewarding behavior that promotes project success. IPD team members share project losses and gains from the same profit pool, providing an incentive for team members to work collaboratively. Profit in such arrangements may be paid collectively—paid to all or none—further aligning mutual interests.

3. Risks Identified and Accepted Early

All parties benefit equally when the most important decisions are made mutually for the best interest of the project. Similarly, when one party makes a mistake, the whole team is responsible and works to reconcile the error, challenging traditional notions of liability. This is the basis of shared risk and reward. With IPD the lines of responsibility are blurred when compared to traditional design-bid-build project delivery. Contractors contribute to the design and architects address construction issues, with risk distributed across the team. Because of the early involvement of all stakeholders and the expansion of traditional roles, risks can be identified and addressed early, making it more likely that they be mitigated well before construction begins. Thus, IPD is often characterized by the counterintuitive notion that embracing additional risk (through risk sharing) results in lowering the exposure to the project team.

4. Collaborative Innovation and Decision Making

The promise of IPD is that freely sharing information among all project participants leads to more innovative, informed, and balanced decision making. Ideally, in IPD ideas are judged on their strengths, regardless of the status or role of the contributor. While the expertise and judgment of each individual team member is valued, arriving at innovative ideas and creative decisions can be enhanced when accomplished collaboratively. Critical decisions are reviewed by the project team and, where possible, decided by consensus.

5. Early Involvement of Key Participants

The involvement of core team members from the earliest practical moment is key to an integrated approach. IPD requires the architect and all major stakeholders to be at the table with the owner early in the project development process. The timing of each team member's input is critical to the success of the project from early involvement of the project team, including consideration of the optimal time to engage manufacturers, subcontractors, and suppliers. Early involvement of key participants improves decision making and encourages the generation of informed alternatives for solving project problems as they arise.

6. Early Goal Definition

In IPD, project goals are jointly identified, established, and agreed upon by all participants before execution of a full contract for design and construction services. Agreement about the basic characteristics of the project, including program, cost, and schedule, is the foundation from which the team agrees to accomplish the project.

7. Intensified Planning

The IPD process recognizes that increased and concentrated effort in a project's earliest stages will result in improved outcomes, including increased efficiency and cost savings during construction.

8. Open Communication

IPD's promise of better team performance and results is based on the principle of completely open communication channels throughout the design and construction of a project, achieved by the elimination of traditional barriers to open communication. Disputes, when they do occur, can be promptly resolved in an open and transparent manner. Instead of dwelling on which party may be liable, collaboration and mutual indemnification leads to increased and open communication. Open communication begins with the owner, who must voluntarily share information, thoughts, preferences, and requirements with the rest of the team.

9. Appropriate Collaboration Technology

Early in the planning process, the IPD project team must identify and select the various technologies to be used throughout the design and construction of a project. No particular technology is right for use on all integrated projects. Each team has to decide—based on each participant's comfort level, familiarity, confidence, and experience—which technologies are appropriate to achieve the desired project outcomes. Regardless, the technology chosen must enhance collaboration and enable communication among all project participants through open and interoperable data exchange.

10. Organization and Leadership

► The backgrounder on The Need for Integrated Project Leaders (9.3) discusses the skills, talents, and traits of successful integrated project leaders.

Multiple leadership roles are played throughout an integrated delivery project. These leadership roles are determined on a stage-by-stage basis by the team. In general, the team member most appropriate for the role, skillful and experienced with the work at each portion of the project, will rise to lead the team through that phase.

IPD PROJECT CRITERIA AND CONDITIONS

While IPD is an innovative approach to project delivery, it may not be appropriate for all projects. Several considerations may combine to determine if a project should be executed under IPD.

Owner Involvement

While IPD is primarily an owner's decision, not every owner has the interest, time, or authority to participate fully in an IPD process. Some owners want the results of IPD without requiring that IPD be used in their project. Other owners may be reluctant to expend the energy and effort necessary to collaborate effectively. Owners may have no interest in addressing the unfamiliar terms of the IPD agreement, or may be skeptical of the reported cost and time-savings from the IPD process. While design and construction professionals may present a convincing scenario, the fact remains: IPD cannot work without a committed owner.

If the owner does not participate fully as a team member, the team's ability to make timely, fully informed, and integrated decisions will be negatively impacted. An owner's inflexibility when it comes to process and procedures can constrain the team's ability to make decisions on a timely basis. Public owners might be further constrained by public procurement laws that favor other delivery methods. Despite these hesitations, the first condition is that the owner drives IPD.

Project Size, Type, and Complexity

All sizes of projects can benefit from an IPD approach. IPD will be effective for smaller projects when it is defined and structured. This must be done in a way that minimizes upfront expense and time commitments that may be hard to justify on a smaller project. Smaller firms may have the ability to address issues nimbly and flexibly even though they lack the resources available to larger firms.

Due to complexity and scope, IPD may seem more appropriate for some building types than others. One building type commonly associated with IPD is the hospital, primarily due to the owner's familiarity with construction, complex building systems, and need for current technologies. However, many other building types also lend themselves to the IPD process, including commercial and institutional projects, so type of building should not constrain those considering IPD for their project.

Complex projects seem to benefit the most from an IPD approach due to the early involvement of the collaborative team. Ideally, IPD might be suitable and beneficial for any project—small or large, simple or complex. The criteria, constraints, and conditions mentioned in this section will help team members consider whether integrated delivery processes are appropriate for their project. As IPD project protocols become more widespread, the methodology will become more accessible to a broader constituency of participants.

IPD CONTRACTS

IPD is a delivery method that engages teams and changes the roles and behavior of team members when compared to traditional project delivery. The contractual principles below apply to "pure" IPD but can be selectively applied to integrated or "IPD-ish" contracts. To take part in pure IPD, an IPD agreement must be executed.

The IPD agreement:

- Is a contractual arrangement among multiple parties uniting the owner, architect, and contractor together in one agreement
- Is a contract based on a relationship of trust and mutual respect between the parties
- Establishes procedures that encourage specific behavioral norms
- Specifies the obligations team members have to one another

IPD CONTRACTUAL PRINCIPLES

- Key participants bound together as equals
- Shared financial risk and reward
- Decisions based on project outcome
- Liability waivers between key participants
- Fiscal transparency between key participants
- Early involvement of key participants
- Jointly developed project goals and targets
- Collaborative decision making

► See the backgrounder on IPD Agreements in Project Team Agreements (17.2) for more information.

Multiparty Agreements for IPD

A standard IPD agreement is a single contract executed by the owner, architect, and contractor, representing a change from the way construction project participants have traditionally allocated risk. Standard multiparty agreements are template contracts made specifically for IPD. They are "multiparty" agreements because core team members sign one contract instead of each party signing separate contracts with the owner, engineers, and consultants. Standard multiparty contracts for IPD expand traditional responsibilities for scope of work by key participant and shift the distribution of risk.

Perhaps the greatest challenge in working with multiparty agreements is the change to work that is collaborative. Drafted with everyone's participation, the contract encourages communication among the team members prior to commencing work and reminds all parties that this is not business as usual. These conversations can create resistance, but they can also result in much stronger teams with greater alignment on key issues and project goals. People are the most complex variable in the IPD process: To overcome resistance to change, and avoid litigation, it is best to communicate early and often.

IPD BEHAVIORAL PRINCIPLES

- Mutual respect and trust
- Willingness to collaborate
- Open communication

Determine the outcomes you desire, then assess the behaviors and processes you believe are necessary to achieve those outcomes. Only then do you decide what structures best support the behaviors and outcomes. It is at this last stage, not at the first, that the choice of project delivery method becomes evident.

—Howard W. Ashcraft Jr., LinkedIn discussion comment, 2011

IPD Behavioral Norms

IPD is not just about contracts; it is also a set of behaviors. IPD conforms the contract terms to the desired behaviors while protecting the project's team members. IPD creates an environment where behaviors can change in order to facilitate the process. Behaviors supported by the contract—especially optimizing collaboration and transparency—are meant to heighten team members' resourcefulness and their ability to innovate.

THE IPD TEAM

The team is the most important element in integrated project delivery.

Team Structure

The core IPD team, in simplest form, requires an owner, an architect, and a contractor. IPD teams usually include members other than this basic triad of key players but certain players (like a specialty consultant or sub) can be procured outside the IPD contract. Because large teams can sometimes be less productive, large projects with large teams often require teams-within-teams or cluster groups. Similarly, smaller teams might be less diverse and, as a result, could be less innovative. Irrespective of team size, select people for the core team who are critical to the project's success.

Team Experience

Teams will range from those with significant IPD experience to those who treat their pilot IPD project as a learning experience. First-time IPD teams often encounter a steep learning curve, which can be made less steep by involving those who have experience working together and by taking on less-complex projects.

Team Selection

The goal in team member selection is competency, access to a wide knowledge base, diverse points of view, and demonstrated ability to work together. IPD team members must value interdisciplinary collaboration, and have the ability to be nimble, flexible, and responsive. In IPD, where team member roles are expanded, all involved have the opportunity to contribute to the design intent, and architects can safely contribute to the means and methods. IPD removes barriers that, in traditional project delivery, kept design and construction professionals from collaborating.

BENEFITS OF PURSUING IPD

While it might be argued that a successful project is of most benefit to the owner, IPD is designed to share the rewards of that success across the members of the project team.

Benefits to the Owner

IPD provides the owner with the following benefits:

- *Predictability*. IPD can provide owners more predictable outcomes because of collaborative processes, alignment of goals, and early involvement of all stakeholders.
- *Reduced risks*. Along with predictability comes risk mitigation. People resist change because of real or perceived risk. According to Symphony LLC Partners, "remove the risk, remove the resistance."

- *Improved overall experience*. When issues do occur, IPD provides a process for dealing with inevitable unknowns. Energy is not diverted to blame and self-protection.
- *Greater flexibility*. IPD allows owners the ability to make decisions later in the design and construction process.
- *Better overall project experience*. IPD promises the elimination of adversarial relationships (typical of traditional delivery methods) and more communication, innovation, and efficiency.
- *Increased owner value*. The inherent efficiency of the IPD process reduces productivity loss in construction, thus the owner receives better value at less risk.

Benefits to the Architect

IPD affords the architect the opportunity to:

- Design and facilitate the process.
- Lead collaborative teams.
- Communicate with others in myriad ways, including architects instructing subcontractors on how to proceed.
- Develop, analyze, and evaluate a model more quickly.
- Analyze and develop options until a decision is made at the last responsible moment.
- Share knowledge and data to address the full life cycle of the project.
- Participate in projects beyond a purely design role.
- Reduce risk while potentially increasing profit.
- Improve chances of achieving high-performance building outcomes and other goals.

Because documentation is optimized by collaboration of the architect and contractor, IPD frees architects to do what they do best, allowing them to spend less time in documentation and more time focused on their core competency: design.

Benefits to the Contractor

The contractor benefits from IPD by:

- Having an influence on construction input early in the design process
- Being made aware of and contributing to design direction and decisions by the entire project team
- Having potential to influence construction efficiency, resulting in lower overall construction cost and reduced project schedule
- Eliminating change orders by clearly defining the design documentation necessary for construction
- Working collaboratively, lessening the possibility of creating adversarial relationships

CHALLENGES OF IMPLEMENTING IPD

There are significant challenges in pursuing IPD. While design and construction professionals may struggle to adopt a collaborative approach, the greater challenge to integrated delivery processes is the skepticism of project owners. Owners who expect to award projects to the lowest bidder, for example, require that design be completed prior to bidding, which, in effect, excludes the possibility of an integrated process.

There are a number of factors working against IPD catching on and being fully adopted. First and foremost, the recent economic downturn has meant fewer projects and opportunities to implement IPD. People tend to act more conservatively in troubled economic times. The construction industry tends to be risk-averse and resistant to change. Public procurement restrictions have been mentioned, but other owner types—even entire industries—have held back from pursuing IPD due to questionable fit or suitability.

Perhaps the biggest challenge to widespread adoption of IPD is the amount of work that is involved in planning and organizing the team, the agreements, and the process.

A Committed Owner

IPD cannot work without a committed owner, who must:

- Trust the process.
- Have knowledge of the industry.
- Understand the impact of design decisions being made.
- Agree that the best decisions are informed by key participants early on.

The shift to early involvement shifts increased financial outlays to earlier in the project. This change may prove detrimental for cost-sensitive and speculative projects, such as those for developer clients. Many owners are not convinced that IPD will result in cost savings. At the time of this writing, there have not been enough "pure" IPD projects completed, or accompanying cost data available, for a true comparison of delivery methods.

Owners sometimes believe that they are purchasing a product when what they are actually acquiring is a complex combination of services, knowledge, and commitment to their project. In other words, with IPD owners are investing as much in a collaborative process as a product.

Expanded Roles and Disciplinary Boundaries

In IPD, key participants are encouraged to contribute to the design intent, just as designers are free to comment on and contribute to means and methods of construction. While intended to remove obstacles and encourage collaboration, architects are sometimes threatened by the blurring of roles brought about by working in IPD. Participating in integrated delivery requires architects to redefine their position relative to the design and construction process. The blurring of roles can be seen as an expansion of services, depending on how broadly design is defined, and can result in a positive outcome for the architect.

Collaboration vs. Do-It-Yourself

In IPD, collaboration is non-optional, foundational, and fundamental to its realization—and yet another challenge to its pursuit. Collaboration thrives in the safe environment created by IPD, empowering participants to engage in ways that result in more predictable outcomes. However, collaboration cannot guarantee consistently better results compared to working independently.

Collaborating is sometimes hard. Design professionals often have individualistic ways of working. This may be antithetical to the way many architects design projects and may be more interactive than their usual approach.

If owners could obtain diverse knowledge, breadth of expertise, and increased innovation with all key participants working independently, pursuit of IPD would seem unnecessary. Yet, trends in the construction industry productivity indicate an inability to achieve acceptable results using traditional, non-collaborative delivery methods. Despite challenges, increasing numbers of owners and design professionals are seeking out opportunities to work in integrated teams.

Legal Issues

Until IPD becomes easier to implement, architects will continue to find creative ways to work around the legal obstacles to using IPD, such as the hybrid approaches described below. Legal barriers to IPD include:

- Fluid information sharing
- Unsupportive insurance policies

- Collaborative rather than distinct responsibilities and liabilities
- Inconsistent state licensing laws

IPD principles stipulate that information produced by one party is to be made freely available to all the other team members. In terms of file sharing, some firms are concerned that the time and effort they have invested into modeling proprietary information or intellectual property becomes freely available for others to use when the model is shared among parties. This also raises the question of confidentiality, as well as liability, should the information that is borrowed without permission turn out to be faulty or misapplied. IPD exists to take advantage of information and knowledge sharing. Until barriers to sharing are satisfactorily removed, project participants will find ways to work around these and other legal challenges.

Insurance Issues

Insurers have had difficulty in confidently underwriting integrated project delivery. Insurance remains a sticking point for many teams trying to undertake an IPD approach. Some project teams continue to use traditional insurance and other standard professional liability products with the belief that special insurance isn't required in order to participate in IPD. Contractors might add professional liability to their insurance package, enabling them to participate earlier, as encouraged by IPD, in the form of preconstruction services.

There are new IPD insurance products offered by insurers, including IPD wrap type and other project-specific insurance products. AIA Contract Documents recommend working with an insurance consultant to assist in obtaining integrated team insurance.

▶ Risks and Emerging Practices (16.3) addresses the legal and insurance issues relating to IPD.

HYBRID APPROACHES: IPD-ISH, IPD-LITE, AND CONTRACT-FREE IPD

When a pure IPD approach through a multiparty contract is not possible for the reasons explained above, project teams may attempt to apply integrated principles to standard project delivery paradigms. They can be applied to a variety of contractual arrangements—some think of IPD as a set of philosophies that can be applied to various delivery methods. But only IPD requires that all participants place the success of the project ahead of personal gain—something that is very difficult to achieve voluntarily. Too often, such ideals are abandoned in the face of challenges without a structure in place for their amicable resolution. While design professionals are capable of working selflessly, voluntary collaboration is often fragile and should therefore be supported by integrative contract provisions.

IPD Without a Multiparty Agreement as an Intermediate Step

Architects have developed many ingenious ways to apply integrated strategies to typical delivery approaches (see case study). Hybrid IPD (IPD-ish or IPD-lite) projects follow or adapt IPD contractual and behavioral principles without strictly adhering to the constraints of the "pure" delivery method, including the use of multiparty agreements. There are certainly advantages of the IPD-ish approach. There is no checklist defining what a hybrid approach is, with agreements ranging from that required by a multiparty contract to no contractual obligation to collaborate.

Challenges of the Hybrid IPD Approaches

While IPD requires people to behave and engage differently, hybrid approaches—as sets of principles and philosophies applied to any project delivery method—don't have

HYBRID INTEGRATED PROJECT DELIVERY CASE STUDY

Project: Consolidated Forensic Lab

- Type: Government building
- Completed: 2011
- Location: 4th and School Streets, SW, Washington, D.C., USA
- Architect: HOK WDC
- Contractor: Whiting-Turner
- Area: 351,000 GSF (287,000 NSF) six-story building with two additional underground levels

As a highly complex and multidimensional organization, Consolidated Forensic Lab (CFL) needed to combine and collocate multiple independent groups into a single, state-of-the-art facility. CFL intended to realize significant operational and space efficiencies and sought to improve the Washington, D.C., crime-fighting and public health capabilities.

The project involved a complex program and a challenging site located in a dense urban area. The design team consisted of the architect and more than thirty subconsultants. With so much to coordinate, the owner insisted that the contractor complete a full 3D building information model.

The project did not use full IPD because it was awarded prior to IPD being completely defined. As a government owner, it was also constrained by public procurement laws that favor other delivery methods. The project team used a design-bid-build (DBB) delivery method but worked throughout in a spirit of cooperation.

In the DBB delivery method, the design team makes assumptions on how the work will be sequenced. These assumptions do not always work out as planned. An IPD-ish approach allows the team to coordinate and vet these assumptions early in the process.

The team took a low-tech approach of talking, openly and often, to make a high-tech approach function effectively. High-level representatives from each firm sat together in weekly meetings to go through the BIM and participate in a dialogue about the project.

THE IPD-ISH PROCESS

- Was leveraged to manage a great deal of complexity
- Allowed the owner, contractor, and design team to work together to craft the design, coordinate delivery, and control costs throughout the process
- Allowed the design team to quickly perform several different studies of the integrated façade design, and to organize about a dozen schemes for building design

RESULTS OF USING IPD-ISH MEASURES

- The actual contract value was $30 million less than the original design estimate of $165 million.
- The construction schedule was shortened by 6 months.
- Energy modeling achieved an expected 26 percent energy reduction over the ASHRAE 90.1 standard.
- The project achieved LEED® Platinum certification.

Documented benefits include cost, time, and energy savings from the use of BIM and the cooperative design and construction process.

Quotes from the project designer:

- "You have to be collaborative to achieve coordination like this."
- "The designer can't keep the contractor on schedule, but the designer can keep them off schedule."
- "We worked with everybody's interests in mind to facilitate the best outcome for the owner."
- "An IPD approach dramatically reduces the owner's risk, while the architect and contractor often take on more risk."
- "If your focus is on the owner's satisfaction, you will find a way to make IPD work."
- "In an IPD-ish approach, the team is under no obligation to coordinate—it is in the project's and owner's best interest to do so—especially to keep the contractor on schedule."

Timothy O'Connell, Sr. Project Architect/Project Manager, HOK WDC

these same constraints. Hybrid approaches address the "what" and "why" of IPD, without addressing the critical "how" it is going to work for all involved:

- How will it happen?
- How will a safe, risk-free collaborative environment be created?
- How will aligning people and processes come about?

The transformational requirements of full contractual IPD answers these "how" questions. When it is possible to commit to a complete IPD approach, outcomes are maximized.

CONCLUSION

Architects are becoming more familiar with collaborative processes and practices. The adoption of integrated project delivery methods encourages university architecture programs to foster student skills in leadership and teamwork. Architects will also be continually challenged to educate clients about IPD participation.

Despite the many challenges, owners will increasingly seek higher quality, lower cost, and faster schedules. Firms that are agile in collaboration and information sharing will be advantaged. While public sector procurement restrictions limit the use of IPD, public agencies such as the U.S. General Services Administration have shown flexibility by accommodating IPD-like principles.

To work collaboratively in IPD is to question the mind-set of the traditional practitioner. It is not necessary to be an expert in IPD or collaborative work processes to be open-minded, willing, and committed.

For IPD to catch on, contracts need to be tested in courts, the legal and insurance challenges need to be addressed, and greater education on the principles is required. In other words, these challenges need to be reframed as problems to be solved. To transform the profession and industry, there needs to be clear direction about where it is going, even if it is not going there today. IPD is one way to get there—and may be the best and highest hope for achieving shared professional goals and objectives.

For More Information

Integrated Project Delivery: A Guide (AIA, 2007): http://www.aia.org/contractdocs/AIAS077630.

Primer on Project Delivery, 2nd edition (AIA and AGC, 2011): http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab093116.pdf.

BIM and Integrated Design: Strategies for Architectural Practice (Wiley, 2011) by Randy Deutsch, AIA, LEED AP: http://www.wiley.com/WileyCDA/WileyTitle/productCd-0470572515,subjectCd-AR30.html.

Integrated Project Delivery: Case Studies (AIA/AIA California Council, 2010): http://www.aia.org/about/initiatives/AIAB082049.

Integrated Project Delivery: Updated Case Studies (AIA/AIA-Minnesota/University of Minnesota, 2011): http://www.aia.org/about/initiatives/AIAB087494.

PART 3: PROJECT DELIVERY

9.4 Contractor-Led Design-Build

Barbara J. Jackson, Ph.D., DBIA

In contractor-led design-build, a general contracting firm selects an architecture firm to form a design-build team, and together they prepare a proposal in response to an owner's request for proposal. If successful, the contractor holds the prime contract with the owner, and the architect enters into a contract with the contractor.

INTRODUCTION

The design-build project delivery model is characterized by a single point of responsibility to provide both design and construction services to the owner under one prime contract. The benefit of this approach is that the contractor who will build the project works together with the architect who will design the project from the earliest conceptual and schematic stages of design through design-development, construction documents, preconstruction, construction, and commissioning.

Barbara Jackson is a professor of construction management in the College of Architecture and Environmental Design at Cal Poly, where she also serves as director of the Center for Integrated Project Leadership. She is the author of *Design-Build Essentials* (Delmar Cengage Learning, 2010) and chairs the Policies and Standards Committee of DBIA.

This contractor-architect teaming arrangement, which usually begins at the proposal stage of the competitive design-build procurement process, is what allows for the various design and construction discipline experts to leverage their respective knowledge and experience to achieve integrated project solutions for their client. Once the owner selects the design-build team they want to deliver their project, the owner and the team work together to complete the design and deliver the project to the cost, schedule, and performance targets established by the owner. Because of this single-source responsibility and collaborative teaming arrangement, design-build has been found to be an effective project delivery method for clients who seek to optimize design value while adhering to strict schedule and budget constraints.

According to a study conducted by Victor Sanvido and Mark Konchar of Pennsylvania State University, design-build projects are delivered 33.5 percent faster than projects that are designed and built under separate contracts (design-bid-build). Sanvido and Konchar also showed that design-build projects are constructed 12 percent faster and have a unit cost that is 6.1 percent lower than design-bid-build projects ("Project Delivery Systems: CM at Risk, Design-Build, Design-Bid-Build," Construction Industry Institute Research Report: 133–11. April 1998). In February 2010, a study utilizing the GSA Capital Construction Database, conducted by Riecke Smith, Castro-Lacouture, and Oberle at the Georgia Institute of Technology, revealed that design-build delivered projects at an overall lower cost than design-bid-build, CM-constructor (aka "at risk"), or bridged design-build. The same study also revealed that design-build and bridged design-build have shorter time durations from design-start to construction-finish than either CM-constructor or design-bid-build ("Influence of Delivery Methods and Legislative Impediments on Project Performance Information," *Journal for the Advancement of Performance Information and Value* Vol. 2, No. 1, February 2010).

Contractor-Led Design-Build

In contractor-led design-build, the contractor holds the prime contract with the owner and is responsible for leading the multidisciplined team, managing the design-build process start to finish, and delivering both the design and construction as an integrated project solution.

The contractor-led design-build model is by far the most prevalent in the industry. According to the 2007–2008 Design/Build Survey of Design and Construction Firms, published by Zweig White, it is estimated that general contractors hold the prime contracts with owners on 56 percent of all design-build projects. This compares to 12 percent for AE firms, and 27 percent for integrated firms. This predominance of contractor-led design-build should come as no surprise given the capitalization requirements associated with carrying the cash flow burden and risk for both the design and construction of projects. Because the design-build model has become such a popular approach for owners, there are very few general contracting firms today that do not count design-build projects as some portion of their overall business development plans.

Design-Build Procurement

Traditionally, architects have been selected by owners based on qualifications under the qualifications-based selection (QBS) procurement model. Traditionally, contractors have been selected based on low bid procurement, in which the builder submits a bid to the owner in response to a completed set of plans and specs prepared by an architect hired by the owner. Although QBS design-build procurement can be used for any private project and some public projects, the most common procurement approach for design-build is Best Value. Best value procurement is a two-step process that takes into account a DB team's qualifications, proposed technical solution, and proposed price. The first step puts out an RFQ in which the construction firm and the architecture firm submit their qualifications to the owner as a team. Experience, past performance, reputation, financial capability, and other qualification factors are considered. Once the owner evaluates the qualifications packages, he/she will typically short-list the top three teams to go to the next level of the competition. The second step of the best value competition is the request for proposals (RFP). This step will typically require the DB team to prepare a conceptual design, a price, and a schedule for the project, in addition to any other project requirements in response to the criteria in the owner's RFP.

The owner's goal in choosing best value as their design-build procurement approach is to achieve the greatest value in terms of the design and other non-price factors such as quality, schedule, and performance relative to their dollar investment.

THE DESIGN-BUILD PROCESS FRAMEWORK

Design-build is distinct from traditional design-bid-build processes in every phase of the work. Figure 9.6 illustrates the overall design-build process framework from the preproposal stage to the construction stage, and the various steps that are commonly executed under the contractor-led approach. The focus of this article is on the proposal development stage, the immediate post-award stage, and the design stage.

Proposal Development Stage

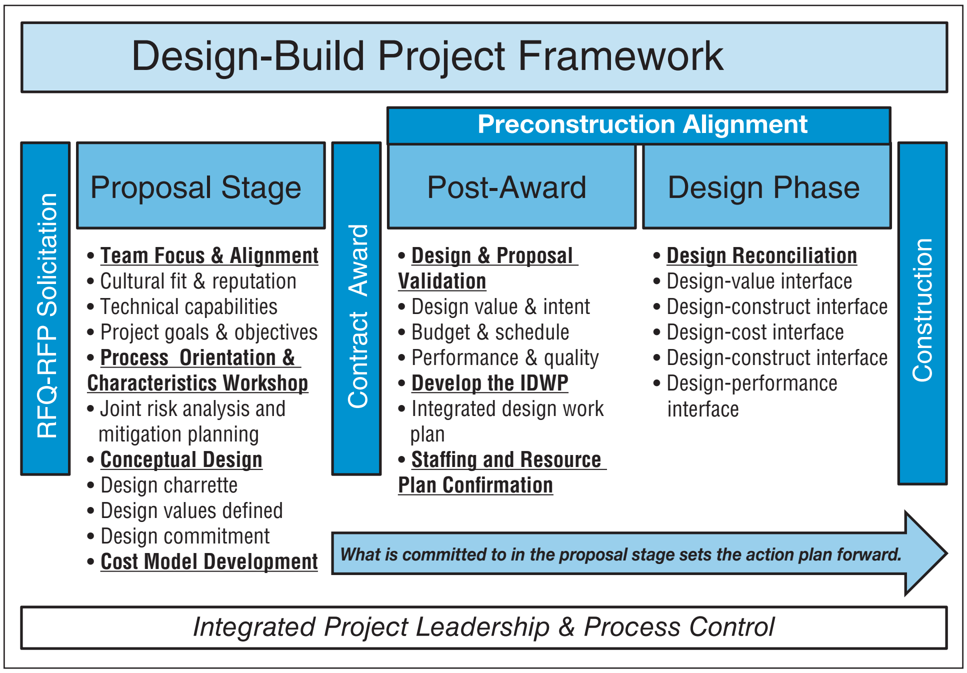
The proposal stage is where the groundwork is laid for the entire design and construction execution plan that ultimately delivers the project to the client. There are several unique tasks that occur at this stage in the typical contractor-led design-build process. The primary purpose of this stage is to develop and submit a proposal to the owner that meets all of the requirements spelled out in the owner's RFP and from which the owner will select the design-build team. Preparation of the proposal typically includes the following steps.

Different contractors may have different names for the various steps identified under each of the framework stages, but the purposes of each step are similar.

Making the Play or Pass Decision

Contractor-led design-build begins with the contractor reviewing the owner's RFQ and RFP. If the project is of interest to the contractor, they perform proper due diligence and a risk analysis. There are several factors considered in this analysis. For example:

- Will the competitors be short-listed after the RFQ process?
- Is the procurement low bid or best value?



Barbara J. Jackson, Ph.D., DBIA

FIGURE 9.6 Design-Build Project Framework

Information regarding how many teams the owner will short-list between the RFQ and RFP phases of the solicitation is usually found in the RFQ. If the owner does not limit the short-listed teams to three or four at the proposal stage, many contractors will decide not to "play" and will decline to submit a proposal.

- What is the contract format, lump sum, GMP, target price, or other?
- Is the project duly funded?
- Does the contractor have the required project experience and expertise?
- Does the contractor have a geographic advantage?
- Is there a political component to the competition and what might be the ramifications?
- Are the owner's scope, schedule, and budget realistic?
- Who will make up the selection panel, and what types of criteria will be evaluated?
- Is there a pool of qualified architecture firms available to team with?
- If it is determined that the risk-reward potential is realistic, then a decision is made to go after the project. At this point the contractor will begin to put together their project pursuit team, starting with the selection of a qualified architecture firm.

Team Selection and Formation

The power of the design-build process lies in the team. Unlike traditional design-bid-build, in which the project architect and project contractor are arbitrarily paired by an extremely unpredictable low-bid selection method, in design-build the individual design and construction parties get to pick who they want to go to the dance with. The teams are self-selected, and, given this intentional pairing opportunity, picking the right partners often results in a competitive advantage that leads to success.

The contractor-leader must select architecture team members that have compatible experience in the project type and design expertise identified and required by the owner in the RFP. Most contractors will also check for cultural fit and team alignment as they choose their architects. Cultural fit has to do with the personalities of the two firms. For example, some firms are very structured in their dealings while others are more informal. Likewise, it is important that the two firms share similar values, principles, and beliefs and have fundamental agreement on overall project goals and objectives. Alignment with these basic core project issues will either make or break the teaming relationship and strongly affect project outcomes. Characteristics that contractors identify as being important to them when selecting architects include the following:

- Relevant project experience and technical competence
- Design-build knowledge and experience
- Reputation for design quality and expertise
- Responsiveness to cost and schedule constraints
- Adaptability and responsiveness
- Staffing and project management capabilities
- Communication, collaboration, and trustworthiness
- BIM proficiency and compatibility
- Presentation skills
- Financial health and business savvy

Contractors leading design-build projects commonly look first to architecture firms with which they have previously worked, and seek out individual architects within those firms with whom they have had good experiences. But these previous relationships do not always match up with the requirements and expectations of the owner and the RFP. In very competitive project pursuits, contractors frequently seek out firms who are known to be the best-in-class relative to a specific project type and quality, or with those whom they know the owner already has a good working relationship.

Characteristics that architects have identified as important to look for when deciding whether to join the contractor-led design-build project team:

- Experience working with architects
- Experience with design-build, design-assist, or IPD
- Design sensitivity and respect

- Technical competence and reputation
- Strong preconstruction support
- Conceptual estimating skills
- Bonding capacity
- Financial health
- Reputation for quality
- Reputation for fair dealings

In any new design-build teaming arrangement, it is critically important for both parties to take the time to openly examine and discuss respective views about the project, client, and firm cultures and values. The good news is that this vetting can take place before there is a project to pursue. Although rare, today there are some managers of business development units within construction companies who are reaching out to architecture firms in an effort to establish common goals and strategic initiatives in advance of project opportunities. Likewise, architecture firms that wish to tap into the design-build market may initiate similar proactive relationship building to prescreen potential construction teaming partners. Once a contractor-architect team learns how to work together and has success pursuing and delivering design-build projects, they often decide to work together again.

In many instances, the contractor will also include specialty contractor teaming partners such as mechanical, electrical, or plumbing contractors to support the proposal development effort. It is not unusual that some of the specialty contractor team members selected by the general contractor, like the mechanical, electrical, and structural subs, are integrated design-build firms with in-house engineering capabilities. These specialty contractors become both design and construction teaming partners. From an architect's perspective, having such engineering expertise on the design-build team at the proposal phase allows for integrated project planning to begin at the very earliest stages of the project design and budgeting process.

Not all general contractors bring the specialty contractors onto the team at the proposal stage. But many who follow the DBIA best practices do. Some will wait until after the contract is awarded by the owner.

Project Orientation and Characteristics Workshop

The proposal development process typically begins with a kickoff meeting. This initial gathering is important in that contractor-led design-build teams are most often formed as one-off temporary organizations that exist solely for servicing the project, and that disappear after the project is completed. Team members often meet for the first time at the proposal stage. The ability to build trust is limited by the temporary nature of the teaming arrangement, so the key purpose of the kickoff event is to allow individual team members to get to know one another and begin to understand the nature of the teaming arrangement, expectations, accountabilities, and concerns. Because each member of the team may have different levels of understanding and/or experience with design-build, this is also an opportunity for the contractor to orient everyone to their company's approach, articulate their goals and objectives for the project, and identify the expected roles and responsibilities for each of the team members. A formal teaming agreement will further articulate the expected roles and responsibilities of the parties.

The kickoff meeting will also include an examination of the project requirements and identification of critical success factors in preparation for developing the overall design approach in order to be both responsive and competitive. This meeting is often the first opportunity for the architect to voice an opinion about design direction and how such a direction will be a competitive response to the owner's RFP.

In addition to the kickoff meeting, it is a good idea to conduct a more intensive planning meeting, often referred to as a project characteristics workshop. This is an opportunity to integrate various perspectives on risks and strategies on how best to mitigate those risks. It is recommended that a joint risk assessment and mitigation plan be developed. The workshop should include input from subconsultants, subcontractors, and perhaps even major vendors. Unfortunately, the more common approach is for each party to go off and do its own independent risk analysis and mitigation strategy,

Some contractors may initiate a formal "partnering" or "teaming" workshop conducted by a third-party consultant as part of the initial project kickoff.

but this may prevent each party from being fully aware of the risks associated with the project and being clear about what they are getting themselves into before going forward with the significant work associated with developing the proposal.

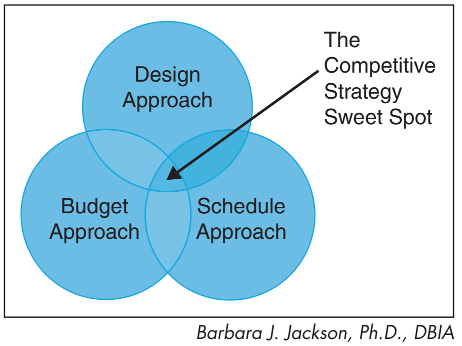
Developing a Win Strategy

After the contractor has completed the project orientation and characteristics workshop, a common next step is to brainstorm the "win strategy" for the project and discuss the team's collective advantage in pursuing the project. The strategy must include decisions about how to approach the design, budget, schedule, and other competitive factors. What is the unique advantage that can help the team win?

It is not unusual for the contractor to lay out their overall design and construction strategy for winning the project early in discussions, identifying what they believe must happen in order for the team's submission to be both competitive at the proposal stage and executable should the team win the project. Keep in mind that contractors have significant knowledge and expertise around project planning and performance management relative to budgets, schedules, quality, and safety for construction. Architects should expect them to apply some of the same tactics to planning the design strategy that they do to planning the budget and schedule strategies. However, in their efforts to try to hit the competitive "sweet spot," they aren't necessarily familiar with the nuances of the design process, and it is important that the challenges and needs of all three key deliverables of design, budget, and schedule be coordinated in the overall integrated solution. (See Figure 9.7.)

The use of design-build subcontractors to support the design effort often streamlines the design and construction coordination process and frequently leads to shorter schedules and earlier project completions, which is a common competitive factor in design-build.

For example, the contractor may elect to bring design-build subcontractors onto the team at the proposal stage. Design-build subcontractors have both design engineering and construction capabilities within the same company. In these instances, the contractor-leader intends for the subcontractor's engineers to play a key role in developing elements of the design. However, most contractors will still depend on their architect to lead and coordinate the design efforts of all design consultants, whether they are independent specialty engineers or affiliated with a design-build subcontractor organization. In some instances the design-build subcontractor's engineers may be assigned "engineer of record" accountabilities. In other instances these engineers may have a more limited role and only provide design assistance, supporting the architect and their design consultants relative to issues such as cost containment, schedule compliance, and constructability analysis. This is where some architects may feel the first twinges of not being in control of the design in the same way they are accustomed to under more traditional approaches to project delivery, especially approaches where they are working directly for owners. Bringing design-build subcontractors onto the team sets up a dynamic that may at first seem awkward or uncomfortable, but many architects report that the design assistance they receive from design-build subcontractors is quite valuable and streamlines the design and construction coordination process.



Barbara J. Jackson, Ph.D., DBIA

FIGURE 9.7 The Competitive Sweet Spot in Design-Build

Teaming Agreement Execution

At the proposal phase there is no formal contract for services between the contractor and the architect, only a teaming agreement that structures the relationship of the teaming parties during the proposal development phase, as well as the post-award contract execution if the team is successful in its pursuit. The actual contract for design services is not negotiated until after the notice of award is made by the owner, but the teaming agreement sets forth the intended contract expectations in an effort to avoid misunderstandings or surprises after the fact. There are a great many tasks associated with putting together a highly responsive, quality proposal, and there are also significant costs associated with such an endeavor. The teaming agreement should address both issues.

► See Project Team Agreements (17.2) for more detail on teaming agreements.

The teaming agreement identifies the roles, responsibilities, and expectations of the design-build team members relative to cultural issues, corporate and legal considerations, risk management, financial matters, and any other items of interest to the parties. Teaming agreements should be negotiated when the design-build team is first formed and prior to the commencement of any competition or actual proposal preparation activities. Some are more detailed than others, but here are a few of the important questions that a good teaming agreement will answer:

During the Proposal Development Phase

- Who will do what?
- Who will be responsible for reviewing the proposal prior to submission?
- Who will provide the technical oversight for the design?
- How will the costs associated with the proposal development be shared?
- How will confidentiality be maintained regarding proprietary information and strategies?

During the Post-Award Phase

- Who will be responsible for what tasks during the contract performance phase?
- How will the design and construction work be coordinated?
- How will design and construction errors be handled?
- What will be the protocol for engaging the client during design reviews and approvals?
- What will happen if team members do not honor the commitments spelled out in the teaming agreement?

Developing the Conceptual Design

Most design-build RFPs require the submission of a design and a project budget as key components of the proposal package. Some owners choose to begin the design process before they issue the RFP and will include some conceptual or schematic design in the RFP. This approach, referred to as bridging or bridged design-build, is typically the least preferred by experienced design-build contractors and architects because the team's creativity, innovation, and problem-solving capabilities are often constrained by the preliminary design provided by the owner in the RFP. However, some owners have legitimate reasons for prescribing design in their RFP, such as regulatory or operational standards that must be adhered to. Either way, there is usually a fair amount of design required at the proposal stage of the competitive DB process. The extent to which the design is developed depends on the deliverables required by the owner's RFP. In some cases the design level at the proposal stage is conceptual only and may include as little as basic floor plans and elevations, along with a site plan and an outline specification. In other instances, the design is carried to the schematic or even the initial design development stages.

Most contractors will ask their architect to organize a design charrette exercise to launch the design effort, in which several members of the construction side of the team participate, including major subcontractors, the project superintendent, and key subconsultants. Between the owner's program and project requirements spelled out in the RFP, the design charrette, and the various kickoff meetings, the team will agree to the design direction for the project.

In order to create a more precise cost model, the contractor may require the architect or other design consultants to carry the design at the proposal stage beyond what the owner is asking for in the RFP. This may be especially true for high-risk or high-dollar design elements. These more detailed drawings may or may not be included in the proposal package. The key is that the architects (or engineers) are fully aware of the level of design detail that they will be expected to develop and deliver at the proposal stage, so that they can properly plan and anticipate staffing and resource needs. These discussions and agreements are most often a part of the project characteristics workshop or win strategy meetings, and should ultimately be spelled out in the teaming agreement.

Developing the Cost Model for the Project

Once the initial conceptual design parameters are agreed upon, which may occur before or in parallel with the conceptual design, the contractor will develop a conceptual estimate or cost model. The cost model takes into consideration the specific project at hand relative to similar project "models" from a historical cost perspective.

One of the foundational principles that allow the design-build process to work is a practice that design-build contractors often refer to as "designing to budget." The Lean Construction and IPD community refer to this same principle as target value design (TVD) or target costing. The LCI defines TVD or target costing as a practice that incorporates cost as a factor in design to minimize waste and create value. The cardinal rule is that the target cost for a project should never be exceeded. In traditional design-bid-build project delivery, cost follows design, but on projects where the "design-to-budget" or TVD approach is used, the project cost or budget directs the parameters of the design to see that the target cost is not exceeded.

Releasing proprietary cost information is probably the area where contractors feel the most exposed. Because they are accustomed to competing in a low bid environment, openly sharing pricing tactics and cost information is a new experience. But in order for the design to budget practice to work, architects need detailed cost information that only the contractor can provide. Likewise, many architects report that they are initially taken aback by this approach and feel that such targets constrain their creativity. But once they become accustomed to the practice, several have reported that having such cost information as a guideline often eliminates unnecessary redesign work.

In some instances, contractors will build a cost model based on the owner's program during their risk assessment exercise to determine whether the owner's budget is realistic before they engage the architect in the design process.

The initial cost model is usually developed as a Uniformat conceptual estimating model that represents project costs as a series of systems. Each system is broken down into a series of subsystems. For example, in Figure 9.8 the main system identified is the Shell (B). The next subsystem is identified as B20–Exterior Closure. Exterior Closure is broken down into the subsystem B2010–Exterior Walls, etc. In most cases, costs presented at the first three levels of the Uniformat are adequate enough to provide useful guidance to the architect. There is an overall cost, unit cost, and quantity limit given to each system and subsystem. These are the parameters used by the architect in developing the design. The cost model must be aligned with the original design scope for it to be useful. However, design is a dynamic, iterative process and the scope and cost must be constantly reconciled. The key is to know immediately when scope and cost begin to diverge so the team can make adjustments as necessary to remedy the variance.

Proposal Preparation Cost

Different team members will invest varying amounts of time and dollars in the typical DB pursuit. It's important for the team to discuss the compensation and reimbursement terms whether the team wins the project or loses the project. And if the owner

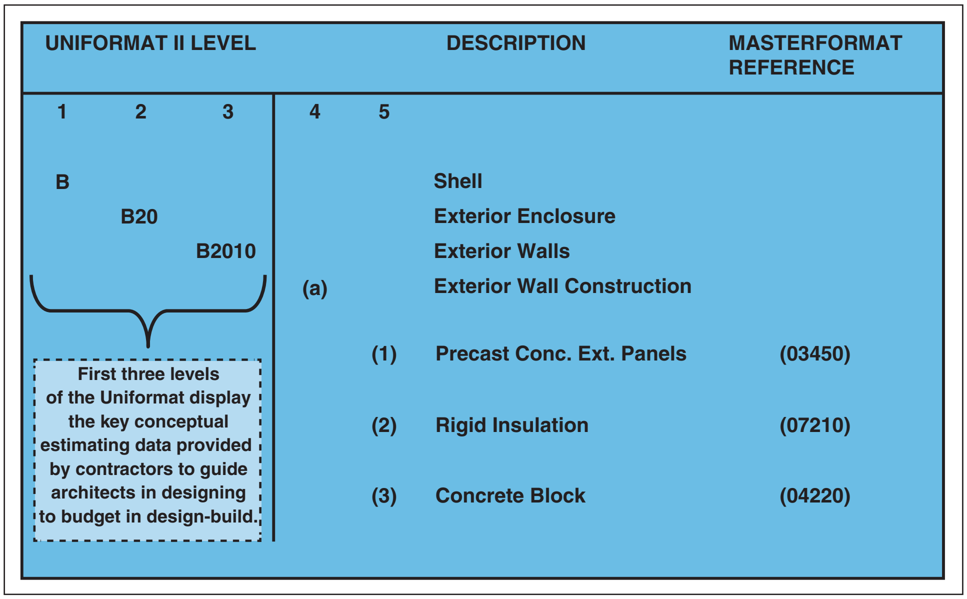


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FIGURE 9.8 Conceptual Estimating Uniformat Hierarchy

does offer an honorarium to the non-winning teams, how will the honorarium be split? Today, most contractors give the entire or almost the entire honorarium to their architecture team member because the bulk of the hours associated with the proposal effort are design. However, the honorarium is never enough to cover the cost of the design preparation in total, no matter how "preliminary" the design deliverables are. It is estimated that the average honorarium only covers approximately 15 to 20 percent of the actual cost to prepare a good proposal. How the rest of the costs are covered usually boils down to the individual negotiations between the contractor and their architect. In some instances, depending on the size of the project, the architect will take on the proposal prep cost at risk just like the contractor does in hopes that the team wins the project, at which point both would be reimbursed for their prep costs out of the project budgets. In other instances, the contractor will negotiate with the architect and agree to pay for the prep cost up to a fixed amount based on an agreed-upon staffing plan, base rate, and payroll tax burden, less profit. (The profit portion of the preparation costs would only be paid if the team wins the award.) These initial fee negotiations usually only cover costs from the proposal preparation stage through to the design/proposal validation exercise at the post-award stage of the process.

Immediate Post-Award Stage

Once the job is won, it is time to celebrate. The time between the proposal development phase and the contract award can be short, or it can be very, very long, particularly in uncertain economic times. The biggest challenge for contractors is to make sure the parties that they went into the competition with from the start are still available to go forward with project execution once the contract is awarded, so confirming available resources and commitment is usually the first order of business after notice of award is announced. The second step is to meet with the owner and their representatives and validate and confirm that the proposal and design submitted by the team meet the requirements of the RFP as the owner expected.

Design/Proposal Validation

The design/proposal validation stage in design-build is a very important step in successful design-build. In the competitive design-build process, this is the first time the owner and the winning design-build team are "officially" on the same team. This is when the contractor and the architect make sure that what they intend to deliver is what the owner is expecting. Likewise, this is where the contractor and architect disclose their expectations of the owner. Process coordination issues are also discussed. A few are listed below:

- Lines of communication
- Decision-making authority
- Design review procedures
- Application for payment procedures
- Technology requirements and coordination
- Conflict-resolution procedures
- Insurance and bonding requirements
- Regulatory approvals and procedures
- Others

Before the design/proposal validation meetings occur, it is important to first make sure that the contractor and the architect are on the same page regarding the project and the process so that they are able to present a united front to the client.

It is at this stage that any adjustments that need to be made are made, agreed to, and documented. These give-and-take negotiations can take days, weeks, and even months, depending on the size of the project and the variables that have changed between the proposal submission and the contract award. The key is that everyone is on the same page before the team proceeds any further with the design.

Service Contract Negotiations

Once the design and proposal validation process is complete and the owner's expectations regarding design are confirmed, the contractor, architect, and DB specialty contractors (with in-house engineering capabilities) will work to put together a reasonable staffing and resource allocation plan that best illustrates how the actual design work will be delivered, and by whom. Although this plan is first discussed during the "win strategy" meetings at the proposal prep stage, the specific accountabilities associated with project execution and the development and delivery of the final design documents cannot be determined until after the team meets with the owner during design/proposal validation and everyone gets on the same page regarding project outcomes and expectations. Fee negotiations will be based on the staffing and resource allocation plans agreed to. Architects should be aware of the unique procurement needs of design-build and plan for delivering multiple work packages, and potentially other additional services. Likewise, there may be some traditional architecture services that will not be needed in design-build. These requirements form the basis of the fee negotiations.

Developing an Integrated Design Work Plan (IDWP)

Most contractors will request that their design team put together a schedule that represents how the design will be delivered in coordination with the construction schedule. This "design management" effort takes some real finesse, and the practice is relatively new to most AEC practitioners not accustomed to integrated forms of project delivery. Some contractors are more experienced in leading this coordination effort than others, but either way the purpose of this exercise is the same: for the contractor, subcontractors, architect, and engineers to plan how they will synchronize the design workflow and schedule with the construction workflow and schedule. This is a very important task and lays the groundwork for managing the design to meet all expected and agreed-to targets for the project. Once the overall plan has been determined, time and resources are loaded into the schedule. This sets up the design reconciliation process that will occur throughout the design phase of the DB process.

The Design Stage

Once the IDWP is in place to coordinate the design deliverables with the needs of the construction schedule, design can proceed. This is the point at which real challenges for the architect arise.

This design-to-project-targets approach is a new way of thinking that may make some architects feel quite uncomfortable. Rather than the contractor estimating based on a completed design, the architect is required to design to a completed cost model developed by the contractor. Rather than the contractor reacting to the design relative to issues of constructability, constructability is discussed and coordinated proactively before the design continues. And finally, rather than make design decisions in isolation and then come together for group reviews and reactions, the design direction is decided and agreed upon as a team, led by the contractor in this contractor-led model, and then is expected to proceed forward in accordance with those agreements.

This scenario turns the traditional design approach upside down. It is quite different from the "command and control" liberty that both architect and contractor participants have applied to their independent functions under the traditional segregated services model of project delivery. But this "reverse, proactive" design approach is what makes the design-build delivery method more efficient and cost-effective for all involved—including the architect. Such an approach will indeed result in less redesign, but it requires a significant mental shift and a great deal of communication, collaboration, and facilitative type leadership on the part of the contractor leading the process.

Coordinating the design-build process to meet project targets requires some give and take on everyone's part. Open dialogue, or "thinking together out loud," before proceeding with the design is most beneficial. Contractor-leaders of design-build projects must develop and provide useful cost data, constructability parameters, and schedule milestones to help guide their architect team members. Architects must likewise communicate design intent information, code compliance requirements, performance criteria and standards, and design constraints information to the contractor. This scenario is quite different from the usual contractor-architect engagement in design-bid-build but is necessary to deliver superior design-build project outcomes. A contractor who tries to apply the traditional "command and control" tactic to the contractor-led design-build process will not find many willing architects to participate. However, there are many contractors who are becoming more adept at leading design-build projects in a collaborative fashion and succeeding.

Design Phase Management

Managing the design process is one of the biggest challenges associated with design-build, regardless of who is leading the project. Contractors are very accustomed to the notion of "managing" project variables and are expert in controlling construction costs and managing construction schedules. In design-build, it is critical that the design process be managed in a similar fashion. In contractor-led design-build, this design management task becomes the responsibility of the contractor. The contractor does not manage the creative process of design, but as the prime contract holder, they are responsible for managing the design so it matches up with the various targets established for the project. Architects often believe that design creativity will be sacrificed if strict parameters or targets are assigned to the design function. This is not necessarily so. A parameter that restricts a design element to a specified quantity or unit cost does not negate the opportunity to configure the design in a number of ways, using a number of applications to create interest and aesthetics. But the reality of budgets and schedules is one of the reasons why design-build has gained popularity with owners. The fact is, unless the project's design can meet the limitations set forth by the owner's needs, the project won't be built.

Design Reconciliation

At the proposal stage, a number of design and construction performance targets are set for the project by way of performance requirements and standards identified in the RFP. These targets are then confirmed at the post-award stage. At a minimum the targets will include cost, schedule, quality, and design performance. (As many RFPs include performance criteria in lieu of prescriptive specs, there must be confirmation that the performance will be met by the design). Design reconciliation is the oversight task that assures that the project's design ultimately meets these targets. As the project's design progresses from design phase to phase, each of these targets must be monitored on a regular basis. If variances are noted from the original targets, they must be reconciled with the design. There are many different reasons for getting off-target as the design progresses. A common reason is that the owner begins to tweak the original scope by adding a little bit here and a little bit there (square footage, quality upgrades, etc.). Most contractors and architects allow minor adjustments, but if left unchecked this can lead to significant "scope creep," and may greatly affect both the budget and the schedule if not reconciled in a timely fashion. Architects must also resist the temptation to add scope to the project without consulting with the contractor, in order to avoid scope creep impacts. Another cause for variance may be increases (or decreases) in material costs. If the budget allowed for a certain quantity of a particular finish material in the design and the cost of that material goes up before purchase orders are issued, then the quantity or quality represented in the design must be adjusted to bring the budget back on target, or another trade-off must be made elsewhere in the design to compensate for the target overrun. This design reconciliation process is part of the design-build "dance," and it requires significant communication and transparency. There are five design interfaces that should be reconciled continuously as the design develops to avoid major redesign efforts.

- *Design-cost interface:* Monitoring and managing the design to align with the agreed-to budget. Contractors will generally implement some type of "trend-estimating" technique to track budget variances as the design progresses. These budget variances may result from any number of project impacts—scope creep, material cost escalation, code changes, etc. The contractor will expect the architect to make adjustments to the design where feasible to help manage these impacts.
- *Design-schedule interface:* Monitoring and managing the design to align with the agreed-to design delivery dates expressed in the integrated design work plan. Work breakdown structures and short interval scheduling techniques are often employed to break the design tasks down into manageable activities. If the design delivery tracks off schedule, the contractor and architect will analyze root causes and correct the course as warranted.
- *Design-construct interface:* Monitoring and managing the design to align with issues of constructability such as productivity, availability of qualified labor, product and material availability, schedule, safety, and other issues that impact construction feasibility and cost.
- *Design-performance interface:* Monitoring and managing the design to align with the performance criteria set forth in the RFP. To support the management of this interface, contractors may ask their architecture partners to provide senior partner "technical review" oversight or third-party peer reviews as the design develops. Although some architects may balk at such reviews, they represent a risk mitigation strategy that protects all parties, particularly the architect.

MEASURING DESIGN QUALITY

A commonly expressed concern by both architects and some owners regarding contractor-led design-build is that contractors aren't concerned about design quality. From the contractor's perspective, design quality is an objective attribute that can be measured, such as whether a column is plumb or a floor is level, or a mechanical system meets the performance criteria set forth by the client. But when architects speak of design quality they are usually referring to more subjective attributes, such as aesthetics, a well-functioning layout, or the emotional impact on people as they engage with the environment. The owner values and expects both the objective and subjective components of design quality to be delivered on their projects. Contractors who lead design-build projects must understand both the owner's and the architect's concerns regarding design quality. The challenge for contractors, who are charged with managing the design-build process, is that it is difficult to manage something they can't see. It's hard to "see" how people feel about the design. However, this is where architects can assist by facilitating discussions with clients to help establish "acceptable" target ranges for the more subjective criteria associated with design quality. Granted, these targets may be a bit fuzzier and require value judgments on the part of the observers, but they are targets nonetheless, which means the team can determine whether they are on- or off-target regarding design quality as the design develops. One of the methods currently being used by some contractors to help define and articulate design quality expectations is called VALiD, or Value in Design. It is a methodology for establishing quantifiable ways to measure subjective features of design.

- *Design-value interface:* Monitoring and managing the design to meet the subjective design quality expectations set forth by the owner. Design quality associated with visual image, aesthetics, and emotional appeal is subjective criteria and is difficult to measure. Contractors struggle with managing this interface and often resort to more objective design scope "benchmarks" to monitor design quality. This is an area where architects can bring much expertise to the table and should, as it is in the contractor's best interest to deliver on this very important project outcome if they intend to satisfy owner expectations.

The contractor may assign the accountability for monitoring each of the targets to different members of the team. For example, the construction project manager might be responsible for tracking the design-cost interface, whereas the designer-of-record may be charged with tracking the design-performance interface. Design-build project management through the design stages requires a team effort, and although contractors are well-practiced in project management techniques, they still need the input and active participation and cooperation of the architect to be an effective design-build project leader.

Design Commitment

What constitutes design commitment in design-build is a critical agreement among team members. Design commitment means that the design element has been confirmed to meet the budget and schedule requirements of the contract by the contractor and that the design element has also been confirmed to meet the performance requirements of the RFP by the designer-of-record.

The biggest upset that contractors report regarding trying to manage the design to budget and schedule is when their architect proceeds to present new or enhanced design ideas beyond the original scope to the owner before the idea or enhancement has been confirmed to meet the project budget, schedule, or performance requirement. If an architect presents a design element to the owner before first confirming that it meets the targets, and the owner really likes it, this leaves the contractor in an awkward position of having to say "no" to the client and looking like the bad guy. This leads to mistrust between the contractor and the architect and can be easily avoided.

Design enhancements outside of the originally contracted design scope should not be presented to the owner by the architect until they have been confirmed to still meet the budget, schedule, and performance targets for the project. If the enhancement pushes the project beyond these targets, it can still be presented to the owner, but only after the team has fully fleshed out the contract impacts and determined possible trade-offs or other mitigating strategies to accommodate the enhancements.

Failing to coordinate and align the design with the scope, budget, and schedule commitments that form the basis of the contract is what leads contractors to sometimes insist on being present at every interaction between the architect and the owner, which is not a very practical way to proceed through the design process. Owners expect to engage with the project architect regularly, and although contractor representatives should be present at key design-construction alignment and decision-making meetings, it is impractical for them to be present for every interaction. Having complete alignment around the ground rules associated with what constitutes design commitment is very important in contractor-led design-build. If such alignment is not achieved and honored, it causes a great deal of frustration among all parties, but especially for the owner. One of the reasons architects often give for bypassing the contractor and going directly to the owner with new design ideas is that the contractor has "no listening" for them because they aren't in the original budget. However, if architects approach the contractors with options of how the costs of the new ideas could be offset with adjustments elsewhere in the design, they are more likely to respond in a favorable fashion. Some contractors will ask their architects to set aside new or enhanced design ideas that emerge until after the project buyout is underway. If dollars can be saved during the buyout phase, the savings can be used to add design value to the project. This type of give and take is part of the design value proposition, and architects have reported that such an arrangement is appreciated and also incentivizes them to help the contractor save dollars in the buyout period so that they may use the savings to buy design enhancements back into the project. This type of coordinated collaboration ends up providing a win for all parties: the contractor, the architect, and, of course, the owner.

MAKING THE MENTAL SHIFT TO DESIGN-BUILD

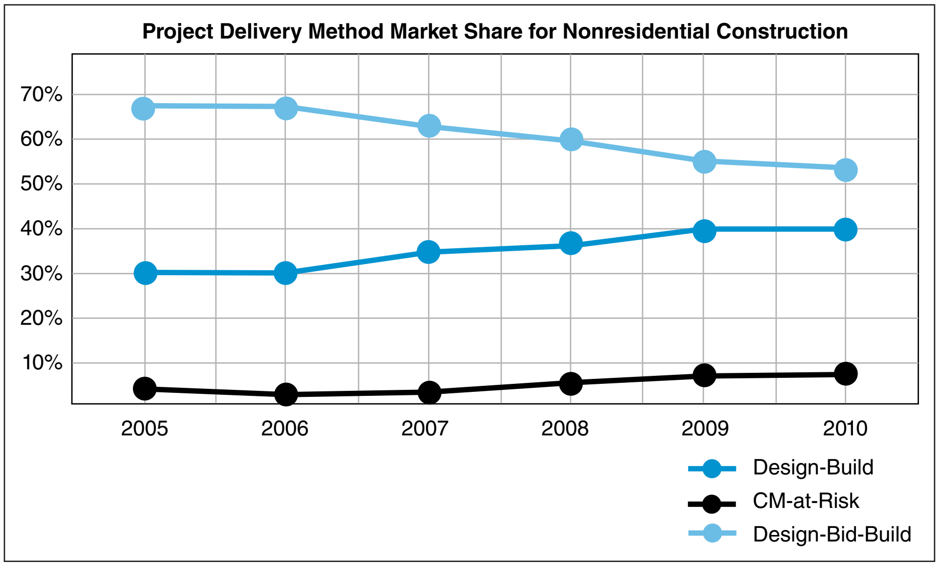
The biggest challenge for both contractors and architects in contractor-led design-build is making the shift from a segregated services mentality to an integrated services mentality. In reality, many owners would do the planning, design, construction, and commissioning of their projects themselves if they could. But they cannot, so instead they look to the contractors and architects who join together to form design-build teams. But their expectation is that the team work together "as one" in the delivery of the project.

Before this mental shift can occur, however, architects, contractors, and owners must learn to let go of past stereotypes and traditional practices and embrace a completely new way of working together in a supportive fashion. Traditionally, architects have often taken the position that they must "protect" the owner from the contractor. The thinking has been that contractors will cut corners if not carefully monitored in order to save money. But design-build contractors who cut corners will only hurt their own reputations and pocketbooks, because they must stand behind not only the construction but also the design and its performance—there are no errors-and-omissions change orders in design-build.

Owners who opt to use the design-build project delivery should shy away from the low-bid approach. The low-bid mentality stifles collaboration, open communication, creativity, and innovation. On the other hand, the best-value approach, particularly when combined with a guaranteed maximum price contract with shared incentives for savings, boosts collaboration, value enhancement, and creative expression.

The industry as a whole has operated under a low-bid DBB model for a very long time, and the experiences associated with this model haven't always been positive for architects, contractors, or owners. However, design-build is intended to be a best-value approach, where design and price are considered together and where reasonable tradeoffs can be discussed, risks can be jointly evaluated, and decisions can be weighted from multiple perspectives. Learned behaviors and reactions stemming from past experiences are hard to unlearn. However, the impetus to change is significant, as more owners are opting for design-build project delivery. A 2011 RSMeans Reed Construction Data Market Intelligence study analyzing the use of the design-build project delivery method in the United States shows design-build was used on more than 40 percent of nonresidential construction projects in 2010, a 10 percent increase since 2005. (See Figure 9.9.)

Contractors, architects, and owners alike are on a learning curve when it comes to making the mental shift from a segregated services approach to an integrated services approach to project delivery, but there are two key factors that will catapult any design-build relationship to the place where team members can operate "as one." Those two factors are trust and respect. One of the fastest ways to encourage trust in design-build is transparent communications and interactions. Respect is another matter. It seems that both disciplines—contractors and architects—lack a good understanding of what the other provides that the



2011 RSMeans Reed Construction Data Market Intelligence

FIGURE 9.9 Project Delivery Method Market Share

owner values. Cross-disciplinary exposure and training can make this quite apparent. With trust and respect among the teaming members, the rest of the challenges are quite manageable and success is inevitable. However, even if all of the proper procedures and processes are put in place, without the presence of trust or respect the challenges associated with contractor-led design-build will be greater. First, choose the right teaming partners, and then figure out what and how you will work together as one team.

The contractor-leader of a design-build team must understand that his first job is to create an environment in which every member of the team can succeed. This requires knowing what success looks like for each party, and architects and contractors measure success by different criteria. Under the segregated services model of design-bid-build, the contractor did not need to understand or be concerned with the interests of the architect. They simply needed to deliver the project in accordance with the plans and specs. However, in contractor-led design-build the contractor must be concerned with the interests of the architect because the owner is concerned with the interests of the architect. Failure to recognize the design as a significant design-build deliverable will jeopardize the contractor's relationship with the owner, and perhaps risk the potential for repeat business with that client. Reputable design-build contractors are not interested in risking this potential, particularly in today's economic climate.

Contractor-led design-build, when done right, presents an opportunity to change the traditional architect-contractor experience from a negative one to a positive one. If the experience changes, then people's beliefs about one another will change. If their beliefs about one another change, then their behaviors and actions will change. If their actions change, the outcomes will change.

For More Information

Design-Build Essentials (Delmar Cengage Learning, 2011) by Barbara J. Jackson, Ph.D., DBIA.

Design-Build Institute of America (DBIA): www.dbia.org.

Analytical Design Planning Technique (ADePT): http://www.amltechnologies.com.

Value in Design (VALiD): http://www.adeptmanagement.com/amltechnologiesus/valid.html.

Construction Management Jump Start (Sybex, 2010) by Barbara J. Jackson, Ph.D., DBIA.

9.5 Architect-Led Design-Build

Peter L. Gluck, Architect

Design-build is a fast-growing project delivery method, generally led by contractors. The same methodology led by architects is conceptually appropriate for projects where design is paramount. Architects have an opportunity to provide more complete and efficient services to their clients by "jumping in" and taking leadership in construction.

OVERVIEW

Over the course of the twentieth century, design-bid-build (DBB) has become the most common project delivery system for architects. In this process, an architect designs, contractors bid, and one contractor is selected to build. According to the 2012 AIA Firm Survey, design-bid-build work constituted 55 percent of projects designed by architects in

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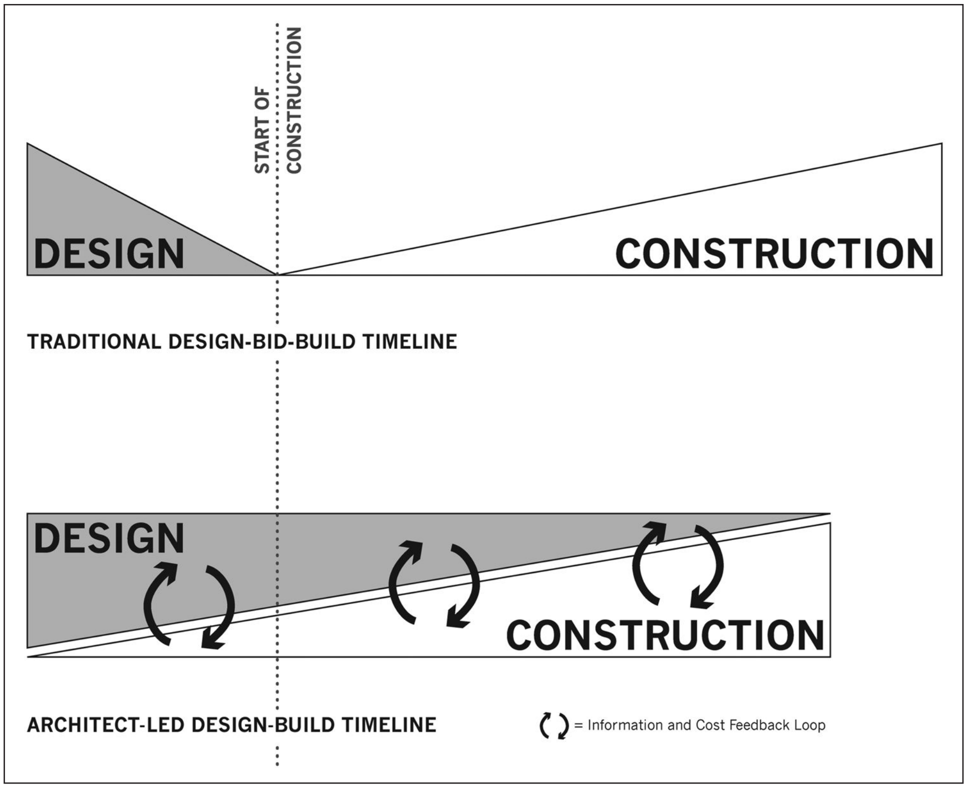
2011. Under DBB, the architect observes the work of the selected contractor, thereby assisting the owner in knowing that the contractor is following the requirements of the design. The system is based on a contractual prescription that is intended to provide checks and balances to protect the owner's interests. However, this methodology, with separation of functions between those who design (architects) and those who build (contractors), has become cumbersome, inefficient, and adversarial. Since 1980, as construction litigation has become more and more prevalent, architects have been advised to absent themselves from most aspects of the construction process. Section 3.6, Construction Phase Services of the AIA Standard Form of Agreement Between Owner and Architect (AIA Document B101™–2007), says that the architect shall not be responsible for construction means, methods, or sequences. Architects are advised only to become generally familiar with the process of construction in order to evaluate it. This separation of responsibilities is intended to shift the risk of construction away from the architect and onto the builder.

This fear of litigation has had a tendency to drive a wedge between builders and architects, creating an intractable wall between the two players. As architects have limited their representation on the construction site, they have also potentially reduced feedback that fuels good practice, and the ongoing educational and technological knowledge that is critical in the rapidly evolving world of building technology. The wall has also apparently exacerbated cultural differences between architects and builders, leading to a perceived antagonism between design and construction, dichotomizing the arts and business, professionals and tradespeople, visionaries and technocrats—despite the common interests and goals they share.

Design-build is one answer being provided by the marketplace to mitigate the inefficiencies of the design-bid-build process. Design-build is typically described as collaboration among design and construction professionals who form one integrated team responsible to and under one contract with the owner. This article describes an integrated entrepreneurial approach for architects to assume an active role in leading the design-build endeavor. (See Figure 9.10.)



Peter L. Gluck, Architect

FIGURE 9.10 **DBB-ALDB Project Timeline**

However, architects have not historically been at the forefront of this movement. Design-build methodology has generally been led by contractors, for it has been the contractor who has been willing to take the risk involved with a building project. This circumstance also results from the fact that many design-build methods first made inroads for projects that are essentially prescriptive in their design requirements. For example, the design of highways, military barracks, manufacturing facilities, or the simple enclosure of a predetermined production process can be defined by performance criteria and design standards, sufficient to measure the success or failure of the resulting construction. In such cases architectural considerations are less of an issue than cost or time of completion.

Possibly because most architects have not seen the loss of these projects as a challenge to their core business, design-build remains a minority "alternative" project delivery method. Nevertheless, design-builders are taking on a greater and greater portion of architects' work, including projects that involve more complex design criteria. The Design Build Institute of America (DBIA) suggests that design-build construction projects led by builders are increasing steadily and more traditional architectural projects are being produced within this paradigm.

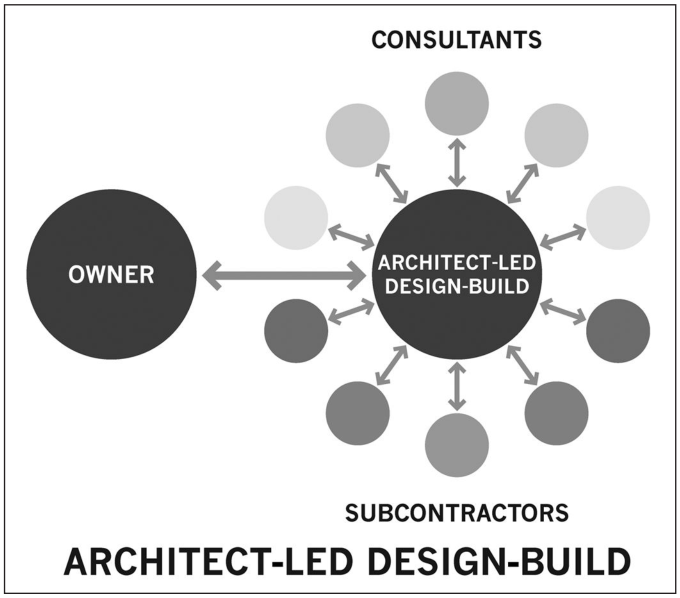
▶ For more on design-build project delivery, see Contractor-Led Design-Build (9.4).

Architects looking to engage with this trend have the opportunity to do so with architect-led design-build (ALDB). However, according to the 2012 AIA Firm Survey, while the number of architect-led design-build projects doubled from 2008 to 2011, those jobs only comprise 2 percent of overall work.

Architectural Projects

Most will agree that the role of the architect cannot be minimized when it comes to buildings that must be designed for a specific site, a specific context, a specific purpose, and for a specific budget. The ongoing relationship between the owner and the architect in this scenario is paramount, often requiring the architect to interpret the owner's needs throughout the design and the construction phase of the project. This context, and the skills architects possess, affords the architect an opportunity to lead in the design-build process.

Architect-led design-build can be accomplished contractually by a joint venture between two entities (the builder and the architect), with the architect holding the prime contract with the owner. (See Figure 9.11. Other possible structural relationships include the creation of a separate construction company, or division, within and wholly owned by the principals in the architectural firm.



Peter L. Gluck, Architect

FIGURE 9.11 ALBD Relationships

In addition, architects can increase their participation in the construction process by creating a variety of contractual relationships with a builder to deliver a project. However, simple contractual relationships do not necessarily erase the barriers of siloed knowledge, experience, and culture. Care should be taken not to enter into any relationship or responsibilities that expose architects to risks not covered by their professional liability insurance.

Nevertheless, it is commonly agreed that the expansion of engagement in construction processes by architects is generally beneficial to all involved in the building process, including architects, builders, and owners. Architects have the foundation to lead design-build, and the opportunity to apply their energy, intelligence, and assertiveness to develop and expand their roles.

Architect-Led Design-Build

In architect-led design-build, the architect is the full-service leader of the design-build team, taking responsibility for the entire process. This fully integrated process represents the pure design-build methodology with the architect taking the lead rather than a contractor. From the owner's point of view this can better reflect the need for a single source that is responsible for the design, costing, and production of the project, led by the entity that has originated the design and can take responsibility for its execution.

Architects traditionally work and cooperate with a multitude of design consultants and product manufacturers. For most, it should not be a problem to also coordinate the work of craftspeople, subcontractors, and tradespeople. It is a continual collaboration between the architect and the construction trades and manufacturers, as well as the owner, which can provide agile responsiveness to the nonlinear process of producing a building. In ALDB, this process can be a continuum from conceptual design to the ultimate commissioning of the building.

Architects might accept the potential value of ALDB, but fear the complications and risks of construction. When considered specifically, the tasks simply represent another set of operations that are closely allied to those normally performed by the architect. In addition to standard design responsibilities, the architect as design-builder would have responsibilities for the following:

- *Bidding, negotiating, and "buying" subcontractor work:* For the most part, this is an administrative and evaluative process. Even in the design-bid-build method, the architect prepares the concept for and content of this work. In the ALDB process, the construction drawing set is likely to be separated out into drawing subsets by construction trade and sent to a series of subcontractors to determine what their portion of the work will cost. Normally, this process must be done by the contractor, who cannot conceptually alter the design documents. The subcontractor bids are then tabulated, and a determination is made as to which contractor is best qualified to perform the tasks as drawn and specified by the architect. In this process, which is a departure from traditional, discipline-based construction documents, the architect has the opportunity to meet face-to-face with the bidders and to incorporate their comments into the final bid documents, often of great benefit to the project. The technical feedback inherent in this process assists in producing a well-conceived set of drawings and contributes to a series of subcontractors who understand the ultimate shape of the project, financially, technically, and professionally.
- *Fiduciary matters related to payment of costs of project:* Another critical task of the contractor is to keep track of the project's cost. This is an outgrowth and extension of the architect's standard contract administration responsibility to certify the percent of completion of a subcontractor's work. With full-time representation on the job site assured by the architect's role in ALDB, managing project costs can be accomplished with a great degree of accuracy. All other job costs, such as employee salaries, rental cost of job trailer, telephones, etc., are easily tracked by bookkeepers

assigned to the project. Many architects perform these same operations for their own businesses and are familiar with principles of cost management.

- *Dealing with cost overruns:* The fear of being responsible for significant construction cost overruns may be the major factor inhibiting architects from engaging in ALDB. However, by embracing the world of construction and becoming familiar with the costs of each aspect of their design, architects have the opportunity to better estimate and control costs. Entering into an ongoing dialogue with those who construct the architect's design is also likely to create better design.
- *Coordinating approvals and inspections:* The overall responsibility for producing designs that comply with local and national building codes, zoning ordinances, etc., is generally under the architect's purview. And there are many sign-offs required of architects engaged in contract administration during construction. There are additional inspections required during construction that are normally organized by the contractor, but they are, in essence, extensions of what the architect would ordinarily perform.
- *Coordinating turnover of MEP systems to Owner:* The commissioning of all mechanical systems, and their coordinated turnover to the owner, may be underperformed on many projects. This can cause problems that owners may potentially see as being created by the architect. In the traditional process, the architects' disassociation from construction disallows opportunity for them to remedy this situation. In ALDB, the design-build entity is responsible for commissioning. It is a logical extension of the architect's work, since the architect and mechanical engineer have the most knowledge of the systems and their operation. When the architect has full knowledge of the mechanical contractor's work and can assist in educating the owner about systems operation, a successful result is likely. With the increasing complexity of mechanical systems, owners will benefit from professional commissioning, an operation that must start during the installation of those systems.
- *Preparing and obtaining lien releases and insurance certificates from contractors and suppliers:* Another administrative task required by the ALDB entity is to collect lien releases at the time of payment to subcontractors, and to obtain insurance certificates from all who work on the construction site. The architect involved in contract administration normally certifies the percent of completion of the subcontractor's work. It is a simple additional task to secure lien releases for each at the time of payment of the many requisitions. And it is a simple management task to see that anyone working on the construction site has proper insurance.
- *Scheduling and controlling means and methods of construction:* This is traditionally the major responsibility of a general contractor, and in this case becomes the responsibility of the ALDB entity. It involves determining the most efficient sequencing of the work and allocation of resources for construction and is essentially a problem-solving task. While this may seem challenging to some architects, it is a logical extension of the thinking that drives the production of architectural drawings. In time, daily contact with the subcontractors, provided by full-time presence on the construction site, and collaboration with experienced builders, can provide architects with the information necessary to develop job scheduling.
- *Providing and monitoring a site safety program:* Job safety is a critical responsibility for any builder. It has become a specialty task that must conform to industry guidelines, common sense, and a multitude of government regulations. It has evolved into a specialty in itself, with consultants who manage its prescriptions, write safety manuals, and monitor the site for compliance. Hiring consultants to manage site safety is common practice and, with proper training, it can be another management operation that architects are capable of directing.

GETTING STARTED

How does an architectural office accumulate the knowledge and personnel to augment its existing staff and integrate those skills that it might lack?

An architectural office has these options:

- Hire a construction professional. This approach is similar to how contractors have expanded their expertise to include design by hiring architects.
- Form a joint venture with, or buy, a construction company.
- Develop construction expertise within the design firm. Many architects are highly skilled and comfortable in the construction environment and perform contract administration and construction phase services for their clients. These architects could form the leadership group for a new internal division of an architectural firm.

BUSINESS-RELATED ISSUES

Contracts

▶ For more on design-build agreements, see the backgrounder Design-Build Agreements accompanying Project Team Agreements (17.2).

There are many contracts designed specifically for design-build projects, but most have been designed for contractor-led projects. The AIA A141™–2004 family of contracts are specific to design-build projects, and have the ability to be flexible in terms of the role of the architect as leader of the project.

Fees

Two sets of fees are generated from a building project: design fees and construction fees. The design fee is generally comparable to the construction fee, with one significant difference. While the architect must produce the work and reserve some of the fee as profit, a good part of the contractor's work is not considered part of their fee, but rather is covered under the general conditions of the construction contract. For example, site supervision, accounting, and all costs of the site office are generally reimbursable expenses or overhead. A good part of the contractor's fee can then become profit, often as much as the architect's entire fee. The ALDB entity benefits from this situation, since the entity receives a combination or a portion of both the architects' and the contractors' fees.

Licensing

Similar to the licensing of architects, there is no national licensing for contractors. Each state has its own requirements, sometimes overridden or augmented by local towns or cities. Qualification for contractor licensure is often, but not always, quite simple. There is normally a test for which study materials are readily available to the applicant. In general, the testing procedure is significantly less demanding than for architectural licensure.

There is usually a minimal cost to take the test and a small fee for yearly renewal. In some cases a character check is required; for example, in New York City applicants are investigated to uncover jail time or child support delinquency. In many states a financial assets threshold must be demonstrated. In some instances, the solvency of the construction entity may be tested by the requirement that the entity hold a certain bank balance for a period of time. Additional financial requirements may also have to be met, depending on state law and the nature of the project.

Risk Management and Insurance

The prevalence of litigation in American society is legendary. In the construction environment, whenever there is a conflict, legal actions can spill over to every entity on the project, whether reasonable or not. Holding insurance is necessary, but insurance policies can become the "deep pockets" of the industry. Because of their central role, architects and their insurance carriers have been prime targets in construction litigation.

The reality of risk management for architects is that reducing errors and conflicts can reduce overall risk of legal action. Paradoxically, this is made more possible by increasing an architect's involvement in construction rather than the common practice of reducing risk by avoiding involvement in construction. Architect-led design-build streamlines the construction process, improves communication, and maximizes close supervision of the work, thereby minimizing errors and risk.

General liability insurance, paid by the contractor, is a necessary part of the building process and it is quite expensive. Its cost (usually from 1 to 3 percent of the cost of the construction) is considered a general overhead expense. Insurance rates for first-time contractors tend to be as much as 1 percent higher than for established companies, but these rates go down as a history of successfully completed projects is established.

Owners or contractors generally carry a builder's risk policy that names the owner as coinsured and covers them from liability and loss during the construction of their building. This insurance is either part of the cost of construction or simply a soft cost attributable to the owner's project.

Architects generally carry professional liability insurance, the cost of which reflects the degree of risk involved with the project and the architect's claim history. In analyzing that risk, insurance companies have shown their preference for design-build projects because there has been a record of less litigation in projects with single source responsibility. Involvement in design-build has the potential to reduce insurance costs for architects.

Because of insurance requirements, a design-build company might consist of two legal entities: a design professional corporation, which would obtain professional liability insurance; and a construction limited liability corporation that would hold construction liability insurance. Ownership of both corporations could be the same.

► For more on professional liability insurance, see Insurance Coverage for Business and Professional Liability (16.2).

Capital Requirements

Construction is a business that need not require high capitalization. Whereas large general contractors might own much expensive heavy equipment, most equipment is rented and tools are amortized over the course of each job. In fact undercapitalization is an industry-wide weakness. When a project is required to be bonded, the financial worth of the contractor is investigated and bonding capacity relates directly to the company's financial statement. Bonding is generally required by government projects or for high-value projects where contract prices are guaranteed by the contactor. Private owners often find the cost of bonding an unnecessary expenditure. However, some jurisdictions will require bonding as a prerequisite to obtaining a contractor's license. Operating capital may also be necessary to cover construction costs while waiting for owner payments.

Guaranteed Pricing

There is real risk to the ALDB entity when it guarantees a fixed price (a guaranteed maximum price, or GMP) to complete a construction project. However, the ALDB process provides the financial means to manage costs when adequate funds are allocated in the general conditions of the construction contract. And, it is common for costs to remain as estimates until the major portions of a project have been bid to the actual subcontractors who will perform the work. Moreover, to account for the risk involved in providing a GMP, the ALDB entity is entitled to hold a contingent amount above the anticipated actual cost. If this contingency is not used, it may be absorbed by the ALDB entity as profit or may be shared with the owner, depending on contractual agreements.

CONCLUSION

The architect's separation from construction appears to have led to unfortunate consequences. Scope of services and the associated fees have been reduced; control of design and detailing has been lessened; professional respect by some owners and others in the construction community has been compromised; and legal risks arguably have been increased. To reverse this state of affairs, the architect can reengage in the construction process through architect-led design-build. It is sensible that architects engage in the construction of their projects, not only because they are the most familiar with the goals of the project, having seen it through design, but also because their skills and experience lend themselves to the managerial requirements of construction—including sequencing, supervising, bookkeeping, and organization of employees (subcontractors). Taking a role in construction can energize an architectural practice, enhance owners' experience of designing and building their projects, and improve the building industry as a whole.

BACKGROUNDER

ARCHITECT-LED DESIGN-BUILD AND ARCHITECT AS CM FOR SMALL PROJECTS AND SMALL FIRMS

James A. Walbridge, AIA

Small firms whose practices focus on smaller projects have a great opportunity to expand their services and increase their profitability by adopting leadership positions in alternative project delivery methods as either Construction Managers or leaders of Design-Build teams.

James Walbridge is President of Tekton Architecture, an architect-led design-build firm in San Francisco. His design and construction experience has led to national leadership positions in the AIA. Walbridge has lectured on the architect as master builder, architect-led design-build, and building information modeling on a local, state, and national level.

Small firms have a great opportunity to control design and make more money by considering leadership positions as either construction managers or leaders of design-build teams. Adopting and implementing an architect-led design-build or architect as construction manager project delivery method is very well suited to the small firms that focus on smaller projects and practices on a more local and regional basis.

For example:

- The scope and size of a small project practice allow the architect to expand into construction management and construction services more easily than their larger-firm counterparts, whose projects may be spread out nationally or internationally.
- Small projects typically require fewer team members than larger, more complex projects that often depend on multiple AE teams, consultants, prime and subprime contractors, fabricators, and vendors to complete the work.
- As a project moves into the construction process, the opportunity to more closely control and monitor the design for a small project is increased due to the architect's involvement in the management and execution of the construction.

Therefore, small firms have the opportunity to participate in small projects in a much larger role—and for additional revenue—than solely providing the architectural services typically offered in the traditional design-bid-build project delivery system.

ARCHITECT AS CONSTRUCTION MANAGER

For the small firm seeking to embrace a leadership position in construction, the Architect as Construction Manager (adviser, with no risk, CMa) is often a good place to start. The risk to the architect is the lowest and the capital costs for implementing construction management services into the firm can be minimal. This is a good strategy for firms that do not have additional resources or experience with project management in construction. The small firm can staff for this additional service by hiring an experienced construction manager on a permanent, part-time, or even per-project basis as a consultant, thus allowing flexibility for the small firm to provide such CM services.

Firms should consult with their professional liability carriers, as the insurance required for Architect as CM adviser (CMa) is typically covered in professional liability insurance policies for traditional design-bid-build project delivery. Another important insurance risk factor to review is both responsibility for and liability for job site safety measures during construction, and means and methods for the execution of the construction itself. Typically, the standard errors and omissions policies for Architect as CMa will not cover these construction risks. Care should be taken to organize and craft professional service agreements accordingly, outlining which parties will be responsible for this during the construction.

Fee structures for Architect as CMa can be done on a lump sum basis, hourly basis, or guaranteed maximum price based on the scope of construction management to be required, project timeline, and complexity. Contractually, the AIA has developed agreements required for construction management services by architects. They are readily available and can be easily tailored to meet the scope of services as required. The financial rewards can be great, owing to the low initial investment up front, the higher overall net profit, and the ability to manage the project to achieve a faster completion time, thus allowing the firm to move on to newer projects more quickly.

For the owner, having the continuity of their interests maintained with the architect's representation from the design phase into the construction phase is a value-added benefit.

ARCHITECT-LED DESIGN-BUILD

As a firm gains more experience integrating Architect as CM into their business model, it may want to progress toward architect-led design-build (ALDB). With ALDB, the risk to the architect (ALDB firm) will be the greatest, as the firm is assuming responsibility for the design, project management, and construction of the project. However, proportional to this responsibility is the opportunity for greater income and profit from controlling the project from its inception through completion.

The greatest challenges for the small firm considering ALDB are with business organization and insurance. Attention should be given to how the legal ALDB entity will be organized and formed, based on the goals for the firm and the legal requirements of the state(s) where the firm is practicing. This can be done as one individual business entity comprising the architecture and construction or as two separate legal entities, and will require legal work to setup correctly. The insurance requirements will increase in scope and cost, since policies for both the professional and the field office need to be in place to cover all aspects of the ALDB liability umbrella.

Creating the construction arm for an ALDB entity can be accomplished in various ways, including the following:

- Establishing a joint-venture partnership with a separate general contractor on a per-project basis
- Forming a new general partnership and merging with an established GC
- Staffing a complete in-house construction crew employed directly by the new ALDB entity

Although these initial challenges will need to be addressed in adopting ALDB, the small firm that has gained experience employing Architect as CMa has already developed the core requirements, with construction management being the key component, to move toward ALDB efficiently. The rewards for this increased risk are far more substantial with ALDB. The potential income streams include design fees; CM fees; contractor's overhead and profit; and, depending on the business organizational structure, can include markup on construction labor as well. This equates to a much higher per-project profit for each project, increasing the small firm's bottom line far more than if only providing design services.

As the world of architecture and construction move closer together in a much more integrated manner, the idea of the architect employing the ALDB and Architect as CMa project delivery methods makes more sense and is a natural progression. Acting as a single-point of responsibility, the ALDB/Architect as CMa entity can minimize and, with some small projects, eliminate the inherent conflicts typical with a design-bid-build project delivery method, when all the team members are not present at the inception of the project. Bringing together those project team members at the onset of each project, all under one umbrella led by the architect, makes good business sense to owners, as the accountability is centralized and the goals for the project are shared by a team versus individuals. Owners are more likely to consider this integrated team approach led by the architect on smaller projects than on larger, more complex ones that are typically done with design-bid-build project delivery.

By reclaiming a role in the construction process, architects can expand their services and increase potential revenues. ALDB and Architect as CMa are market differentiators for the small firm that can lead to more work and increased profitability. As leader of the team, the architect is in the position to promote leadership for architecture on the very front lines of the profession—the small project.

9.6 Architect Developer

Bruce Redman Becker, AIA, AICP, LEED AP

This article addresses the benefits and challenges of practicing in the dual role of architect and developer. This includes integrated project delivery, different types of property development, the key elements of a successful real estate development plan, and strategies for mitigating development risks.

ADVANTAGES OF COMBINING ARCHITECTURE AND DEVELOPMENT

Architects who serve as developers can gain more control over the design and construction process by initiating projects and leading the development process, rather than relying on developer clients to hire them and define or limit their role.

Bruce Redman Becker is president of Becker + Becker, an integrated planning, architecture, and development firm with offices in Fairfield, Connecticut, and New York City.

Initiating a development project allows architects to create work for themselves, as an alternative to marketing their services to traditional clients and competing against their peers. As Jonathan Barnett noted in the 1976 book *Architect as Developer*, which he coauthored with John Portman,

> The architect's role does not usually begin until many important decisions have been made about location, size, character, and budget. These decisions greatly restrict the number of alternatives open to the architect, and after assumptions have been made without any real understanding of their effect on design. If architects could participate in these early decisions, they could design better buildings, but for their suggestions to be taken seriously they must understand the other issues involved.

By serving as developer, architects can gain more control over the process and outcome of their efforts, and have more flexibility to achieve deeper levels of sustainability, design quality, and social impact as well as other objectives that are important to them. An integrated approach to design and development can also allow faster project delivery, a less fragmented design process, and elimination of the potential conflicts between architect and developer that can put the architect at risk and result in litigation.

As entrepreneurs creating and owning the buildings they design, architects may also be able to achieve greater financial benefits for themselves, but only by taking on and successfully managing additional areas of risk, such as leasing and financing. However, some areas of risk are reduced when architects become their own clients—for example, it is easier to correct design omissions and resolve change orders if the architect is also the developer. The motivation to blame and seek damages from the architect does not exist, and an architect has more ability to prevent the project from being stalled or abandoned if they are in the driver's seat.

Ultimately, society and environmental interests are well served when trained architects who are as motivated to achieve long-term positive social, environmental, and design outcomes, as well as economic success, are leading the development process. But this requires a change in outlook and training. As Jonathan Barnett noted,

> Although the real estate industry is the major force shaping our surroundings, it has done little to recognize its responsibility to the environment. With some honorable and infrequent exceptions, developers have been selling the public a very inferior product. In our country, with its history of rapid growth and change, developers have had little trouble in marketing buildings of poor design, because any product has been better than none. Architects on their side have often acted as if the subject of real estate finance should not be discussed in polite society…. The result of this taboo is that an architect often finds that he does not have a clear sense of whether or not his design is an appropriate answer to the developer's problem. He doesn't understand how different designs change the building's financial feasibility or its real estate market. He is left in the position of constantly experimenting to see what he can persuade his client to do. It is not surprising that developers tend to seek out those architects who stick to tried and true formulas and minimum building costs and fees.

The taboo against an architect taking charge of the overall development and financing of a project is less prevalent than it was in the 1960s, when Portman began to change these perceptions, and it has never existed when an architect is building their own home. Often an architect's most notable or satisfying work is the design of their own home, or their parents' home, because they can control client decisions such as selecting a site, setting a budget, and finalizing design details. The resulting level of satisfaction and accomplishment can be achieved on larger projects as well, when the architect is also the client. Prior to the early twentieth century it was not uncommon for architects to also be the builders and developers of their projects. The separate profession of real estate developer did not exist before the early 1900s, and 1928 was the first year that the term "real estate developer" appeared in the *New York Times*.

Deborah Grossberg, associate editor of the *Architect's Newspaper*, noted in a 2005 article titled "Architects Turned Developers" that

For much of the AIA's 150-year history, the organization prohibited architects from engaging in development work. Intent on distinguishing architecture as a noble profession on the level of fine art, distinct from baser building trades like carpentry and masonry, the AIA also felt the need to protect its members from the economic ruin met by early architect-developers, like Robert Adam in London and Charles Bulfinch in Boston. It was not until 1964 (by then, the profession was well established and the success of architect-developers like John Portman of Atlanta celebrated) that the AIA relaxed its ban on working in property development. It even issued a document in 1971 encouraging architects to pursue it.

Apart from the greater freedom that can come from having a broader role on projects, being a developer and understanding the developer's perspective makes an architect better able to serve developer clients.

If an architect developer retains an ownership interest in a project, then the architect is compensated for the long-term value inherent in the buildings they create, something that the fee-for-service model does not account for. This also allows the architect to stay involved well after completion and perhaps for the life of the project, maintaining quality and shaping adaptations to the design to address future needs as well as ensuring proper maintenance. The operation and maintenance of a building is important to its performance, particularly for green buildings.

An integrated practice allows the design to evolve more efficiently and effectively with ever-changing project and market conditions. The architect-developer can respond to events as they occur, and create opportunities to explore design options that a typical developer might not have the time or inclination to explore.

An integrated practice results in less miscommunication between the design team, construction team, developer, and owner. A seamless architect-developer team will understand each party's objectives and coordinate activities more effectively.

A deeper understanding of funding and market constraints can inspire unique program and architectural ideas. And by addressing specific urban and social needs with their designs while meeting investment objectives, an architect is better able to work with municipalities and community groups to gain public support.

Creativity is often the factor that sets a good developer apart from their peers. Naturally, architects bring this element to the development process, and the architect-developer will likely be more successful at creating a project that stands out from those of typical developers.

DEVELOPERS NEED SPECIAL SKILLS AND EXPERTISE

Real estate development is a truly multidisciplinary field, demanding imagination and capabilities that transcend established professional boundaries. A developer must be able to simultaneously think like a lawyer, banker, broker, mayor, resident, environmentalist, and capitalist while integrating these perspectives into a single successful process of conceiving, designing, financing, approving, building, and marketing a building. A developer must have the flexibility, persistence, and resilience to respond and adapt to changing events and conditions, as well as the common sense and objectivity to know when to make major changes or abandon a project if obstacles are too great to overcome. Architects are well suited to interdisciplinary problem-solving; however, in broadening their role to include the entire development process, special skills and expertise are needed.

An architect's experience in coordinating the work of other professionals and managing quantitative analyses and disciplines such as structural engineering makes them well suited to manage the financial and market analysis inherent in the development process. Structural engineering requires a combination of creativity and discipline to determine the most efficient use of resources to meet project requirements, which is not unlike the process used to successfully structure the financing of a project. Just as an architect needs a basic understanding of engineering principals to effectively oversee engineering consultants, an understanding of the fundamentals of finance and market analysis is required to coordinate solutions to the financing and marketing of projects. And as with structural engineering, an architect can rely on outside experts and consultants to finance and market their projects—they need not have this expertise themselves. However, a general knowledge of the following elements of development is essential:

- Developers must research and create reliable financial pro formas for development and operations and use these as a basis to finance their projects.
- Developers need to find capital to build their projects, from sources such as banks, insurance companies, pension funds, tax credits and private investors, grants, and family and friends.
- Developers must be able to find market opportunities based on objective market analysis, and create projects that meet market demands and attract end users.
- Developers must manage a wide variety of risks, including public approvals, financing, and marketing risks. Having strong negotiating skills and experienced legal counsel is vital.
- Developers must effectively lead and manage the entire development team, including lawyers, insurance agents, brokers, property managers, PR firms, real estate finance professionals, contractors, and other consultants.
- Architects who choose to be developers must be comfortable with and capable of broadening their role, and may need to do less design work themselves or fewer projects, depending on their interests and workload. Architects will need to transition from marketing professional services to marketing their buildings.

Beyond expertise, it takes a strong stomach to be a developer. Developers generally aren't paid until construction starts; therefore, they must have the resources to cover all soft costs until construction begins. Not every project a developer pursues will be built, so it is important to know when to cut losses and move on to the next opportunity, but not without a fight. Being a little audacious can be helpful. A developer needs to lead, problem-solve, cajole, and corral.

APPROACHES TO COMBINING ARCHITECTURE AND DEVELOPMENT

There are many ways to broaden an architectural practice to encompass development. Some governmental entities and not-for-profit groups that do not have in-house development expertise will hire firms to provide development consulting services in much the same way as they hire architects to provide supplemental architectural services.

Some developer/owners in need of additional resources will hire the project architect for services such as obtaining land-use approvals or preparing financing and marketing documents, rather than increase their own staffing. This can be an excellent way to gain exposure to the development process without having to become fully responsible for the entire project.

Cities and state governmental entities often issue requests for proposals (RFPs) for developers and development services and make a selection based on the quality of the plan and design, as well as the capabilities and resources of the development team. These RFPs can be an excellent opportunity to gain control of a site and a development opportunity through ingenuity and effective planning, rather than bidding in the private market and having to prevail by offering the highest price for land.

Being a developer is not the same as being an owner or investor, but depending on what resources it has available, a development firm can also own or invest in its projects. As Jonathan Barnet noted:

> Developers almost never finance a whole project out of their own resources; they are entrepreneurs merchandising their ingenuity and experience, not financial institutions looking for places to put their money. If the big financial institutions, like insurance companies, were to act as developers themselves, the story would be different; but as Albert Mayer, the architect and planner, once wrote, "The developer tail wags the investment dog."

Most institutional investors lack the staffing to manage the development process themselves and will partner with developers to invest their capital in a way that meets their investment objectives. The key to a successful "marriage" with an investor is to fully understand their objectives in order to bring them a project that meets their criteria.

Before taking full responsibility for a large development project, it is wise to get training or direct experience working on a small project; or on a larger project in collaboration with an established development firm, either as a consultant, staff member, or joint venture partner. This development "internship" can be structured any of the following ways:

- Start by providing architectural services to a developer, and with repeat assignments broaden the scope of your responsibilities and learn what you can from your client.
- Start small, such as by developing your own home, and then grow your design/development practice incrementally.
- Create a joint venture or partner with a lead developer. Some architects take a stake in a project for a reduced or supplemental fee and gain access to information and decision making as a result. John Portman got permission from a friend who was a developer to sit in on project meetings to observe the real estate development process.
- Bring a potential deal to a developer in line with the developers current portfolio as a joint venture opportunity.
- Get a joint degree, go back to school for an MBA or master's in real estate development, or take executive education courses—there are a growing number of programs at top schools, as well as individual courses offered within architecture schools, that provide education in the fundamentals of real estate development.
- Add a staff member to your firm who has an MBA or master's in real estate development and some development experience.

Many architects leave the practice of architecture once they develop expertise in real estate development and finance. That is unfortunate but understandable, since an architect's skills are needed in many types of organizations and industries. One can combine a traditional practice of architecture simultaneously with practice as a developer-architect and adjust the balance as needed.

TYPES OF PROPERTY DEVELOPMENT

Developers typically focus on a specific property type where they can add value and offer expertise, as each type of development has its unique challenges and opportunities. If an architect already has experience in the planning and design of certain types of property, this provides a significant advantage in broadening this expertise into other aspects of development for the same property type.

Affordable housing development requires expertise in obtaining housing subsidies, such as qualifying for low-income housing tax credits and other governmental incentives for affordable housing, as well as negotiating the tax credit syndication agreements and loan agreements. Overseeing the management and marketing of affordable units, managing limited budgets, and obtaining land-use approvals is also required. Architects with nonprofit affordable housing clients can provide development services to their clients, including preparing funding applications and securing land-use approvals as a way to transition to development as a principal.

Market-rate housing, whether rental housing or home ownership, requires access to construction and permanent investment capital, and an ability to objectively assess and create market opportunities. Expertise in negotiating agreements with housing finance agencies, lenders, and equity investors is necessary to short-term and long-term success.

Transit-oriented development (TOD) requires an ability to assemble and acquire well-located land adjacent to transit nodes, obtain zoning for higher-density development, and integrate mixed uses, often working in partnership with public sector agencies. A role as a planner for TOD sites can lead to opportunities for development.

360 STATE STREET, NEW HAVEN

TRANSIT-ORIENTED MIXED-USE DEVELOPMENT

360 State Street encompasses the master redevelopment of an urban infill site in downtown New Haven, Connecticut. The architect-developer was selected in 2006 by the city of New Haven through a competitive RFP process to develop and design the site, which had been a surface parking lot for 40 years, into a high-density, mixed-use, transit-oriented community. Becker + Becker served as developer and architect of record, and collaborated with other architects, including Kent Bloomer, who designed exterior ornament, and Deborah Berke, who designed the interior common areas. The general contractor was Suffolk Construction. Construction commenced in 2008 and the project opened 22 months later in 2010. By 2012 the project had stabilized at 98 percent occupancy.

The site, a 1.6-acre brownfield lot, is located adjacent to the downtown train station, one block from the central business district, and three blocks from Yale University. Formerly an historic department store, the site was razed and converted to a surface parking lot during the era of urban renewal in the 1960s. Although the architect-developer was not the high bidder for the site, they were chosen for their commitment to provide community amenities, including a full-service grocery store, affordable housing, and a green development. The city sold the property to the architect-developer for $1.00.

With 360 State Street, the architect-developer was presented with an opportunity to create a community, which would provide much-needed affordable and market-rate housing; offer a transit hub for downtown workers commuting via rail and bus; carry on the tradition and continuity of pedestrian retail at a scale amenable to the neighborhood fabric; and bridge the gap between several downtown neighborhoods culminating at the intersection of the site.

The pre-development phase of the project was a collaborative effort between private architect-developer, public agencies, and institutions. The architect-developer held planning and design charrettes with the community to inform the appropriate program, scale, unit mix, architectural character, and sustainable elements. The project represents a new level of density and type of urban living for New Haven; therefore, exhaustive third-party market research was conducted to aid the design of dwelling units and amenities to attract the target market and secure financing.

The program created by the architect-developer features 500 residential units, including 50 affordable units, ranging from efficient studios to three-bedroom units with terraces; 20,000 SF of amenities, including a fitness center, periodical library, screening room, club room with catering kitchen, art gallery, half-acre green roof and swimming pool, bike shop and bike storage, 500-car shared parking garage, and 25,000 SF community-owned food cooperative.

Sustainability was a key objective of the city and community; therefore, the architect-developer designed 360 State Street to include the most advanced energy-efficient measures. The project achieved LEED Platinum certification through the LEED for Neighborhood Development Program, and uses less than 50 percent of the energy compared to an ASHRAE 90.1 baseline model. 360 State Street utilizes a fuel cell CHP system to provide power, heat, and hot water to meet the majority of the building's demand, a feat spearheaded by the architect-developer, overcoming regulatory and design hurdles. This system saves the property approximately $300,000 per year in utility costs.

The total development cost was $186 million, with residential units built at approximately $200/SF. Twenty percent of the project's financing was sourced through nine programs, including city and state grants and federal tax credits. The remaining 80 percent came from a union pension fund, the Multi Employer Property Trust (MEPT) with whom the architect-developer had successfully collaborated with in the past. The $150 million of pension fund participating debt requires a 6 percent return until the project is stabilized; and converts to a 7 percent interest-only investment at stabilization. Additional cash flow above the 7 percent return is split, 65 percent to the pension fund and 35 percent to the architect-developer. Thereby, even though a third-party property management firm controls the day-to-day operations, the architect-developer is encouraged to maintain an ongoing role in leasing and operations to ensure investment returns are met. The architect-developer earned a competitive architecture and developer fee, but the value of its subordinated equity interest in the project will depend largely on MEPT's success in reducing property taxes, which the city increased fourfold over detailed estimates approved by the city and which MEPT relied on prior to committing funding for the project. Challenges in developing the project included changing contractors and undertaking a major redesign, including, in the eleventh hour, changing the structural system from poured-in-place concrete to staggered steel truss and concrete plank to meet budgetary constraints. Such a major change in the last 60 days of the design phase might not have been possible without an integrated architect and developer.

The architect-developer's success in sourcing a vast array and sum of public funding lies in the team's integrated structure and full devotion to one or two projects at a time. Because planners, architects, and developers in the firm were able to work creatively side by side, the project's program continually evolved to match market conditions, the city's needs, and the parameters of funding sources, while ever cognizant of the construction timeline, sequencing, and budget.

Historic preservation and adaptive reuse often requires obtaining approvals with preservation agencies and meeting requirements for state and federal historic tax credits, as well as an ability to syndicate credits to investors and obtain approvals for new uses. An example of such a project is the Wauregan Hotel case study.

Office and retail development typically necessitates obtaining advance leasing commitments from commercial space users as a condition to obtaining financing.

THE WAUREGAN HOTEL, NORWICH, CONNECTICUT

Historic Restoration, Adaptive Reuse, and New Development of an Affordable Multifamily Housing Community

Robert Benson Photography

FIGURE 9.12 The Wauregan Hotel

The Wauregan Hotel restoration was born out of complementary demands: (1) saving one of Norwich's most important historic structures and the keystone of its downtown neighborhood; (2) meeting diverse housing needs in a community seeing rapid growth in new service jobs; and (3) spurring arts and community-related economic development (see Figure 9.12).

Built in 1856, the Wauregan was once the premier luxury hotel between New York and Boston and an anchor of Norwich's central business district. Over the last several decades it had become blighted as a welfare hotel and then left vacant, a prominent symbol of downtown's economic struggles.

The preservation community alerted the architect-developer that the City had slated the building for demolition. The architect-developer testified at the demolition hearing claiming his firm had a feasible plan for reusing the building and developed a coalition of supporters, eventually including the mayor and city council, which helped refine and implement the plan.

The $18 million mixed-use redevelopment plan addressed the need for affordable housing, parking, cultural space, and community retail in downtown Norwich. The program for the 76,000 SF building includes 70 units of affordable housing, 8,000 SF of commercial space, a 3-story parking garage, and a fitness center. In addition to the historic renovation of the original building, a new addition was added to complete the streetscape where a building had been demolished and an empty lot had been plagued by crime.

The ownership was structured as a for-profit limited partnership to take advantage of funding opportunities. Funding was provided from the sale of low-income housing tax credits, federal historic tax credits, state historic tax credits, state taxable bonds, low-interest loans from the City of Norwich and the National Trust for Historic Preservation, Connecticut Neighborhood Assistance Act tax credits, developer financing, and an HGTV Restore America grant.

The project would not have come to fruition without the broad support of the City of Norwich, the historic preservation and economic development community, and affordable housing advocates. This support was not initially forthcoming. The City was opposed to building affordable housing in the downtown and was set on demolishing the building. However, after a series of meetings and a tour of other affordable housing projects the architect-developer completed in conjunction with nonprofit sponsors, the city council and mayor voted to give the building to the architect-developer for $1 and provided a $800,000 1 percent interest only-loan to the project as well as a favorable tax abatement agreement. At the urging of the developer, the City created a neighborhood revitalization zone to help focus economic development efforts in the neighborhood surrounding the Wauregan.

The architect-developer earned a competitive architecture and development fee, but it initially received less income from the project than anticipated because operating revenues were used to replace a defective sprinkler system and to recover damages from the sprinkler contractor and supplier through litigation. Normally the project architect might have had to defend itself as part of this litigation, but as an affiliate of the owner, the architect was able to avoid this.

The design, financing, and preservation plan successfully revitalized a long-abandoned historic structure to meet the community's needs at the gateway to historic downtown Norwich. The architect-developer oversees the third-party on-site property management team, leasing, marketing, and building improvements.

Medical offices and retail center development require special expertise and require an ability to anticipate evolving market needs.

Hotels are a business of their own, requiring partnering with an experienced hotel operator, but often hotels are owned by separate entities and have long-term leases or management agreements with operating entities.

Child care and educational facilities are sometimes leased to or developed on behalf of nonprofit and for-profit operators. This requires expertise with public regulatory and licensing approvals, and ability to access educational facility capital and operating funding.

MANAGING RISKS

In many respects, the process of successfully managing the development process can be viewed as the process of mitigating the wide variety of risks present at each stage of development.

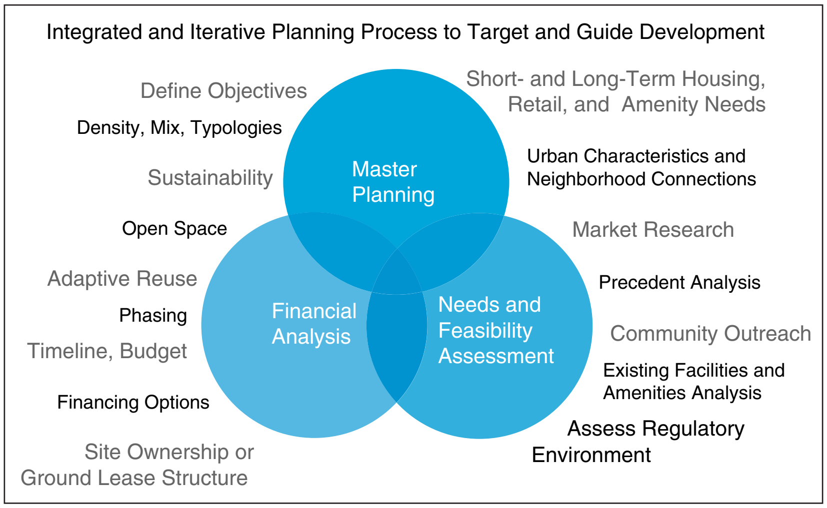
The decisions made in creating the initial development plan must all be informed by the developer's ability to manage these risks. For example, certain project types are inherently riskier than others. Rental apartments are typically less prone to litigation and easier to finance than condominiums, so a condominium developer must have confidence that they can manage these additional risks.

Thousands of decisions will need to be made to bring a project from initial concept to completion, and having trusted and experienced mentors, team members, partners, and consultants to share in these decisions will help ensure that these decisions are well informed. If the architect developer lacks direct experience in leasing space or apartments, it is critically important to involve a broker or leasing agent with that expertise before designs are finalized to ensure that they are marketable. If the builder has the most experience with a specific building type, be sure to solicit their advice on all major decisions. In general:

- Get the best outside resources to support the team.
- Include generous contingencies in budgets, pro formas, and schedules to account for the inevitable delays and change orders that all projects encounter.
- In financing a project, avoid providing personal financial guarantees. If a lender can only be persuaded to commit funds based on the developer's promise to make them whole from their personal funds, this may be an indication that the market demand for what the developer is building isn't clearly supported.
- Obtain adequate insurance, including builder's risk, property insurance, and liability insurance, as well as performance bonds, from the builder and major subcontractors.
- Do not to become financially committed to a project until all major risks are fully mitigated. Sometimes it is better to walk away from a project of several years than to move forward if the fundamentals aren't strong enough.
- Be careful not to take on a project that is too big to finance or lease, but also realize that it is often just as easy to develop a larger project as a smaller one, and often there are economies of scale. For example, if there are fixed costs for land, it is usually better to build the maximum number of units that can be permitted, if the market analysis indicates the demand exists to absorb the units.

ELEMENTS OF A REAL ESTATE DEVELOPMENT PLAN

The creation of a successful development plan requires undertaking an integrated process of defining and refining a building program and physical plan and design, together with a financial model, marketing plan, and rigorous feasibility analysis. Often each of these elements will be taken through dozens of iterations to see that they are optimized themselves and relative to the other disciplines and the overall development concept. (See Figure 9.13.)



Bruce Redman Becker, AIA, AICP, LEED AP

FIGURE 9.13 Diagram of Integrated and Iterative Development Process

The first step in conceiving a development may be identifying a market demand for a specific program and then finding a site suited to this program. Or could be the other way around, where the starting point is the site—but demand should somehow influence the first step. Insight into market demand can be gauged by following occupancy trends and local comps, and assessing how the market responds to new projects in the marketplace.

Once a site or existing building suitable for redevelopment for the intended program is identified, the next step is obtaining site control, either by outright purchase or obtaining an option to purchase or lease the property. The option period should be sufficient to get all public approvals and financing in place. Ideally, site control is obtained without making a significant investment. However, a predevelopment budget is at risk prior to final commitments being secured.

The scale and definition of each program element is likely to be refined based on physical and regulatory constraints, market needs, and financial viability, responding to iterative planning, financing, and market analysis.

Prior to financing being committed, a market analysis by an independent and objective consultant is usually required. This analysis assesses the supply and demand for comparable real estate in a defined market area, to assess what rents and absorption can be reasonably expected. An investor or bank needs to understand how and to whom the property will be marketed, and the developer's plan must address this.

The architect-developer maintains an ongoing role in the property management of the Octagon as a managing member, overseeing marketing, leasing, and property enhancements. In this role the architect-developer seeks to continually improve the project to meet the tenants' needs and marketability, and strengthen the bottom line.

Financial feasibility of a project requires development of an objective and conservative capital and operating budget. The capital budget includes a summary of all anticipated sources and uses of funds. Uses of funds includes all construction, design, and soft costs, as well as financing costs, legal costs, market studies, interest during construction and lease up, and miscellaneous costs such as permit fees, insurance, marketing and advertising, and overhead and fees. Sources of funds would include all equity and debt, grants, and developer's equity. The amount of sources must match the amount of uses. Table 9.1 details the financial aspects of the Octagon project described in the case study sidebar.

THE OCTAGON, ROOSEVELT ISLAND

Historic Restoration and Adaptive Reuse, Multifamily Housing

Paul Warchol

The Octagon (Fig. 9.14), designed by Alexander Jackson Davis, opened in 1841 on the northern end of Roosevelt Island as the Pauper Lunatic Asylum. The hospital closed in 1955, and the building fell into neglect in the years thereafter. While the Octagon is a city and state landmark and joined the National Register of Historic Places in 1972, its survival remained in doubt for decades because of its deteriorating condition. In 1997, the architect-developer began a nine-year effort to rehabilitate the landmark to meet a host of community needs.

Having secured the development rights from the Roosevelt Island Operating Corporation through a public RFP process, the architect-developer facilitated the certified historic rehabilitation of the landmark Octagon tower, new construction of residential housing wings, and development of a two-acre ecological park along the East River.

Conflicting design priorities among different local, state, and federal preservation agencies made it difficult to get the project underway, and an eleventh-hour redesign of the residential wings to change a mansard design to modern fenestration enabled the architect-developer to overturn a denial at the National Park Service and qualify the project for needed historic preservation tax credits. The architect-developer's integrated services allowed for this significant redesign effort to be completed rapidly so project financing could close prior to site control expiring.

The 550,000 SF project includes 500 units of rental housing, exhibition gallery, below-grade parking, café, child day care, fitness center, tennis facility, swimming pool, and a two-acre public ecological park. Residential units range from 500 SF studios to 1350 SF three-bedroom apartments. The architect-developer hired Gotham Construction as the project's general contractor and benefited greatly from Gotham's own extensive experience as developers of multifamily housing, receiving guidance in the selection of the most effective consultants.

The Octagon achieved LEED Silver Certification and a Green Apple Award for leadership in application of sustainable design features, which allow the building to use 35 percent less energy than a conventional apartment community. The project is home to a 50 KW photovoltaic array and a 400 KW fuel cell, together providing over 50 percent of the project's electric, heat, and hot water needs, saving the building $500,000 a year in utility costs.

The total development cost was $165,000,000, or $250 per SF, including the underground parking garage. The architect-developer spent two years attempting to obtain a financing commitment from HUD to finance the project with bonds insured through the FHA Section 220 program. When the HUD commitment wasn't forthcoming, the architect-developer worked with a broker to secure a $145 million equity investment through a union pension fund. The balance of project funding was obtained from historic tax credits and state green building tax credits, state Historic Preservation Office grants, and New York State Energy Research and Development Authority grants for energy efficiency. Construction was completed in August of 2006 with, full lease-up achieved by October of 2006—a year ahead of schedule.

FIGURE 9.14 **The Octagon**

TABLE 9.1 Octagon Sources and Uses Budget	
Uses	
Land Costs	$12,695,538
Hard Costs	
Construction	$107,408,373
Furniture, Fixtures, & Equipment	$819,000
Final Cleaning & Stabilization	$325,000
Construction Contingency	$4,000,000
Total Hard Costs	**$112,552,373**
Soft Costs	
Architecture & Engineering	$6,790,417
Environmental	$225,000
Testing & Inspection	$550,000
Permitting	$160,835
Accounting	$200,000
Insurance	$333,000
Legal, Appraisal, & Title	$2,429,543
Financing Costs	$2,626,651
Imputed Interest @ 7.25%	$15,828,591
Marketing & Leasing	$1,848,907
Developer Fee	$7,000,000
Contingency	$2,570,382
Total Soft Costs	**$40,563,326**
Total Uses	**$165,811,237**
Sources	
Pension Fund Equity	$145,900,000
Historic Tax Credits	$9,680,000
Income During Lease-Up	$7,538,246
Green Building Tax Credits	$903,200
NY Energy Smart Loan Program	$860,291
NY Energy Grant Program	$690,000
State Preservation Grant	$239,500
Total Sources	**$165,811,237**

To evidence that the development is financially feasible once it is up and running, a multiyear operating pro forma is also required showing all sources of income and all operating expenses, including utilities, debt service, maintenance, building staff, marketing and leasing, property management fees, and replacement reserves. (See Table 9.2.)

TABLE 9.2 Octagon Operating Pro Forma

Income	Stabilized Year
Residential Rental Income	$16,294,227
Less: Vacancy (5%)	$(764,572)
Subtotal Residential Effective Gross Income	**$15,529,655**
Parking Garage Income	$459,289
Day Care Center	$228,722
Other Income: Storage, Laundry, Offices	$686,283
Subtotal Nonresidential Effective Gross Income	**$1,374,294**
Expenses	
Maintenance & Operating Expenses	$(3,199,390)
Replacement Reserve	$(125,000)
Subtotal Expenses	**$(3,324,390)**
Net Operating Income	**$13,579,559**
Interest Payment to Pension Fund Investor	$(11,672,000)
Project Cash Flow	**$1,907,559**

In addition to evaluating the feasibility of the design, budgets, market, and financing, the political, social, and environmental impacts and risks need to be assessed and managed, which may include community outreach and engagement to foster relationships with stakeholders, supporters, collaborators, political leaders, and end users.

Perhaps the most important decisions a developer makes in planning and executing a development project, and must make in order to attract investment capital, are in selecting and assembling a capable and compatible development team. Special care must be taken to bring in required expertise that the developer does not have in-house. For developers with limited experience, partnering with contractors and consultants with a depth of related experience—who are also willing to take upfront risk—is critical. For example, an architect who is undertaking the development of a large-scale project will benefit from selecting a general contractor that also has experience as a developer of larger projects and who is willing to share that expertise. Similarly, a less experienced developer might select a property manager that has well-respected development capabilities, in order to demonstrate that the team as a whole has the required talents and insights to mitigate risks and collectively make the best development decisions. It is important that the developer is ready and able to make changes to the development team members once a project is underway, if a team member is not compatible or underperforms, as well as to revisit development decisions that may be improved or refined once the development process is underway.

Another essential element of the development plan is the creation and refinement of a project schedule, including milestones for each stage of development and target dates for key steps, such as acquiring site control, obtaining land-use approvals, starting and completing bid documents, obtaining bids, closing financing, commencing construction, initial occupancy, and stabilization. The development schedule includes an abbreviated construction schedule but also many tasks preceding the construction and following construction completion. (See Table 9.3.)

TABLE 9.3 The Octagon Development Schedule

	YR1	YR2	YR3	YR4	YR5	YR6
Predevelopment						
RFP Issuance and Award						
Acquisition						
Preliminary Design & Permitting						
Financing						
Development						
Construction Documents						
Construction						
Leasing & Marketing						

IMPLEMENTING THE DEVELOPMENT PLAN

Architects and planners understand better than other professionals which sites and buildings have inherent value. Identifying and securing site control at an affordable cost, either through a public process or through private negotiations, is the first step toward creating a valuable development.

Architects can add significant value to a site by creating attractive plans that are responsive to community needs as a means to obtaining zoning variances to increase allowable density. Creating a plan that addresses public priorities can also qualify a project for public incentives and grants, or tax abatements, to make these program elements easier to finance.

Securing equity and debt financing is an essential step to implementing a project. If there is no relationship with investors or experience in securing funding, seek the advice and help of mortgage brokers and investment bankers. While their fees are not insignificant, they can play an essential role in securing project financing.

Throughout the design and construction phases, a developer must be actively involved in managing costs and optimizing the marketability of the project. Ideally the leasing agent and property manager are consulted and involved from the earliest stages of design to see that the project will be cost-effective to manage and operate and will capture the full potential of rental or sales proceeds.

The developer should have an exit strategy in mind from the inception of the development, anticipating whether the property will be sold or refinanced upon lease-up or held long-term.

The developer should continually refine their role to ensure it is the right fit for them. Remember that developers don't need to be owners or investors, they can be fee-developers, and if required they can partner with others that have the resources or experience needed.

The stages of development include feasibility and acquisition; design; financing; construction, marketing and leasing; and operations and management. The stages sometimes overlap, but at each stage different skill sets and professional input are required and different challenges and risks need to be managed. These stages will be different for each project and each project type, but the developer needs to plan ahead, and have the necessary resources in order to succeed at each stage.

CHALLENGES OF COMBINING ARCHITECTURE AND DEVELOPMENT

Becoming an architect-developer requires a change of mind-set from a designer and architectural service provider to an entrepreneur creating and managing the entire process to create a project. This broader role requires balancing design with other disciplines.

If unable to manage design in a way that supports economic success, an architect may fail as a developer. Balancing public and private priorities benefits society and the built and natural environment, but may make an architect-developer less financially successful than a developer that ignores noneconomic criteria.

An architect who is their own client or has fewer outside clients cuts both ways in maintaining a consistent workload for an office. They will have more roles with fewer projects, but can be just as busy. They need to be pursuing the next development project before finishing the current one. As opposed to traditional marketing of architectural services, this may involve months of due diligence, market research, design, and financial planning prior to knowing if a project is feasible. For this reason, maintaining a healthy architecture fee–based clientele aids in supplementing lost costs during the feasibility stage of development.

Architect-developers must be prepared to find themselves in unanticipated new roles or bring in special expertise. They will need to form new organizations, manage political and community relationships, and take on new challenges, such as managing the marketing, leasing, and PR for development projects, as opposed to just marketing their firm's services.

An architect-developer might be more or less financially successful than a traditional architect—in fact, it is much easier to get into deeper financial trouble as a developer than as an architect. And because most developers do not earn any fees until construction commences, sufficient resources are needed to keep afloat until the project is off the ground. But having an architectural practice that also works for outside clients can help.

FINAL THOUGHTS

Practicing architecture and development together can provide greater opportunity for true innovation in the design, financing, and environmental and social impact of buildings, fostering projects that are both aesthetically and financially successful. Combining disciplines can allow architects to gain greater control over their practice, in the same way they have control over a house they build for themselves or their parents. Architects are educated and trained to analyze and integrate information from multiple disciplines, and this background is a very strong basis for the skills needed in real estate development.

For More Information

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9.7 Emerging Issues in Project Delivery

Phillip G. Bernstein, FAIA

For decades, project delivery models were stable, predictable, and repeatable, supported by standard contracts and case law. The advent of advanced digital technologies and new project objectives is stretching traditional approaches toward new models with both continual and disruptive innovations that change the roles, responsibilities, and risks of the project players.

OVERVIEW

At the turn of the twentieth century, as the modern practice of architecture was being professionalized with licensure and more formal education, projects had simple organizations and contractual models to match. Roles and responsibilities were well understood, and delivery structures were simple and streamlined. The original AIA Contract "B1" (the great-grandfather of today's AIA Document B101™–2007, Standard Form of Agreement Between Owner and Architect) explained the architect's role briefly, allocating the job of design and construction to each participant with relative clarity. Ideas like "means and methods" were created to distribute responsibilities and keep a smoothly running job site. By the 1920s, the architects of the Empire State Building had more than 200 site superintendents and managers under their direct employ, all of whom worked to complete the world's largest and tallest building in a mere 14 months, an approach almost unthinkable by modern standards. (See Neal Bascomb's *Higher*: *The Historic Race to the Sky and the Making of a City* [Broadway Books, 2004].)

The future of project delivery context is considerably murkier. Building construction has become both more complex and more litigious, and the means of project delivery has followed suit. Multiple methods of organizing a project have evolved in the U.S. construction market, each of which is designed (putatively) to make the structure, risk, and outcomes of construction more repeatable, streamlined, and predictable. Alas, if only this were completely so.

Well-understood arguments about low industry productivity, excessive risk assumed by architects who lack the means to manage it, and ambiguous relationships to the building life cycle are just a few of the arguments for re-examining the structures of building delivery. While models like design-bid-build and construction manager (constructor) continue to be widely adopted, new modalities are starting to emerge, catalyzed by the opportunities of new technologies, innovative owners, and industry organizations, and a growing sense that new options are necessary.

Examined here are some of the emerging innovations in project delivery processes as things stand in 2012, with a particular eye toward different approaches to changes in business structure and project structure. Designing and constructing buildings is a deliberate and careful process that is dependent on a complex, conservative supply chain of clients, designers, and builders. Systemic change therefore moves slowly, and industry participants vary widely in their appetite for radical adjustments in long-held

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processes—even when traditional processes yield less than satisfactory results. Therefore, some of the new ideas below can be seen as incremental (adjusting current methods toward new ends), and others disruptive (changing the underlying structure of project delivery itself).

A survey of U.S. construction owners in 2005 by the Construction Management Association of America (CMAA) concluded that almost a third of all building projects miss either their budget targets, completion dates, or both (2005 CMAA Owner's Survey). While the motivation to improve project delivery is based on this growing dissatisfaction with the results of building by everyone involved, emerging solutions depend heavily on three factors: closer collaboration of project participants, transparent exchanges of information, and reliance on advanced digital technologies like building information modeling (BIM). Innovations in methodology and technology will combine to change project delivery as a result.

INNOVATIONS IN METHODOLOGY

The separation of design and construction responsibilities and roles was an arrangement of convenience at the turn of the twentieth century, but by its end that separation became more of a gulf. The distinction between the architect's responsibility to define "design intent" through construction documents, and the contractor's obligation to follow that intent, has been and continues to be a source of tension on the job site, or, worse, lawsuits alleging negligent drawings. A more reasoned explanation of these tensions might include the acknowledgment that the separate roles of designer and builder had been exaggerated by delivery methods that optimize self-interest (in the form of risk reduction and fee protection) over communication. Thus, at the heart of most current innovations in delivery is an attempt to bridge the gulf and bring the designer and builder into closer collaboration. Such an idea implies the restructuring of the design-to-build relationship, and in many cases the revision of obligations accordingly.

Design Plus Construction Integration

Thus, two characteristics of today's traditional approaches to delivery are being questioned. First, highly sequential project delivery models like design-bid-build bring one of the most important players in the process into the project after 80 percent of the architect's efforts and the development of the job are complete, without benefit of the builder's insight. So a first principle of innovation is to bring construction expertise in early during design. This idea might involve the use of a general contractor (GC) for constructability analysis in a hard-bid project, the simultaneous selection of architect and construction manager (CM) in CM jobs, or even the use of the builder to help organize and integrate the construction documents on a project. In disruptive models like integrated project delivery (IPD), the client selects an architect and builder together and holds them jointly accountable for project outcomes, sharing the risks and rewards as a result.

► See Integrated Project Delivery Overview (9.3) for more detail on design plus construction integration.

Second, the oft-repeated assertion that information created by the architect is for "design intent" creates controversy about the accuracy and completeness of that information for purposes of construction. In order to manage risk, architects assert that such information provided to the contractor be reviewed, coordinated, and checked vigorously before being used in the field. Such assertions create opportunities for misinterpretation, transcription errors, and argument. The digital exchange of design intent data—geometry and other information that is part and parcel of design delineation—can be transmitted, under proper arrangement, directly to the builder for accurate use. This "direct data exchange" is a basic underlying principle of almost every emerging trend in delivery today.

Integrative Strategies in Nonintegrated Delivery Models

As the industry begins to adopt "disruptive" project delivery approaches such as canonical IPD, more organic innovations for integration strategies are emerging that can be applied in more traditional delivery models, to wit:

- *Under design-bid-build*, the architect may agree to share or integrate models or other digital deliverables with subconsultants to reduce rework and increase coordination; that information could be provided to the selected general contractor for its use during construction, assuming the proper risk and compensation adjustments have been made to standard contracts.
- *Under construction management (particularly CM constructor)*, AIA contracts offer the option for the architect and builder to share common general conditions that specify particular opportunities for shared outcomes and collaborative outcomes.
- *Under design-build*, the lower contractual barriers between designer and builder offer chances to create deliverables specifically customized to the construction approach and builder's techniques.

▶ See The Architect's Role in Construction Manager-Constructor Project Delivery (9.2) for more on construction management project delivery.

▶ For more detail on design-build project delivery, see Contractor-Led Design-Build (9.4), Architect-Led Design-Build (9.5), and the accompanying backgrounder, Architect-Led Design-Build and Architect as CM for Small Firms and Small Projects.

Lean Methodology

The industry is also examining so-called Lean methodologies, developed by Toyota to streamline manufacturing of automobiles. A Lean approach involves the careful delineation of the design and construction processes by mutual agreement such that information (or materials) are created and received at the optimum moment to benefit the project. While Lean methods are making inroads with contractors, in combination with integrated strategies described above, they are likely to permeate design planning as well. And since this approach makes little distinction between design and construction activities, treating the entire process as a seamless whole, Lean approaches to project organization are by definition integrated.

▶ See Construction Drawings (10.6) for more detail on the application of Lean methodologies in the design process.

Public/Private Delivery

As public entities are under increasing pressure to reduce costs many are looking to "turnkey" services by integrated design-build-operate teams for project delivery. So-called PPP (public-private partnerships) or BOT (build-operate-transfer) projects are the answer for governments that lack both the capital funding and expertise to create complex projects like hospitals, prisons, university housing, or even infrastructure. Usually involving the participation of a developer, who provides financing and management expertise, as well as architects and builders, clients provide a specification and entertain competitive bids for the best deal based on schedule, quality, and cost.

For example, a public university in need of new student housing might offer the rights to build new dormitories on a BOT basis. The winning integrated team would finance, design, build, and operate the project, and take a large portion of the resulting revenues from housing fees, returning some of those funds to the university and relieving the institution of the obligation of running it. After a contractually agreed-upon time period (spanning 25 to 99 years in some cases) the entire project is turned back over to the originating institution.

Many architects participate in such projects in traditional roles, working for the developers who drive the projects. More recently, contractors are stepping into the lead role, using design-build contracts to create the projects. Architects who lead such projects could take advantage of this untapped market.

Outcome-Based Scopes and Services

The design and construction markets have typically been characterized by fierce competition between participants who have difficulty differentiating from each other. Lacking distinct value propositions, designers and builders compete based on only price, and the result is low profit margins. Fixed design fees for architects, lowest hard bids or fee-based compensation for builders, and behavior designed to protect those fees during the project are the result. Emerging integrated approaches are experimenting with correlating compensation with project outcomes defined at the outset of a project.

If the client, architect, and builder agree to a strongly cooperative approach (using, for example, an IPD model) at the project's outset, then outcome-based scopes and compensation can be defined by the owner to pay the architect and the contractor based on how the project is actually accomplished. Incentive payments could be based on achieving the project schedule, meeting the project budget, getting a certain LEED rating, or even meeting certain quality measures. In some IPD models, these payments are made jointly to both the architect and contractor, who decide between them how to distribute the funds among their teams. Such shared incentives are designed to align interests among project participants in the hope that decisions made to benefit the project also benefit its designer and builder.

Sustainable design objectives offer another opportunity for outcome-based scopes of service and/or compensation. They are often tied directly not just to the characteristics of the project—such as the percentage of recycled materials in construction—but also to its operational performance. Assuming proper measurements and parameters can be established at the project outset, the architect (and contractor) could establish an obligation for the building to meet certain performance requirements—such as energy or water usages against a baseline—in exchange for compensation. (Such an approach would depend, of course, on establishing operating parameters that the design and construction team could control.) The resulting project would provide not just an annuity-style revenue stream but also a more permanent relationship between the completed building and the team that created it. By example, Paul Morrell, the chief construction to the U.K. government in 2011, has speculated that he would like to see his projects include a provision for the AEC team to not just finish the project but to also operate it for three years after substantial completion.

Life Cycle and Facilities Management Services

As buildings increase in both technical and operational complexity (consider highly sustainable building systems, for example) owners need new strategies for running them. The design/construction team, particularly if it has created sophisticated digital and analytical models of the project during its development, brings tremendous insight to this challenge. At this writing in 2012, sophisticated owners are asking their teams to deliver digital assets (typically facilities management–based BIM) for use in operating their facilities. Forward-thinking contractors, attempting to differentiate themselves in the cutthroat construction market, are offering to not just provide that data but also to support the ongoing management of the constructed project as a service in addition to construction management. Architects who can understand and define the information and procedures that support post-construction operation of the project can design project delivery models that connect them to that portion of the building life cycle accordingly, as they are arguably the most knowledgeable about how projects are designed to perform when in operation.

INNOVATIONS IN TECHNOLOGY

► Emerging Technology in Practice (11.6) has a more detailed discussion of emerging technology development and adoption.

Digital information technologies are infiltrating the entire spectrum of design and construction methodologies, with BIM at the center of the change. The creation of digital prototypes through BIM is a key characteristic in changing models of project delivery. The resulting digital information can be the basis of new methods of transparent collaboration and the generation of new kinds of information that architects can deliver for projects in various ways. As new technologies like cloud computing come into the mainstream, such methods are likely to become deeply integrated into project delivery methodologies of the future.

Performative Analysis

As the means of documenting the design shifts from paper drawings to digital models, the design process can be increasingly supported by analytical methods and procedures. Digital models, as virtual prototypes of the building, can be evaluated for performance characteristics such as energy usage, occupant capacity, and even lighting or acoustic levels prior to construction, and these measured outcomes can be tied to performance aspects of the project delivery contract itself. Design ideas may be examined by scripts or computer routines to more systematically define the "solution space" within which a problem can be solved. Analytic methodologies increase the capabilities and value of the resulting buildings. The ability to deliver projects of greater value as predicted by these digital tools can be incorporated into the arrangements—contractual and financial—by which the building is delivered.

Construction Analysis, Planning, and Monitoring

A direct result of the combination of collaborative methods between architect and builder and BIM is the use of design deliverables as the basis for construction analysis and planning. Current project delivery models and contracts insist that the architects separate themselves from the so-called means and methods of construction. The resulting construction documents are intentionally agnostic to construction procedures, planning, or sequence, even if such insight is critical to achieving the final design result. Combined with the rules-based parametric analysis methods described above (where design logic is defined by scripts that are part of the deliverables), digital models created under integrated project delivery can instantiate sequence and logic from the builder. The BIM models become not just artifacts describing the finished state but tools to strategize and plan construction. Since many contractors operating under traditional models like CM-constructor are "rebuilding" construction phase BIM models for these ends, there is increased value to the project in combining these processes and using the combined insights of designer and builder to create information that best solves the building problem. "Disruptive" project delivery models like IPD, where the risk of construction is reallocated and refined to reflect the advantages of collaboration, are the best places to exploit this opportunity. Selected designers and builders may decide to make arrangements for the exchange of specific construction-useful information in exchange for proper financial consideration.

Once construction begins, the BIM models can be the basis for monitoring progress. Simple methods like quantity analysis support evaluation of installation and bills of materials are now possible. Advanced techniques like laser-scanning are being used by contractors, creating three-dimensional digital scans of installed work that can be compared for progress against originating BIM data. The design BIM, as the basis of such work, brings real value to the construction process while changing the relationship of the architect to the overall method of project delivery.

Digital Fabrication

Beyond mere construction planning, fabricators of building components can use geometry and other digital information created by the architect. Inasmuch as the best understanding of the geometry necessary to fabricate complex systems such as curtain walls or enclosure systems originates with the architect, it is logical to assume the architect could best guide the resulting fabrication process. Better yet, collaboration between the selected fabricator and the architect to create the geometry and supporting data necessary to create the system is most efficient, and is in fact used on many complex curtain wall designs today. Some such projects are based on integrated project delivery principles where the value of the digital information exchange is defined in the contract. In other circumstances the architect embraces the counterintuitive notion that while providing the fabricator with source geometry actually increases risk, the ability to supervise and control its use actually makes lawsuit-inducing mistakes less likely.

As building subsystems are more frequently created using manufacturing processes under tight schedules, demand for the architect's digital model to drive the fabrication process will increase. This is an opportunity for design professionals to both increase their knowledge of construction methods and add value to the construction supply chain.

Cloud, Mobile, and Social—or "The Crowd and the Cloud"

No discussion about the technological impacts on project delivery is complete without a brief examination of the implications of three critical and interrelated technologies that are changing culture, business, and, by implication, architecture: cloud computing, mobile devices, and social networking, the explanations of which may seem quaint to future readers of the Handbook:

- *Cloud computing*: The use of large collections of Internet-based processors and storage devices that dramatically increase the computation capabilities of any user connected to the service
- *Mobile devices:* The increasing effectiveness of battery-operated, Internet-connected devices that allow information and processes to occur away from the desktop and "at the point of work." In combination with cloud computing, mobile devices suggest that software of the future, operating anywhere from the cloud, will be increasingly independent of hardware platforms (think BIM on a smartphone).
- *Social networking:* The interconnection of large groups of like-minded individuals who rely not on formal communication mechanisms but on point-to-point electronic association, making it possible to build large, geographically disparate teams and tap the collective knowledge of a broad swath of professionals quickly.

If emerging project delivery methodologies are empowering collaboration empowered by digital technology, these trends will further accelerate new techniques and interactions. Digital information about a project will coalesce in BIM, be universally accessible on the cloud, and unconstrained by the limits of a desktop computer processor. It will be available on any Internet-connected device. As a result, the design process is untethered from the design studio, and new collaborative approaches, structures, and project delivery methods are already emerging.

For example, many of today's IPD projects are based on the concept of the "big room," a place where the design and construction team co-locate during part of each week to work collectively on the project. Some work may occur back in home offices, but the team has joint access to the project information by "moving" the place of work to a web-based spot where they can solve it together. Once construction begins, information collectively created is delivered wirelessly to lightweight wireless devices at the new point-of-work on the job site. And even as the team may be back in their respective offices during construction, social networking methods provide easy ways for updates, decision making, and knowledge collection and insight.

SPECULATIONS ON THE FUTURE

If the history of project delivery, from the Empire State Building to the end of the millennium, was characterized by the separation of design and construction and the increasing alienation of architects and contractors (followed causally by increasing dissatisfaction of clients), the twenty-first century has begun a re-examination and bridging of that gulf. Technology has made some early techniques for reintegration possible, but it is just a means to an end. Our inefficient, environmentally challenged, risky, and low-margin industry is crying out for new approaches, and integrated project delivery models are the best vectors for reform. Today's architects and builders are beginning to realize that the answers to these questions lie in refining the ways that they work together, and realigning the project delivery models accordingly. Integrated project delivery and many of the ideas described above are the early indicators of a future that will likely include completely different definitions of the architect's role and scope, connection to the building process, and relationship to the building life cycle.

The changes that are necessary, anticipated today by early IPD projects, are not merely procedural. Future architects and builders will likely not be able to simply "play the positions" of their predecessors and just deploy innovative contract models. New protocols, relationships, and business models—the very processes of delivery—must be redesigned, and architects can lead this process.

Practice has changed rapidly in the first decade of the twenty-first century as digital tools, new construction methodologies, and new responsibilities have emerged for architects. The bridging of design and construction sensibilities that integrated delivery will demand could be seen as a threat to practice, but is better seen as an opportunity for architects to define a new role for themselves and to improve building in the process. That is the best value proposition possible.

CHAPTER 10

Design Project Management

10.1 Managing Architectural Projects

Grant A. Simpson, FAIA

When the delivery of services for architectural projects is well managed, those projects are more likely to meet their goals and objectives and fulfill the expectations of their owners.

This topic covers the process of project management for architectural projects. The backgrounder accompanying this article, The Effective Project Manager, addresses the desirable personal attributes and qualities of project managers.

The design and construction industry is a project-based world. As such, project management is a key component for any architect or architecture firm. Effective project management requires an understanding of project management basics, which are equally applicable to any project, from the development of a large hospital to the design of a one-room addition to a house. Knowing how and when to apply appropriate tools and techniques will make management activities easier, more efficient, and more professional.

Except on the smallest of assignments and in smaller offices, the project manager does not personally produce the major project deliverables. Rather, the project manager must know *who* can produce the required services, *when* those services must be carried out, and *how* those services fit into the overall project delivery scheme. In short, while project managers will do some of the work, their primary role is to direct the work being done by others. In fulfilling this role, the project manager delegates responsibilities to

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those with the design and technical expertise needed to complete the required work.

Project management activities for architectural projects can be clustered in the following groups:

- Organizing the project
- Facilitating the work
- Effect of client expectations on the project

These groups of activities essentially embody the full range of tasks and responsibilities that project managers will encounter in their assignments. The remainder of this topic—organized according to these groups—provides specific guidance and identifies practical methods, tools, and techniques that can be used to carry them out.

Project managers should be actively involved in the development of proposals and agreements. Both small and large offices require a certain discipline when developing these documents, since they establish the foundation for project success or failure. Ideally, the project manager will be included in the initial preparation of proposals and agreements as well as in the negotiation of final agreements. Participating in this process will give the project manager an intimate knowledge of both the firm's and the client's goals, and his or her familiarity with the issues will help the firm maintain continuity throughout the delivery process. Encouraging involvement of the project manager during this crucial stage of relationship-building with the client also demonstrates the firm's confidence in the leadership and authority of the project manager.

TWO SIDES OF PROJECT MANAGEMENT

Project management has two basic sides, which must operate in unison for success to be achieved in any project management assignment.

THE OBJECTIVE SIDE

Some project management responsibilities spring from what is objectively defined by the architect's contract for services. These include issuing notices; providing certifications; and reporting findings, decisions, and observations. Other objective responsibilities may be viewed as industry standards, including such things as attending project meetings, preparing meeting agendas, writing meeting reports, and generally attending to correspondence and documentation.

THE SUBJECTIVE SIDE

Subjective and more intangible responsibilities often require a broader application of judgment than objectively identified responsibilities. This side of project management relies on attitude, personality, behavior, and even personal habits. It involves people skills, such as being a good listener, motivating team members, and leading conflict resolution. For example, project managers are called on to remain calm and function as leaders in times of stress or duress. Project managers must frequently act as teachers to help others understand the decisions required to move the project forward.

PROJECT MANAGEMENT IN SMALL FIRMS: PYRAMID TO MATRIX

In many small architecture firms, the principals, who are usually also the firm owners, are the primary project managers. Principals do all the client contact and project tracking; all information flows through them; and they are the main decision makers. Not surprisingly, partners in these firms frequently work long hours and complain about not having time for design or for firm development.

THE PYRAMID PROBLEM

The project management model used by these firms is known as a pyramid structure. Principals, at the top of their pyramid, often become a bottleneck in the production process, causing delay and wasted effort. Because principals are frequently gone from the office, critical information can be missed and last-minute design changes may be common. If a principal were to disappear completely for some reason, much critical knowledge would also disappear, debilitating the projects and the firm.

As the day-to-day deadlines loom, firm leaders who use a pyramidal project management model may find it hard to turn their attention to firm management tasks. Even though they know they should turn their focus to outreach; to tracking backlog, cash flow, and other financial metrics; and to assessing staff effectiveness, the demands of current projects make this very difficult. Strategic thinking is put on the back burner, and short-sighted decisions are sometimes made as attention moves from one firefight to the next.

THE MATRIX SOLUTION

In the matrix model of project management, professional staff members other than the principals are the primary project managers. In addition to giving the principals more time for marketing and firm development, it gives selected

(continued)

employees more of the billable work. If workload declines, this can make a real difference in being able to retain highly valued staff.

When a talented staff member assumes a project manager role, they are given responsibility and challenge, inevitably resulting in increased commitment and enthusiasm. The principal in charge of a project can then support the project manager with mentoring and quality review. Some principals will also serve on the project team as the lead designer or technical expert.

By letting go of project management, firm leaders are able to focus on work that enables the firm to sustain, even through troubled times. In addition, it introduces a systemic change that can result in higher productivity and employee retention. Even in a firm of two people, one owner and one professional employee, a matrix model can be applied, freeing a sole proprietor to focus on business development.

By transferring project management from principals to project architects, firm leaders will position their firm for growth, if that is their goal. In a pyramid model, growth is only possible by adding more pyramids (principals), but growth through adding pyramids is limited. While the firm may get bigger, it is unlikely it will be more profitable, more productive, or more innovative. By moving to a matrix model, growth is enabled because firm leaders are freed to do what only they can do—network, acquire projects, and set new directions for the firm.

Rena M. Klein, FAIA (adapted from *The Architect's Guide to Small Firm Management*, Wiley, 2010)

ORGANIZING THE PROJECT

The project manager usually takes charge of planning and organizing a project. This simply means the project manager develops a primary understanding of how and when the project will be worked on and what leadership and staff will be needed to perform the work. The project manager usually interacts with firm leaders, and perhaps with other project managers, as this understanding becomes documented in a work plan.

Development of a work plan for the project begins with consideration of schedules, ways to organize relationships between the parties, the firm's available resources, and perhaps fees. In addition, how the leadership for the project will be organized and what experience and specialty levels will be required are identified.

The Manager's Organizational Tools

Organizational tools comprise some of the elements of an effective work plan as briefly described in the following. The work plan is a key part of effective project management. To be useful, a work plan need not be complicated or lengthy. For most projects, it need only include the elements listed below. Even on large projects, this information may take up no more than a few pages.

1. Project description and client requirements
2. Statement of deliverables
3. Team organization
4. Responsibility matrix
5. Preliminary project schedule
6. Preliminary staffing needs
7. Project directory
8. Internal project budget and profit plan
9. Code information (optional)

▶ Project Budgets, Work Planning, and Monitoring (10.3) further addresses the work planning aspect of project management.

Maintaining a work plan is an ongoing process. Projections for staffing, schedules, and budgets must be revisited and adjusted as new information becomes available. When carefully prepared, Items 1 through 7 can be presented to clients to illustrate how you plan to approach their projects.

Project Description and Client Requirements

The work plan includes a description of the project, including its scope and the client's budget, as well as a record of what work the client has authorized. The client's primary goals for the scope and quality of the project should also be incorporated into the project description. A project description would read something like this example:

> A 300-room four-star luxury hotel, located on the waterfront at 212 Boardwalk Street in Any City, including two restaurants, conference facilities for 500 guests, a full-service spa, a resort-quality swimming pool, and landscaped grounds.

This example demonstrates how the project description can be communicated in a short statement, which can later be expanded in greater detail as the program for the project is developed.

Depending on the project phase, client authorizations may be represented in the work plan by a simple checklist of authorized work keyed to copies of signed owner-architect agreements. Client authorizations can include various kinds of documentation, ranging from letters of agreement to formal contracts to phase-completion sign-offs. The project manager tracks and monitors all of these authorizations.

Summary of Deliverables

Projects normally include a work product or deliverable produced by the architect. Such deliverables may include reports, sketches and drawings, specifications, virtual or physical models, and other items. The work plan should include estimates for the types and quantities of deliverables required to complete the work. The format of this estimate can be a simple list or a storyboard or cartoon depiction of the deliverables for each phase of the architect's services. This description and estimate provide a basis for developing the project schedule, staffing needs, and budget for the architect's work.

Team Organization

More and more, owners want information on how the architect will organize project staff, and how that staff will relate to other parties involved in the project. A chart is helpful for communicating the relationships between the project team participants.

A team chart typically reflects who the primary project leaders will be, such as the principal-in-charge, the project manager, designers, project architects, and job captains. While there can be many position titles in an architect's office, the basic intent of the team chart is to define the hierarchy of the architect's team, reflect who will be responsible for what assignments, and show primary relationships between members of the project team.

Usually, there will be one or more project leaders, regardless of project size. For a large project, several project leaders may appear on the project management team. For a small firm and a small project, the architect's project team chart may include only the firm principal.

Project Coordination Matrix

A companion task to defining deliverables is determining who will do what on the project. When a project requires consultants, it is important to have an explicit understanding of what each consultant will do. For example, it is not enough to have a seat-of-the-pants understanding that the MEP engineer will "do the MEP engineering." A more detailed understanding would distinguish responsibilities such as these: "The electrical engineer will wire and circuit the landscape architect's lighting design," or "The MEP engineer will coordinate HVAC equipment selections with the acoustical engineer." Table 10.1 illustrates a project responsibility matrix, which is a convenient way to communicate project assignments.

Preliminary Schedule

Most requests for proposals (RFPs) received or tendered by the architect relate in some manner to the project schedule. This means the work plan should delineate the preliminary project schedule as clearly and as accurately as possible. Whether the objective is to complete a retail project in time for the fall shopping season or to open a sports

TABLE 10.1 Project Coordination Matrix

	Office Building	A	TA	S	MEP	C	L
1	Site Landscape & Grading					X	X
2	Site Grading & Drainage					X	X
	Site Lighting				X		X
8	Structural Engineering: Base Building			X			
9	Structural Engineering: Tenant Specialties			X			
11	Stairs: Lobby Monumental Stair	X					
13	Exterior Envelope, Roofing, and Details	X		X			
14	Doors & Hardware	X	X				
16	Interior: Main Lobby, Core Areas, and Toilets	X	X		X		
17	Interior: Tenant Areas		X		X		
23	HVAC: Base Building	X			X		
25	HVAC: Tenant Distribution		X		X		
26	Plumbing: Base Building	X			X		
28	Plumbing: Tenant		X		X		
30	Electrical: Base Building	X			X		
31	Electrical: Tenant		X		X		

Legend

A	Architect
TA	Tenant architect
S	Structural engineer
MEP	MEP engineer
C	Civil engineer
L	Landscape architect

facility for the opening home game, the owner's goals for the project often dictate its major milestones. Into this mix, the architect must project the team's ability to perform the work within the owner's set of key dates. The preliminary schedule is one of the primary drivers of the architect's assessment of staffing needs.

Preliminary Staffing Needs

Preliminary staffing requirements can be estimated once the project scope has been delineated, the deliverables understood, the consultant's responsibilities defined, and a preliminary schedule developed. The project manager may work with upper management (in a larger firm) to determine what key personnel will be available and what support staff will be required. If available staffing becomes a greater constraint on the firm's ability to deliver the project than the client's scheduling goals, the firm may need to revisit the preliminary schedule with the client and perhaps revise it.

Project Directory

A project directory with current listings for all project entities and their key personnel should be included in the work plan. This can be prepared in a format the firm normally uses, or the entries can be printed from an e-mail management program such as Microsoft Outlook. More simply, organized copies of business cards can be used to develop a directory.

Project Budget and Profit Plan

The project manager may sometimes be assigned the duty of apportioning the project fee to the various tasks required to produce the work to help estimate and plan for the firm's profit. Often referred to as a job cost budget or a project budget, a current copy of this should be included in the work plan.

Regulatory Requirements

Information about the primary building code(s) and local amendments that will apply to the project can be a very useful part of the work plan. This information could range from a simple list of the applicable codes and ordinances to a full building code report prepared by the architect. Including this information gives the project team a close-at-hand opportunity to get an answer to the frequent question, "What code are we using?"

▶ See Building Codes and Standards (13.1) for a detailed discussion of codes and regulations.

FACILITATING THE PROJECT

As the role of the project manager has evolved, what was once thought of as "controlling" the project has come to be more a role of "facilitating" the project. The delivery of design services is facilitated through communicating effectively; developing good working relationships with the client, contractor, and consultants; providing assistance to parties whose decisions are necessary to keep the design services moving forward; and developing and using effective documentation.

Project Staffing

When project leaders and staff positions have been identified, the project manager reviews the project organization chart and the required tasks to verify that assigned staff have the needed skills and experience for the work they will be doing. In fact, staff experience is rarely evenly matched to the project assignments, so the project manager will always need to make adjustments to effectively use the talents of everyone assigned to a project.

Project managers often face the conundrum of balancing the staff needed to do the work against the project staff the fee can sustain. In this situation, the vulnerability faced by both the firm and the project manager is the temptation to sacrifice quality for profit. The firm principals should debate this philosophical question and reach a stance that can be incorporated into the firm's culture so that this burden is taken away from the project manager. The project manager must be allowed to focus on the quality of services provided to the client.

Managing the Project Team

Managing the project team? This sounds like an overwhelming responsibility. However, the basic requirement boils down to a few key ideals. The first calls for understanding what the team is to accomplish. The second requires an understanding of who on the team has the skills to do what tasks, and where additional resources may be needed. The third is fostering a communications environment in which all parties are kept informed of what is expected of them and when their assignments are due. The key tools and techniques for accomplishing this are the work plan, effective management of project meetings, and reasonably thorough documentation of key project decisions and actions.

Client Relationships

The project manager's relationship with the client is key both to understanding the client's goals and to communicating with the client. This relationship must be close enough that the project manager can gain a comfortable understanding of the client's expectations. If the client's expectations do not align with the architect's intended services, then either the architect's services must change or the client's expectations must change. Having confidence in each other's abilities and integrity will facilitate resolution when conflicts occur. Candor and honesty are always beneficial for developing a relationship in which news and events can be presented with a neutral, unemotional attitude.

Decision Making

It is commonly understood that there are few occasions when the architect makes a decision. Instead, the architect typically gives a *recommendation* upon which the client may base a decision. For example, the architect makes decisions about substantial completion and final completion, but commonly these decisions are heavily infused with input from the owner and the contractor. In a dispute, the architect—seeking faithful performance by the owner and the contractor—renders a decision about conditions that can reasonably be inferred from the construction documents. The full range of the authority and decision-making responsibilities of the architect are generally delineated in the owner-architect agreements and in the general conditions of the contract for construction.

The architect does not decide on changes in scope, quality, or time except in specifically contracted circumstances. However, although project managers cannot make decisions for the client, they can facilitate needed decisions by providing support and explanations to the client. For example, the project manager may prepare an executive summary of the pros and cons that the client might consider in making a decision. Or the project manager might research alternative materials and costs that reflect the options the client can choose from. Such support from the architect makes the client's work easier, and will inevitably also make the architect's work easier. (The importance of carefully documenting the client's decisions is covered later in this topic.)

Managing Project Meetings

Successful project managers must learn to orchestrate and administrate project meetings. All project managers have faced the frustration of disruptions, lack of preparation on someone's part, or disruptive—even angry—people while trying to run a meeting. It is possible to take an analytical view of managing meetings and look at some ways a project manager can be more effective. A first step is to understand the obstacles to a successful meeting, which include the following:

- Too many people in attendance
- A disruptive participant
- People who don't pay attention
- Unprepared attendees
- Sidebar conversations
- Cell phone or PDA interruptions

You will have to find a way around such obstacles, even if it means bringing a gavel to the meeting. You don't want the meeting so out of control that you have to raise your voice to get attendees to pay attention.

Meetings Schedule

Arguably, for any project—but particularly for projects with more than three or four participants—it is important to hold regular meetings. Setting a routine by conducting the meetings on the same day of the week at the same time is advisable. Personal schedules tend to fall into a groove, and the participants will adapt more effectively to regularly set meetings. On smaller projects, it will save time and expense to organize the meeting via conference call if the agenda is short. Remember, it is important not to skip meetings. Missed meetings erode communication, and lack of communication is at the root of most problems on architecture projects. (See Table 10.2.)

TABLE 10.2 Meeting Management Plan

Type	Purpose	Attendees from Firm	Recorded by
Executive Session			
Participants:			
Principals	Executive-level representation	Principal-in-charge	Project manager
Owner		Project manager	
Contractor/CM	Decision making		
AE team			
Design Review Session			
Participants:			
Owner	Design direction	Principal-in-charge	Project manager
Contractor/CM	Design review and approvals	Project manager	
AE team		Project architect	
Project Meeting			
Participants:			
Owner	Project planning and general decision making	Principal-in-charge	Project manager and project architect
Contractor/CM		Project manager	
AE team		Project architect	
Special consultants			
Coordination Meeting			
Participants:			
Project architects	Coordination	Project architect	Project architect
Project engineers	Work session	Job captain	
Optional			
Contractor/CM			
Owner			
Redline Work Sessions			
Participants:			
Project architect	Coordination	Project architect	Job captain
Job captains	Work sessions	Job captain	
Consultants' staff			

Meeting Management Plan

The primary purpose of a meeting management plan is to ensure people attend the meeting when their input is required and stay away when it is not. Decisions cannot be made or obtained without the necessary participants. Conversely, you cannot facilitate decision making as effectively when non-decision makers are debating the issues.

Most projects involve a hierarchy within the client organization, design team, and contractor and subcontractor team. Not every project participant needs to attend every project discussion. Whether the project is large or small, discussions run more smoothly and time is used more efficiently when meetings are divided into executive sessions, project design meetings, general project meetings, coordination sessions, and redline work sessions. Table 10.2 illustrates a meeting management plan type that can be shared with all parties.

Executive Sessions

Critical and formative decisions are made at the highest levels in an owner's organization. Whether the client is a large corporation or a couple desiring a new home, there will be key meetings during which important decisions are made. These meetings are most effective when as few attendees as possible are in the room. Meet with the owner and other key project leaders early on, and develop an understanding of who will make critical decisions about aesthetics, scope, cost, and schedule. Schedule executive sessions separately from other meetings, and invite only key decision makers.

Project Design Meetings

When design aesthetics are presented and discussed, it may not be necessary to have all the technical leaders present. For example, when lobby floor paving patterns are discussed, input from the mechanical or electrical engineer may not be needed. A generally successful approach is to make design presentations and solicit owner concurrence with the design direction early in a meeting—before most other participants arrive for a general project meeting, or even on a separate day. Owners tend to become more engaged in design issues without the distraction of unnecessary attendees. On smaller projects, owners are more engaged when design issues are kept separate from technical issues.

General Project Meetings

Meetings with authorities having jurisdiction (AHJs), such as zoning or code officials, may be considered to be coordination sessions.

These are meetings when approved design direction, scope, cost, and schedule are presented and discussed with most or all of the project team members. The agenda should be carefully prepared to keep the meeting as short as possible while accomplishing the purpose of keeping everyone informed. Because general project meetings tend to involve larger groups, it can be difficult to solve detailed or worrisome issues during the meeting. The best use of everyone's time is to designate attendees who will be responsible for resolving and presenting the details of such issues. The discussions required to resolve these details can take place in coordination sessions.

Coordination Sessions

Also commonly called consultant work sessions, these meetings are the time to discuss and resolve issues related to building systems and other detailed aspects of the project. For example, the architect and MEP engineers could discuss clearances required for lights, sprinklers, and ductwork located in the plenum above the ceiling in an office building. The architect and structural engineers would discuss establishing dimension control for the structural column grid. Depending on their tolerance for long, detailed discussions, owners may or may not choose to attend such meetings. If the client does decide to attend, the project manager must take care that discussion of details is not postponed due to the client's lack of interest or patience.

Redline Work Sessions

These are the most detailed of all project meetings. In them, basic details for arranging and coordinating the building elements are discussed. For example, the architect and structural engineer might coordinate slab edge and brick ledges, or the architect and lighting consultant might coordinate fixture types and locations. These meetings are most successful when the topic is narrowly focused and the number of attendees is minimized. Often the only agenda items are the drawings and specifications.

The meetings described above encompass most activities that must be managed during the design and documentation phases of most building projects. On larger projects, some of these meetings may actually involve separate groups, and some meetings may be held at separate times. On smaller projects, all of the meeting categories may simply be divisions of the meeting agenda for one meeting. Persons attending and documenting these meetings are assigned and requested to attend based on what the project manager expects to accomplish.

Effective Agendas

Project managers commonly arrive at a meeting with a single sheet of paper titled an agenda. This approach reflects a misunderstanding of what is to be accomplished by using an agenda. The actual purpose of an agenda is to facilitate discussion rather than to remind attendees of what is to be discussed. Therefore, in addition to the typical list of discussion topics, the agenda should be attached to other pertinent information, such as e-mails, memoranda, schedules, budgets, reports, and the like. While this consumes more paper, attaching pertinent backup information to the agenda removes the risk that an important discussion item will be tabled because a particular attendee cannot recall the details to be discussed.

It is also important to gauge the amount of time to be allocated to each agenda item. To effectively moderate the meeting, the project manager should encourage making a decision and moving on to the next topic after an appropriate amount of discussion. Just as important, however, is the ability to recognize when additional discussion is healthy and to allow the dialogue between attendees to continue without interruption.

An effective project management tactic is to include an item that may be a sticky issue on the advance copy of the agenda to get attention, even though the item may not appear on the final agenda.

The list of agenda topics should be distributed a day or two in advance of the meeting, along with a request for comments. Although some recipients won't bother to read them, at least everyone will have an opportunity to influence the structure of the meeting.

Reporting on Project Meetings

Meeting reports, sometimes called minutes, are a record of the general discussion, decisions made, directions given, and assignments accepted during the course of a project meeting. With time-driven assignments, it is advisable to publish meeting reports as soon as possible after the meeting. A copy of the agenda and any meaningful handouts presented during the meeting, along with copies of drawings or sketches, should be attached to the meeting report. The entire information package can be distributed quickly and inexpensively via e-mail. Meeting reports may be prepared by the project manager or a team leader appointed by the manager. The primary reporter for each type of meeting should be designated in the meeting management plan.

Although some managers believe meeting reports are primarily prepared for risk management purposes, the effective project manager understands the primary purpose of minutes is to facilitate communication among project participants. Meeting reports should be distributed to all pertinent persons—whether in attendance or not—so they can stay up-to-date on the project status, recent decisions, and what is expected from members of the project team.

Reports should record discussions in enough detail so that decisions and directions given—even if not expressed verbatim—can be reconstructed. The two most popular styles of meeting reports are the narrative report and the action-item report.

Narrative Meeting Report

During the design and construction documentation phases, issues tend to be a little fuzzier than during the construction phase. While the need for prompt and accurate decision making is not diminished during these phases, the narrative style tends to be less intimidating to clients and thus can actually encourage them to make more timely decisions. Functioning as more of a "history," the narrative meeting report accommodates detailed explanations of issues that may not require follow-up action.

Effective managers develop personal documentation habits that become part of their daily work. Documenting key aspects of a project is not drudgery to them because it is essential to the way they manage. Writing a meeting report, making handwritten notes, or sending a client a contract proposal becomes second nature.

Action-Item Meeting Report

This format consists of a list of items or issues designated with a unique, nonrepetitive number. It is helpful to key each action item to the particular meeting where the issue was raised. For example: Item 21.01 represents the first new report item for meeting 21. The item is assigned to a firm or individual and is not removed from the report until it has been fully addressed or resolved. Each item should be given a due date. This provides a constant reminder to encourage resolution of the action item in a timely fashion.

It does not matter if meeting reports are handwritten or typed, although many architects prefer the formality of the latter. It also does not matter what style of report is used. For example, some managers may use a simple list of bullet points to record the meeting discussions. What does matter is that the project manager communicates the discussions to everyone involved as he or she understood them, and that the directions and decisions are recorded as he or she heard them. Sharing this information gives all participants the opportunity to clarify any objections to how any item was perceived and recorded. Sharing the report also gives everyone the information they need to coordinate their efforts.

THE IMPORTANCE OF GENERAL PROJECT DOCUMENTATION

From concise contracts that define the obligations of the parties involved in a project to meeting agendas and meeting notes that facilitate effective project meetings, good documentation is the essential fabric of effective project management.

Careful documentation of milestone events and decisions—in some orderly form—is necessary for successful project management. Managers who do not retain at least a brief history of "who told what to whom" and "who decided what when" assume the risk of being unable to prove that such events occurred, a validation that could be critical for resolving any disputes that arise.

Good documentation is more than a defensive procedure to protect the architect in a dispute, however. It provides the basis for effective communication between team members and keeps all parties informed about what has taken place in the past, what is currently taking place, and expectations for what will take place in the future.

Basic Correspondence Rules

There is no industry manual for architects to follow in developing procedures for correspondence and other basic documentation. However, there are some basic principles to follow. For example, all correspondence—e-mail, letters, memos, and transmittals, as well as drawings and sketches—should bear a date and identify the project. Correspondence that cannot be connected to a specific project or cannot be placed in time in all likelihood will be virtually useless.

Memoranda

A memorandum is best used to provide an understanding of the detail of an assignment that has been accepted by a team member. Used in conjunction with a more abbreviated description that might appear in a meeting report, the memorandum provides the necessary level of detail about assignments that team members need to proceed toward delivering the project in the same orderly direction. In today's workplace, e-mail can often serve the purpose of a memorandum. If an e-mail is the preferred platform for sending a memorandum, care must be taken to include the project identifier (name or number); the date will come as a by-product of the medium.

Action Item Lists

The action items list is used to track the issues recorded in the meeting minutes and memoranda. If an action item–style meeting report is being used, creation of a separate list may be unnecessary, although some clients like the "issues at a glance" convenience afforded by an action items list, which consists of items or issues with brief descriptions given a unique, nonrepetitive number. The list itself might be numbered, or it might be sufficiently tracked by date. It is helpful to key each item to the meeting, memorandum, or other event where the issue was raised. Items may be assigned to a firm or an individual, and they are not removed from the list until they have been resolved.

Documenting Conversations

Conversations occur during meetings when others are present. Conversations also occur over the telephone or during chance encounters or in personal meetings. It is probably not necessary for a project manager to keep a record of every conversation that occurs during a project; however, it is necessary to document conversations that can meaningfully affect the project. It is important to keep a record of who generated decisions and direction, as well as when and where these actions were taken.

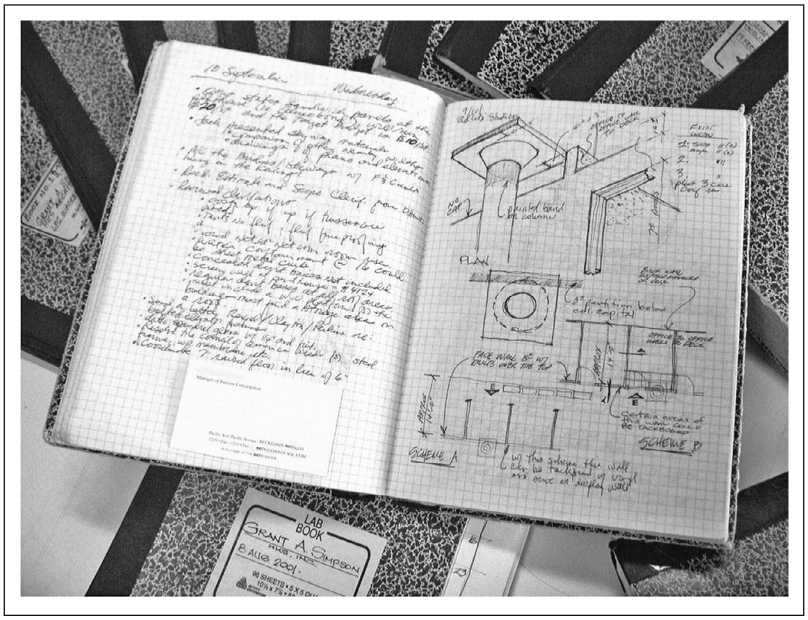
Important conversations that occur outside of regularly scheduled project meetings can be recorded in several ways. Some firms use a communication record or a telephone memorandum to document them. Whether typed or handwritten, a copy of these documents can be given to the person with whom the conversation took place, as well as to the entire project team, when appropriate. A decision to approve the schematic design submittal or to extend the construction documents schedule might be copied to the entire team, while the record of negotiating the client's approval of an additional service request might be copied only to the client.

E-mail

E-mail is a useful business tool, but it is double-edged. The positive side of e-mail is that it is fast. It does not require direct interaction with a person and can be prepared at any time, without regard to a set schedule. But e-mail also has a negative side. The effective project manager must be aware that the more e-mail he or she sends, the less face-to-face personal communication is undertaken. Everyone has received a seemingly rude e-mail, only to discover after further messages or phone calls that the rudeness was unintentional. Moreover, e-mail can more easily be misunderstood than a phone call or a personal conversation. For this reason, when potentially tense or complex topics requiring in-depth discussion arise, project managers should step away from the keyboard and reach for the telephone.

Personal Journal

A valuable tool for the project manager is a personal journal, as illustrated in Figure 10.1. Kept with the manager at all times, a personal journal provides an excellent opportunity to integrate contemporaneous documentation into the daily routine. Meetings, conversations, and casual notes; sketches and business artifacts, such as business cards, can all be recorded or placed in the journal. As project participants become accustomed to seeing the manager with the journal, they will begin to reference it as the project record. The manager will also become dependent on the journal as the key reference source for



Grant A. Simpson, from 14th edition, 13.2: Managing Architectural Projects. P. 711.

FIGURE 10.1 Sample Personal Journal

decisions made and direction given and other project experiences. In undertaking to keep a journal of this sort, the project manager must decide whether to keep only one journal for all ongoing projects or to keep a separate journal for each project.

Managing Information

Managing and directing the flow of project information and saving that information in an orderly manner is perhaps the most important responsibility of the project manager. Of course, not all project information is created internally. As information is received from outside sources, such as the owner, consultants, or contractors, it must be processed. Processing includes noting the date the material is received, determining who requires copies, and deciding how the information will be preserved and filed.

SAMPLE PROJECT FILING SYSTEM

- 01 Accounting
    - 01 Agreements
        - 01 Owner-architect
        - 02 Owner-contractor, general conditions
        - 03 Consultants
        - XX Other
    - 02 Invoices
    - 03 Expenses
    - 04 Insurance
- 02 Marketing
- 03 Correspondence
    - 01 Owner
    - 02 Contractor
    - 03 Consultants
    - XX Other
- 04 Meeting Agendas and Reports
- 05 Memos and Lists
- 06 Project Data
    - 01 Project summary
    - 02 Project directory
    - 03 Codes
    - 04 Estimates
    - 05 Bids and addenda
    - 06 Schedules
    - 07 Site data
    - 08 Reference
    - 09 Photographs
    - XX Other
- 07 Drawings
    - 01 Architectural
    - 02 MEP
    - 03 Structural
    - 04 Consultants
    - XX Other
- 08 Specifications
- 09 Construction Phase
    - 01 ASIs, RFIs, CCDs
    - 02 Observation reports
    - 03 Submittals
    - 04 Logs
    - 05 Certifications and payments
    - 06 Change orders
    - 07 Closeout
    - XX Other
- XX Other

Distribution of Information

Good project management includes making day-to-day decisions about who on the project team needs to see what. Some decisions, like sending a plumbing shop drawing to the MEP engineer, are predetermined, but others require reasoned judgment. While it is not always possible for the project manager to look at every project document or file that is received, he or she must know who is responsible to look at what documents and when they must be looked at. The project manager must either decide who will receive what or set up the protocol for others to make that decision. If the firm does not have a central receiving station where mail is received and stamped, the project manager should decide who on the team will receive mail and how it will be dated and distributed.

Project Filing System

A project filing system must be flexible and comprehensive enough to accommodate many types of project information. This includes letters, memoranda, e-mail, sketches, drawings and specifications, submittals and shop drawings, test reports, and surveys. Some of these items will be physically filed and some will probably exist only electronically, while others will be drawings, oversized materials, and physical samples. Information, regardless of its type, must be preserved in an orderly manner so it can be easily searched and retrieved. Some firms and managers, not realizing the critical importance of a project filing system, essentially use the "read and stack" method, resulting in waist-high piles of unsorted, though possibly chronologically stacked, information.

When trying to locate information that has been filed, predictability is essential. This is important for the project team as well as others who may need to access and use the project files. To make it easier to find material, most firms—large and small—develop a standard filing structure. As electronic files increasingly replace paper files, the electronic file directory structure should closely track the paper file directory structure. This means whether searching in your metal filing cabinet or on your desktop computer, you will be in familiar territory. A sample directory structure that is effective for both paper and electronic files is shown in the sidebar, "Sample Project Filing System". Additional files can be created as project-specific needs arise. For example, if the project is a theater, there will probably be an acoustical consultant file. A firm designing small projects may require fewer file categories. Firms with larger or more complicated projects may develop a more extensive system than the one illustrated.

EFFECT OF CLIENT EXPECTATIONS ON THE PROJECT

A significant ingredient for project success involves understanding and meeting client expectations. The foundation of the client's experience is the client's expectation of how the architect is to perform. The project manager who understands the client's expectations has a better chance of successfully guiding the project team's effort to meet them. If client expectations are unreasonably high, the architect may not be able to meet them even if they are fully understood. In such cases, the architect may need to help the client understand the capabilities of the firm and set more relevant and reasonable expectations.

The first step toward meeting client expectations is to discuss with the client the services to be provided. The work plan can be an effective tool for doing this. Differences between the services the client expects and the services the architect intends to provide must be resolved as early as possible. Ignoring such differences in hope that conflicts will not occur is shortsighted.

Tracking Required Services

The project manager's best efforts will not be sufficient if he or she does not monitor the progress of the project against project goals and objectives, the responsibilities established in the owner-architect agreement, and what is required by the standard of care. Project services are established by the architect's contract with the owner as well as what is expected by the standard of care for such services.

The Agreement

Project managers should keep a copy of the owner-architect agreement in a notebook at their desks at all times. As questions about services arise, the manager can refer to the contract to see if the issue is addressed. The manager should make a checklist of any contract-mandated reports or notices, schedule them, and monitor whether they are being implemented. For example, the contract may require written notice of the architect's awareness of a schedule delay. Effective project managers understand that compliance with contract requirements is *not* optional. Monitoring whether contract provisions are being met is a serious responsibility. For this reason, the project manager should have a copy of the agreement at the ready, and read it often enough that it is dog-eared and annotated to excess when the project is concluded.

▶ Risks and Emerging Practices (16.3) identifies potential risks and risk management strategies concerning the emerging practices of sustainable design, building information modeling, and integrated project delivery.

If one of the project parameters of scope, cost, or quality is changed, it will affect one or both of the other parameters; thus, a change in one component should not be considered without evaluating the impact on the others. The project manager should keep all issues on the table during change discussions and determine that the owner fully understands these dynamics and the potential result of any change.

—James B. Atkins, FAIA

Standard of Care

Not all activities the architect carries out on a project are described in a contract. Things not described might include, for example, making a subjective judgment as to how complete a set of drawings must be or how often the architect should visit the job site during construction. Such matters relate to the "standard of care" concept, which can be stated in many different ways but essentially boils down to the notion that the architect is required to do what a reasonably prudent architect would do in the same community, in the same time frame, given the same or similar facts and circumstances.

There should be no confusion about the standard of care, which is used in the courts for adjudicating cases involving the work of design professionals. From time to time, the project manager must step back and take an introspective look at the project and the services he or she is managing. If this observation reveals something is missing, or services are not running smoothly, the manager should take corrective action.

Monitoring Client Objectives

The architect designs a building to accomplish as many of the client's stated goals and objectives as possible. Those objectives are generally focused on the scope of the project, its cost, and its desired quality. Careful attention must therefore be given to how closely the design accommodates these objectives. The project manager should make frequent comparisons of the current design to the client's objectives. If gaps or differences between the design and the client's objectives are found, the manager must take corrective action. This could mean reviewing the differences with the client to determine if the design, the construction budget, or the level of quality should be revised. Small corrective measures could simply require minor revisions to designs or candid discussions with the client.

Project Program

Clients establish programs for their project to define project uses, the project size or scope, and the desired quality. The project manager must monitor how well an evolving design addresses each of these programmatic elements. This may include periodically preparing floor-area tabulations to check the project size or obtaining samples of proposed materials and finishes to verify compliance with quality goals. It could also involve checking the detailed program to verify that the design accommodates the intended uses.

Construction Budget Targets

Although most architects are not construction cost estimators, the project manager should understand the relationship between scope, quality, and cost. The manager should have a good enough grasp of all aspects of the project to be able to make appropriate recommendations for scope or quality adjustments in the event cost estimates or bids exceed target construction budgets.

► See Project Budgets, Work Planning, and Monitoring (10.3) for further discussion of project tracking.

By far the best approach to meeting client expectations for construction budgets is to carefully monitor the relationship between scope, quality, and cost as a design is being developed. Architects and clients alike are frequently tempted to look past a potential conflict between budget and estimated construction costs, hoping the conflict will be resolved in competitive bidding or subsequent events.

The best practical way to resolve such conflicts—although it may be a painful experience—is to sit with the client and review and adjust one or more of the project parameters of quality, time, and cost before proceeding to the next step in the design process. To help stay on top of this issue, budget compliance or adjustment problems should find their way into meeting agendas and be discussed regularly with the client and the project team. Any statements of probable cost provided by the architect, or required by the contract, should be discussed frequently and provided at required project milestones.

Managing Consultants

The way to "do better work" for many projects involves finding a better solution to coordinating with the work of consultants. Architects and consultants face similar problems in project delivery, such as:

- Reaching the finish line at about the same time to avoid disruption when documents are issued for bidding or construction
- Making sure all parties are using the same versions of the plan backgrounds
- Uncovering and coordinating conflicts between the work of different disciplines

Project managers must allot time and resources to attend to challenges such as these.

Quality Management

Some project managers believe that quality management and quality control are relegated to the technical guys in the back room. Nothing could be further from the truth. In managing and controlling quality at the project level, quality must be a daily concern of the project manager. As with other management responsibilities, this does not necessarily mean holding a red pencil and constantly marking up the efforts of the people producing the work, any more than the project manager is required to actually prepare the drawings and specifications—although some project managers may choose to do so. It does mean the project manager must know the status of the work at all times and must oversee and direct quality management controls as they are performed.

▶ Origins and Development of Quality Management (12.1) addresses quality management as a system that supports and improves a firm's performance.

Responsibility for Document Reviews

The project manager should consider document reviews as an opportunity to uncover mistakes and other conditions before they create problems during construction. However, many managers are reluctant to invite the criticism that results when documents are reviewed, possibly fearing being perceived as poor managers when scrutiny reveals deficiencies in the work they are directing. The irony of this thinking is that the contractor and subcontractors—through requests for information and change orders—will surely discover deficiencies that make their way into the construction drawings and specifications.

The project manager should schedule both time and resources for internal reviews of the project construction documents, if possible before the project is issued for bidding or negotiation. In small firms, the review might be made directly by the project manager. In large firms, the manager may select a reviewer, often a leader from another project. Specification writers can provide valuable internal peer reviews as their familiarity with the project helps them coordinate terminology between drawings and specifications and identify areas in the drawings where materials or systems have not been correctly represented.

The manager should always be present when review results are presented. Project managers sometimes are tempted to skip these sessions because they are tedious and technical. However, the identification and correction of errors and omissions in the architect's work is an important enough occasion to merit the attention of the primary project leader or leaders. Despite its advantages, peer review checking should not be viewed as a substitute for thorough coordination or creation of a reference set prepared by the project team.

AIA Document D200™–1995, Project Checklist, lists tasks (organized by phase) that architects may perform on projects.

External review of the project documents can also be useful. The project manager should welcome such reviews, whether they are provided by owners, contractors or subcontractors, agencies to which applications have been made for building permits, or architects or engineers specializing in plan checking. Most external reviews provide an excellent opportunity for the project manager to improve the quality of drawings and specifications.

▶ Checklists (12.3) discusses the use of checklists as tools in high-quality professional performance.

Setting Expectations

An effective way to meet client expectations is to help set them. This is most often accomplished through frank discussion of potentially tough issues, before they become problems.

Tackling Difficult Issues Head-On

Architects do not always talk with clients about the services they provide. Often they try to sugarcoat tough issues in an effort to be viewed as non-confrontational. For example, although errors and omissions are a normal part of professional life, many architects avoid bringing up the subject. However, it is best to discuss

CREATIVE CONFLICT

A communication technique that can be useful for the project manager is what is called creative conflict, a process in which people engage in debate or even argument, making them more likely to recall the issues later on. Without being overtly adversarial, an effective project manager can lead a debate over an issue in an effort to gain consensus.

For example, if a client is pressing for a very aggressive schedule, the project manager can turn the focus away from the architect's ability to do the work faster by describing to the client realistic consequences of speeding up the work. These could be phrased something like this: "There are two alternatives for how we can proceed: (1) attempt to accomplish the more aggressive schedule, with an understanding that we all may make more mistakes as we try to work faster and acknowledgment of the relationship between the cost of mistakes and your request for speed, or (2) maintain the present schedule."

The client will likely express dissatisfaction with the concept of taking responsibility for the cost of mistakes that result from rushing the process. The alternatives the project manager outlines must represent reasonably perceived truths that place the manager on solid ground. The client will probably not forget the conversation after such an issue has been debated.

In all cases, however, the architect's belief should be discussed with the client *when a change is requested* and not after the change has been completed. Even if the architect is overruled, the owner is likely to remember that such concerns were expressed.

difficult issues associated with project expectations directly with the client and other project participants. Determine what each participant believes is true and what is reality. With an understanding of any different perceptions, the issues can be debated in the best interest of both the client and the project. If this communication does not take place, conflicts are definitely on the horizon.

Explaining Consequences

Discussing the potential consequences of a decision or a change is important. Clients may not always want to believe what the project manager has to say and, in fact, may disagree. Nonetheless, they usually want to hear the project manager's opinion because it is part of the service they expect. For example, if a client decides to eliminate waterproofing on the basement walls, it is not enough for the architect to simply disagree with the decision. The project manager should go a step further and explain that the decision could result in water leaking into the basement, causing damaged finishes and expensive repair costs. While such consequences may seem obvious to the experienced project manager, they might not be so obvious to the owner. Other client decisions may have less obvious consequences. For instance, a decision to save money on a building system may be likely to increase maintenance expenses. The project manager should tell this to the client in plain language. As long as the potential consequences described represent the project manager's understanding of the truth, the manager is on solid ground.

A WORD ABOUT "ABSOLUTE" EXPECTATIONS

Architects frequently do not realize that they may be setting unrealistic expectations for their performance by using jargon that many clients do not understand. The use of "unqualified" language can put the architect in the position of being held to an undefined or unrealistic standard.

Architects tend to state things in absolutes because they want to explain things clearly and without ambiguity. This use of absolute terms may stem from the fact that most owner-architect agreements delineate payment of professional fees in accordance with the percentage of work completed. Thus, the architect may label a set of construction drawings "100% complete" in order to qualify for payment. However, in fact, a single set of construction drawings is unlikely to be 100 percent complete, and labeling them as such can create an expectation of performance that is unintended and even unachievable.

Table 10.3 illustrates some common absolute language encountered in project management, along with language that more accurately portrays what may realistically be expected.

If a project manager becomes an overt advocate only for the architect, he or she risks abandoning and alienating the client. The best approach is to adopt the objective attitude that a good project is a successful project, with ordinary problems and a satisfied client. Clients are likely to be more satisfied when the project runs smoothly, schedule and cost surprises are few, errors and omissions are relatively few, the client is kept informed about the construction process, and the project complies with the client's program. Avoiding unnecessary or unacceptable risks for all parties can go a long way toward achieving success.

TABLE 10.3

Document	Unqualified Language	Suitable Alternative
Proposal letter	"We look forward to designing a first-class new school for you."	"We look forward to designing your new school project."
Drawing set cover sheet	"100% Complete Construction Documents" "50% Schematic Design Set"	"Issued for Construction" "Interim Schematic Review Set"
Field observation report	"The masonry walls have been completed."	"The masonry walls appear complete."

MORE THAN A SERIES OF TASKS

Project management is critical to any architect or architecture firm committed to providing excellent services. While the expansive nature of project management can be challenging to describe, its basic tasks include determining by whom, when, and how the work will be done; directing and leading those who will do the work; tracking how progress compares to what was planned; taking action to make course adjustments when deviation from the plan is required; and evaluating and communicating how well the work was performed.

▶ Risk Management Strategies (16.1) covers the identification and management of risks in detail.

Yet project management is more than just a series of tasks. The project manager embodies professionalism, accountability, and integrity. In line with these more subtle and less apparent qualities, project management can also be viewed as an attitude and a way of going about one's work. For these reasons, a wise architect or other design professional will remain a student of project management throughout his or her career.

BACKGROUNDER

THE EFFECTIVE PROJECT MANAGER

Grant A. Simpson, FAIA

The project manager plays a pivotal role in orchestrating and leading the project delivery effort. The effective project manager must possess and apply a variety of skills, which together contribute to achieving desired project goals and objectives.

WHAT CLIENTS APPRECIATE IN PROJECT MANAGERS

Recognizing that some behavior can lead to uncomfortable conflicts between the client, the project manager, and even the project design team itself, it is prudent for the project manager to understand what behaviors clients appreciate. Some of these are:

- Careful and objective use of authority
- Reliable performance
- A friendly and approachable demeanor
- Not being defensive
- Promptness in returning phone calls or e-mail
- Prompt arrival at meetings
- Being well-prepared for meetings
- Issuing timely reports and other documentation

In addition, some aspects of a project manager's behavior can make the job run more smoothly. These include:

- Being candid and honest
- Being accessible and available
- Being a good listener
- Being responsive to questions
- Using lay terms rather than industry jargon

WHAT MAKES AN EFFECTIVE PROJECT MANAGER?

Achieving success as a project manager requires more than just performing perfunctory duties associated with the management process. It also calls for a certain frame of mind, the ability to get along with others, and an understanding of what clients expect and appreciate. Perhaps as important as any attribute is the ability to see the big picture and keep problems and issues objectively in context.

Attitude

Project managers must have not only the skills to accomplish activities and responsibilities but also the willingness to bring an appropriate attitude to their role. Most important is dedication

(continued)

to being a strong leader. Project management is not a passive activity. The effective project manager must be willing to make decisions and take action. The project manager cannot do all of the work on a project and must rely on others to do much of it. A willingness to believe in others is necessary. However, the project manager must also frequently look beyond this belief in others in an effort to be prepared for what could go wrong. The project manager must also have the patience to teach others how to view and participate in the project.

It is the rare project manager who perceives others as doing the work as well as he or she could do it. Yet successful delegation of tasks involves understanding when the work being done is good enough.

Project managers must be willing to see project circumstances from multiple points of view and to maintain a neutral attitude when conflicts inevitably arise. Nearly every aspect of project management requires give-and-take. This give-and-take must be anticipated and embraced. The project manager who finds conflict threatening or frustrating will find successful outcomes difficult when disagreements arise.

Personality and Behavior

The most effective project managers are those who can both deal effectively with conflict and get along well with other people. To a great extent, project management is infused with the need to manage continuing conflict. Problems arise and must be resolved many times throughout the day. The level of conflict may range from simple difficulty in coordinating meeting times to intense, open disagreement among members of the team. Through all of this, the project manager must recognize that his or her behavior sets the tone of leadership for the project team.

WHAT DO PROJECT MANAGERS DO?

In carrying out day-to-day duties and responsibilities, project managers marshal and apply their knowledge and skills to lead, solve problems, motivate, advocate, and communicate.

Project Managers Lead

Project managers are vested with the responsibility and the authority to get the project designed and delivered. They interact with clients to determine the program and verify program compliance. They interact with their firm to determine whether staffing and resources are appropriate. They interact with the project team to help facilitate communication. They interact with contractors to help facilitate construction.

► Leader Effectiveness (5.5) presents a model of leadership development in architecture firms.

Project Managers Solve Problems

Unexpected issues arise as a part of every project. This makes problem-solving a critical part of the management process. Coupled with this is the need for project managers to successfully negotiate solutions to problems, with either the client or the contractor. Problems can be viewed as meat and potatoes for the project manager, served in great helpings on a daily basis. Problems cannot be avoided, nor are they the de facto evidence that someone has done something wrong. For the most part, design, schedule, cost, and quality problems are opportunities to improve the project along the way. Intuition and the ability to research, understand, and resolve problems are important attributes for a project manager.

► Negotiating Agreement (15.3) further discusses negotiation techniques.

Project Managers Motivate Others

In overseeing the work of others as the project evolves, it is often necessary for the project manager to be a coach or motivator. This calls for laying the work out in a clear way and setting reasonable goals for what is to be accomplished. If the tasks or time frame are not reasonable, the manager must either revise the work plan until the tasks are more achievable or motivate the team to rise to the occasion. A project manager must realize that most teams can stretch to meet the demands of difficult assignments, but that such assignments should be an exception and not the rule.

Project Managers Serve as Advocates

The project manager must always be an advocate for the project design team. This may include standing by firm employees or the consultants working on the project. However, at times, the project manager is called upon to advocate for the client or for the contractor. Loyalty of clients usually grows from their perception that the architect is doing a good job. The project manager can build this loyalty by understanding that the client, not the project, is the firm's valuable asset. Delivering the project through dedicated service, and taking care to understand and advocate for the client's goals throughout, can help win the client's loyalty. When clients consistently feel the project manager is on their side and has their best interests at heart, success is closer at hand. The project manager also may need to advocate for the contractor, however. For example, contractors frequently make suggestions for improving a project or reducing costs but may require the project manager's assistance to explain these suggestions to the owner.

A Pivotal Role

The role of the project manager is a pivotal one. The project manager directs the efforts of others to reach desired project goals and objectives. Successfully fulfilling this role calls for the project manager to effectively plan, facilitate, and monitor the work. Whether this role is assigned to a single person or to two or more, the effective project manager must be able to understand and anticipate challenges, work through obstacles and problems as they occur, and negotiate agreement for them—all a routine part of the project management terrain.

10.2 Project Teams

Winifred Stopps, AIA, LEED AP BD+C, and Natasha Espada, AIA, LEED AP BD+C

The selection and optimization of project teams is critical to the success of every project. This article will introduce the types of teams and best practices in selecting and organizing teams for project delivery.

TYPES OF TEAMS: INTRODUCTION

The work of most architects is carried out in teams. Effective teams are vital to the success of architecture firms, beginning with the project's conception, continuing through construction, and possibly extending into postoccupancy reviews. Architects may form or work with a variety of teams, including overall project teams and subsets of those teams.

The types of teams are briefly summarized below in order of increasing integration between team members. Project delivery methods associated with different types of teams are described in greater detail elsewhere in the Handbook.

▶ The Project Delivery Methods Overview (9.1) presents a more comprehensive discussion of project delivery.

In addition to researching the literature on the many facets of project teams, the authors drew on their own experience in the midsize firm of Leers Weinzapfel Associates and interviewed architects from seven other Boston architecture firms of various sizes, from a five-person office to a multi-office firm with around 300 employees.

Overall Project Teams

Architect/Client + Contractor

A small project, such as a house, may only have a two-person team of the client and the architect during the design phase. Even on larger projects, however, the client and the architect are usually the two most important members of the team. When they share similar goals, then the architect's talents can help form the client's vision.

▶ Bidding and Negotiation (10.8) further addresses construction procurement.

In traditional project delivery, the contractor is chosen after design is complete, either by qualification-based selection or by bidding. During the construction phase, the relationships between team members can be depicted in a project diagram, as in Figure 10.2. The architect is centrally positioned to promote the flow of information between the client, contractor, and architect's subconsultants.

Architect/Client/Construction Manager

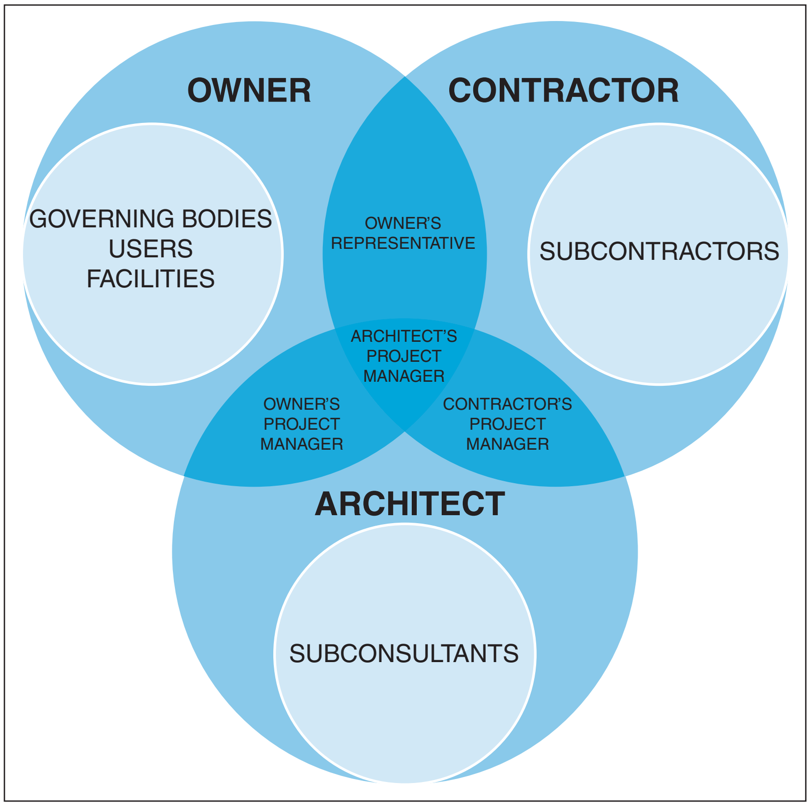
▶ Construction Management Project Delivery (9.2) and Architect-Led Design-Build (9.5) discuss construction management methods.

The client and architect may wish to engage a construction manager to advise on construction logistics and pricing during design and to organize subcontractors on behalf of the owner during construction. This is especially beneficial when the project is a complicated renovation of an existing building, has difficult site constraints, or has a very tight schedule. Although the relationships between the team members are different during the design phase, these relationships are similar to the more traditional Architect/Client + Contractor described in Figure 10.2 during the construction phase.

Architect/Client/Contractor: Design-Build

A well-defined scope, well-known site attributes, and sufficient schedule generally allows the lowest construction cost via a bid-design-build scenario. Two different

Winifred Stopps and Natasha Espada are associate principals in the Boston firm of Leers Weinzapfel Associates Architects Inc., with significant project management experience in academic, student life, courthouse, library science, museum, and transportation projects.



Winifred Stopps and Natasha Espada

FIGURE 10.2 Project Diagram

▶ See Contractor-Led Design-Build (9.4) and the backgrounder on Architect-Led Design-Build and Architect as CM Focusing on Small Projects (9.5) for further discussion of construction management.

architects may be involved in this project type: one working for the owner and the second working for the contractor.

The owner's architect may help to create the description of the project scope, develop a prequalification process, and participate in a pre-bid conference to bring potential contractors quickly up to speed with project issues.

The contractor may have an in-house architect or may hire an outside architect to provide the construction documents once the contractor's design-build bid is selected. Although the traditional design-build model puts the architect at a clear disadvantage, the emerging model is more collaborative and the architect can benefit from improved design control and better compensation. Architects are increasingly taking the lead in the design-build process, as is discussed elsewhere in the Handbook.

Architect/Client/Contractor: Integrated Project Delivery (IPD)

▶ Integrated Project Delivery Overview (9.3) addresses this project delivery method in practice.

IPD is a special risk/reward-sharing contractual arrangement between, at a minimum, the client, architect, and contractor that facilitates additional effectiveness in reaching agreed-upon team goals.

Project Sub-Teams

Within the overall project team, the architect may also function as part of defined sub-teams.

Architect/Architect

▶ See Small-Firm Collaboration (5.7) and Developing and Managing Multi-Office Firms (5.9) for related firm-management information

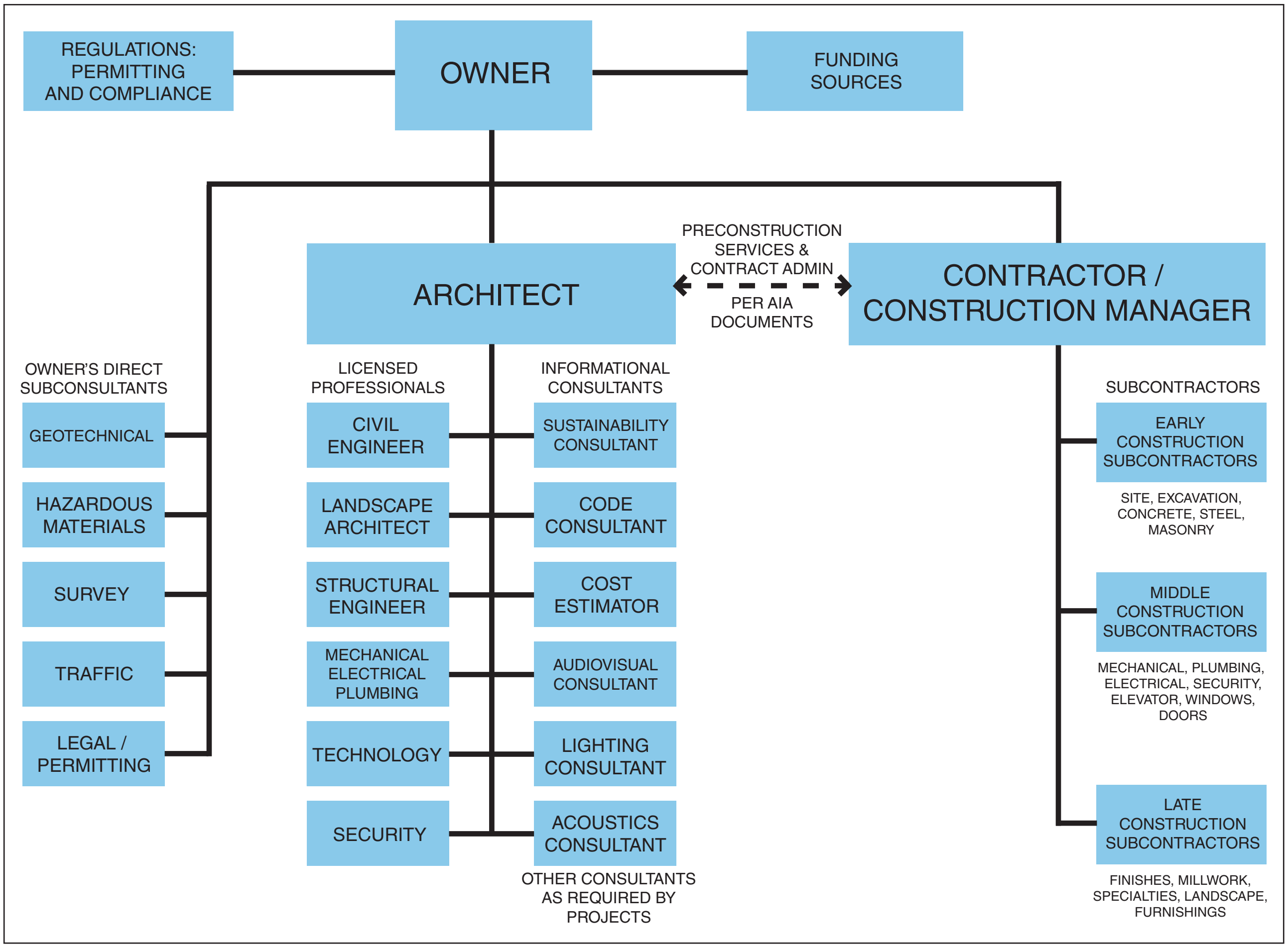
Two complementary firms may join together for a specific project. Often this occurs when a local architecture firm has a prior client relationship and will remain the Prime Consultant, but lacks expertise in a specific project type, such as theaters, hospitals, laboratories, courthouses, or athletic facilities. Sometimes the more distant architect is the prime consultant and the local firm is retained to aid with existing conditions, codes and permitting, construction administration, and daily problem solving. In teams where both architects have approximately equal roles, the roles are often divided for legal reasons by establishing a Design Architect and an Architect of Record or Executive Architect. In all cases, the goal is to have an integrated team that benefits the project.

Architect/Consultant

Architecture firms work with engineers and consultants to enhance their teams. Some large firms, classified as AE firms, provide architectural and engineering services in-house. However, purely architectural firms typically hire a landscape architect and engineering consultants to perform the basic services of projects, including civil, structural, mechanical, electrical, fire protection, and plumbing engineers. In the past two decades, specialty consultants have become a requirement on midsize and larger projects. Among many, the most prominent specialty consultants are in the areas of codes, cost estimation, acoustics, audiovisual technology, security, building envelope, curtainwall, energy modeling, and sustainable strategies.

The organization chart for a larger project, shown in Figure 10.3, illustrates an entire team as organized by contractual relationships. If all of the actual flow of information were mapped onto this neat figure, the dotted lines and arrows would obscure these straightforward relationships as, for example, the owner's geotechnical engineer offers advice to the architect's structural engineer and responds to requests for information (RFIs) from the contractor, or as the architect's civil engineer and electrical engineer collaborate with the landscape architect to work out the site lighting.

▶ Project Team Agreements (17.2) addresses agreements between architects and subconsultants.



Winifred Stopps and Natasha Espada

FIGURE 10.3 Organizational Chart for Larger Projects

Architectural Staff In-House Teams

In-house teams are just as important as all other collaborations. Teams of principals and partners create firm-wide missions and cultures and focus on the success of the firm and their projects. Project teams are created from members of the firm with different levels of experience and talent; the synergy and respect among the team members will predict the success of the project.

SELECTING THE TEAM

Selecting the Client

The most critical member of the architect's project team is the client. The architect may think that the client chooses the architect, but it is equally important that the architect selects which projects to pursue and thus which clients to work with. When asked if they had ever rejected a client, each architect interviewed for this article gave a variation of the same answer: They only wanted to work with clients who valued what the architect had to offer. In addition, the architects had to feel that they would have the time and staff to be able to do a good job for the client. Each architect noted that there had been times when they had tactfully suggested another architect who might be more suited to the client's goals or schedule.

Both large and small firms noted that the best projects often start with a previous client; Heather Taylor of EYP Architecture and Engineering estimated that about 80 percent of their work is with repeat clients. Typically, private clients can freely choose their architect based on experience or referrals and often develop a relationship with one or two architects. These project teams start with the advantage of a client who already trusts and respects the architect. Public clients must often use a more competitive process based on qualifications or fee. When the architect and the client have not worked together previously, additional care is required at the beginning of the project to promote a collaborative working relationship.

Selecting a Contractor or Construction Manager

In most public projects, neither the client nor the architect has much control over the choice of builder; the contractor is chosen for the client by having the lowest bid for construction cost. However, in many projects, the architect may work with the client to select the construction manager, although the client will make the final choice.

The architect can assist the client in the CM selection by reviewing personal and firm experience with the CM or contractor, by calling to review references from completed projects, and by presenting thoughtful questions at the interview. This process has been described as playing matchmaker—trying to find the "sweet spot" between the client and the contractor or CM who best suits that project and that particular client.

Selecting Design Subconsultants

In contrast to the selection of client and contractor/CM, which are largely out of the control of the architect, the architect typically chooses the design subconsultants. Clients may occasionally reject a proposed subconsultant or may insist on including a specific firm. Although this may produce an awkward "shotgun marriage," it may also introduce the architect to a great new colleague. In most cases, however, architects are free to choose their own subconsultants.

A number of factors influence the selection of subconsultants. In interviews, most architects cited a previous good working relationship as the most important consideration; most firms tend to work with a stable roster of subconsultants. Choosing the "usual team" has a built-in efficiency; the engineer or consultant understands the architect's typical priorities and way of working.

Some architects might choose a particular subconsultant if that subconsultant can give a strategic advantage in obtaining a project or has specialized experience needed for conducting the work.

Sustainable High-Performance Design

Certain subconsultants may be sought after because of their commitment to working well in an iterative way with the architect. This is especially important when the team is working together to produce an energy-efficient high-performance building that meets the client's needs and also creates a wonderful piece of architecture. In these buildings, for example, the structural engineer needs to understand the impact that the mechanical design can have on the structure and be willing to participate in several versions of the design to determine the optimal balance.

► The backgrounder accompanying this article, The Integrated Design Process and Green Charrettes, discusses the collaborative process involved in rapidly generating conceptual design ideas.

Expertise and Creativity

Sometimes a subconsultant's level of creativity is critical. For instance, the project may require a more innovative structural design, thus giving the edge to a structural engineer who can join the architect in a meeting, quickly assess possibilities, and give accurate suggestions based on experience and "back of the envelope" calculations. On a more straightforward project, a structural firm that produces high-quality but standard design may be sufficient.

Scale of Subconsultant's Firm

The scale of a consulting firm is critical. Is the size of the subconsultant firm appropriate to the size of the project? The issue of scale is important at both extremes; if it is a large project, can the subconsultant produce all the required drawings in a timely way with their usual staff? Conversely, if it is a small project, will the subconsultant firm give it the proper attention? A small project may get lost at a large subconsultant firm.

Fee Considerations

The subconsultant fee is often secondary in the choice of subconsultant. However, some architects will ask two equally qualified subconsultants to "bid" on the project if the scope is well described. This bid process can also be useful to check the fees of a usual subconsultant; sometimes fees will start to creep up if a subconsultant feels they need not be competitive. Getting a new subconsultant to give a fee for the same scope of work will give a useful reality check. The architect may still choose to partner with the usual firm even if the fee is higher, but the architect may be able to negotiate a better fee with the knowledge of what another subconsultant would charge. Structural and MEP fees are often a typical percentage of the overall fee. In general, architects who were interviewed felt that it was worth paying a little more for subconsultant fees, since a good subconsultant team reduces risk.

Digital Compatibility

A new issue to consider in selecting team members is the degree of digital compatibility between team members. Although two-dimensional CADD protocols are now substantially standardized, digital compatibility is an issue when teams plan to work with three-dimensional building information modeling (BIM). Use of a common software throughout the team is critical. Whether the software is Autodesk's Revit, Graphisoft's ArchiCAD, or Nemetschek's Vectorworks, the use of a single software package increases productivity and simplifies collaboration.

It is also important to determine up front who will house and manage the digital model and how changes to the model will be accommodated. The timing for the full development of the model must be determined at the outset; if the engineers are expected to fully develop their model in design development, they must understand that they may need to model several iterations prior to the completion of construction documents and include a fee for this scope. Subconsultants must be willing to update

▶ Project Management with Building Information Modeling Processes (10.4) discusses how BIM has changed project management and how to use BIM effectively as a design and production tool.

their BIM software regularly, especially since the field appears to be moving to a subscription-based software model; the increasing use of cloud-based computing may simplify this aspect of project management.

Expectations for the degree of resolution of the model must be clear; an architect who creates a virtual building with many components fully modeled to the ¼ inch may not be happy with an engineer who uses generic objects that are not accurately dimensioned. As in many other aspects of creating a project team, early communication of clear requirements and expectations is critical to success.

Periodic Review of Subconsultants

Periodically reviewing the architecture firm's roster of subconsultants is a useful exercise. Since subconsultant firms change over time, all project managers should be asked about recent experiences with each subconsultant and particular project managers within those firms. At the same time, the architect should look outward to identify potential new subconsultants by reviewing teams listed in similar published work, asking other architects for recommendations and interviewing clients about their experience with various subconsultant firms.

Remote Consultants/Virtual Teams

Although the most famous architects have always designed projects all over the world, in 2012 even small firms are working on distant teams. This is due to the availability of technology that allows team members to work together effectively while remaining in their home offices.

Obtaining a project in a remote location is the primary reason for assembling a team that is not co-located. The architect must then choose which of the consultants should be located close to the architect's office, which should be close to the project site, and which specialty subconsultants may be at sites remote from both locations.

If there will be significant permitting involved, the civil engineer and traffic consultant should usually be located close to the project site due to their knowledge of local and state codes and regulations. Geotechnical engineers are typically close to the site since they are familiar with local geological formations and may have actually performed soil borings and other investigations on nearby sites that can guide the early design. Structural engineers might be located close to the project site if local codes are particularly unique or stringent.

However, the structural engineer might be better located in the architect's home city if a particularly creative structural design is needed, requiring extensive iterative design. Landscape architects might also be located in either location, depending on their prior experience with the landscape and flora of the project site balanced against the degree of integration with the architecture that is desired. Other consultants may be located close to the site or to the architect, sometimes depending on client preference.

Specialty consultants, with expertise in fields such as theater, laboratory, and food service design, are typically located in only a few cities in the United States. Thus these consultants will usually be remote from both the project site and the architect's office. However, specialty consultants have extensive experience in working at a distance and making effective use of their limited time on site.

Remote Team Communications

Creating a good team culture with widespread members requires excellent communication. Especially in these days of virtual meetings, it is important to have a face-to-face kickoff meeting with key team members from the architect's office, the main subconsultants, and the decision makers on the owner's side. This allows team members to visualize each other and understand nuances of speech during subsequent telephone conferences or web-based reviews of documents. A green charrette, in addition to guiding the design toward greater sustainability, helps to promote team culture because the entire team is working together toward a common goal.

Face-to-Face Meetings The architect needs to choose which meetings require a face-to-face meeting, whether at the site or at the architect's office, and which meetings might be just as effective if held virtually. Architects typically have on-site meetings with clients, but many of the subconsultant meetings are held virtually using a variety of methods.

Telephone Conferences The time-honored telephone conference is still frequently used for a quick meeting to resolve a particular issue. It is easy to set up, members can be added instantly if additional knowledge is needed, and the format works well for issues that are not primarily visual. However, when the conversation begins to strain at describing physical changes—"No, go up a little further on the right-hand side of the sheet and imagine…"—then it is time for one of the newer technologies that incorporate visual media.

Web-Based Programs Web-based programs, such as Go-To-Meeting, Webex, etc., are useful for looking at documents together with far-flung team members. They can be used on a personal computer, if the project manager is the only member of the office attending that meeting, or projected on a screen in a conference room if the entire team is involved. The document on the screen can be altered and annotated by various participants, and the identified voices of the entire team can be heard. Similar to these programs, "SmartBoard" technology is also in use, allowing real-time sharing of mark-ups, design ideas, and sketches.

Video Conferences The best virtual meetings allow all participants to both see the other members of the meeting and to review documents or even models. Some smaller offices find that common web-based software such as Skype works very well for this purpose; team members can trade the screen back and forth when looking at documents, and the participants remain visible on the edges of the screen. Larger firms with multiple office locations have invested in more sophisticated video-conferencing systems. They make use of three screens: One screen shows the person who is talking, the second screen shows all the other participants, and the third screen shows the item that is being discussed, whether it is an image on a computer or a physical plan or model on a table. The videoconferencing system in the Boston office of EYP Architecture and Engineering is on a cart so that it can be moved to wherever the meeting is best held and allow distant team members to participate in informal pin-ups with the design team, as well as more formal meetings in the conference room.

Virtual Team Management

The MIT Sloan Management Review reported on the best practices for managing virtual teams and found that dispersed teams could actually work better together than teams from the same office, as long as tasks were carefully planned and assigned and the teams had periodic face-to-face meetings. A team leader quoted in the article suggests that projects should include one critical first step, "going out for a beer with all team members." Surprisingly, teams with members spread across the world were found to be more effective than teams whose members worked in the same building but on different floors. This phenomenon is most likely due to the fact that the individuals on the teams were selected for expertise, not location, and also because additional effort invested in the widespread teams.

Selecting and Organizing the Architectural Team

The architect has the most control when setting up the in-house architectural team that will work on the project, although repeat clients may request a particular project manager. The choice of project manager can be key to the success of the project, as shown by the central position of the architectural project manager in Figure 10.2. The architectural project manager interacts with all the other members of the overall project team and is responsible for identifying client expectations, communicating well with the client even when conveying unwelcome news, meeting contractual obligations,

► Project Management Overview (10.1) and the accompanying backgrounder, The Effective Project Manager, further discuss the elements of effective project management in architecture firms.

developing a good working relationship with the contractor or construction manager, and generally getting things done. Within the office, the project manager is typically in charge of organizing the architectural team. Large offices have several distinct ways of organizing their projects into teams; smaller firms are also diverse in their structure.

Large Architecture Firms

As described in the text of Paul Segal's useful book *Professional Practice*, large offices tend to organize their staff in one of three ways: horizontal, vertical, or matrix, which is a combination of the horizontal and vertical systems. These structures are shown graphically in Figure 10.4.

A firm with a horizontal structure is similar to an assembly line, where a project passes through different departments on its way to completion. If programming is not provided by the owner, the project may first be defined by a programming group, then transferred to the design department for development through preliminary design, schematic design, and design development. The project would then be given to a production group to develop the contract documents, and finally completed by the construction group, who will provide field supervision and office construction administration. The advantage of this system is that each department can acquire a high degree of expertise for a particular phase of design. The disadvantage is that the rationale for a particular decision early in design can become lost in the production or construction phases and the project can become an incoherent muddle.

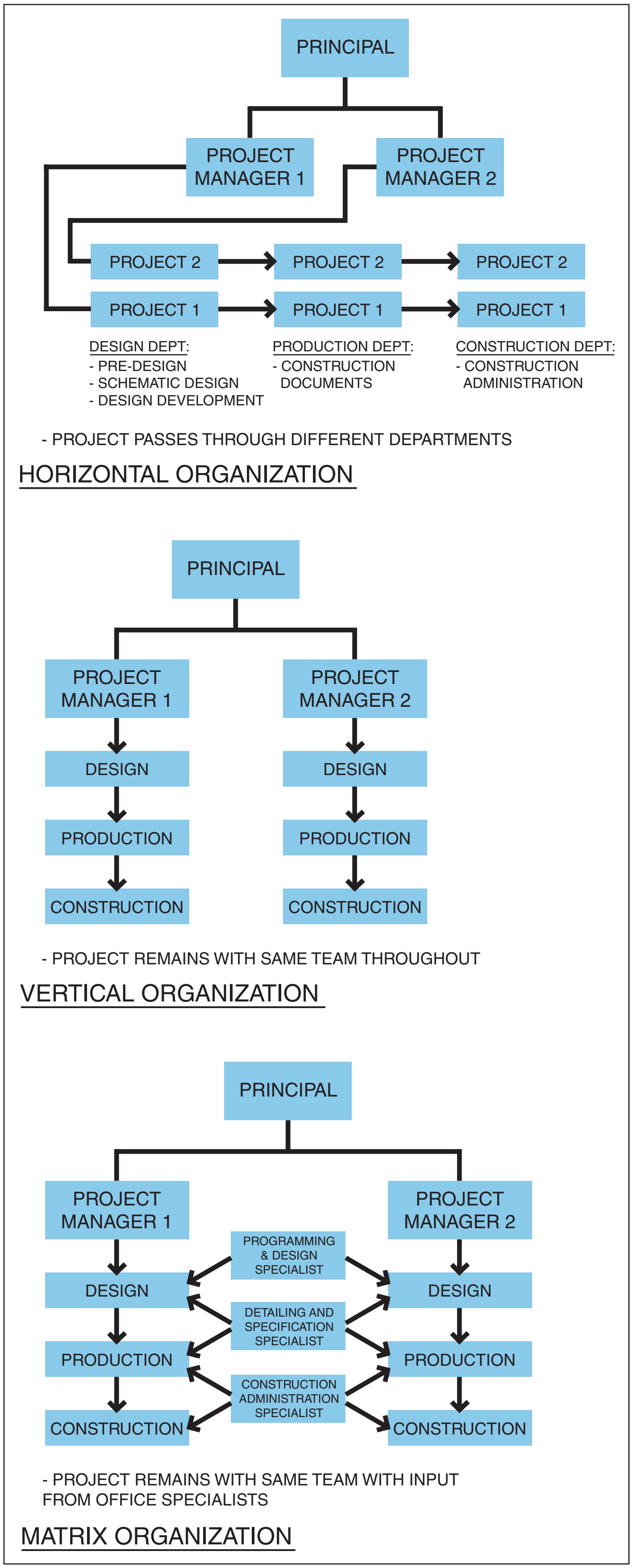
A vertical firm structure keeps the project within one team from beginning to end. The same people work on the programming, design, and production and follow the project into construction. The design advantages are clear, since the continuity of staff can ensure clarity of design responses to various issues. Choosing staff for this type of project team requires a careful analysis of the strengths of each member of the team so that all areas are covered, since it is hard to find staff who are each equally adept at all phases of the project.

The matrix structure blends the best features of both of these ways of staffing. The project remains with a core team from beginning to end, but office specialists join the team at each phase. The firm's most creative designer may augment the group in schematic design, then go on to another job as the project goes into working drawings, and offer more occasional design input thereafter. The staff member with the most experience in detailing and construction may then join the team to work with the project manager to guide the production of the contract documents. This structure therefore allows both expertise and continuity.

Very large architecture firms, with multiple office locations, tend to organize in terms of project type, such as academic or health care or sports. However, one of the three strategies listed above tends to be used within each discipline area.

Small Architecture Firms

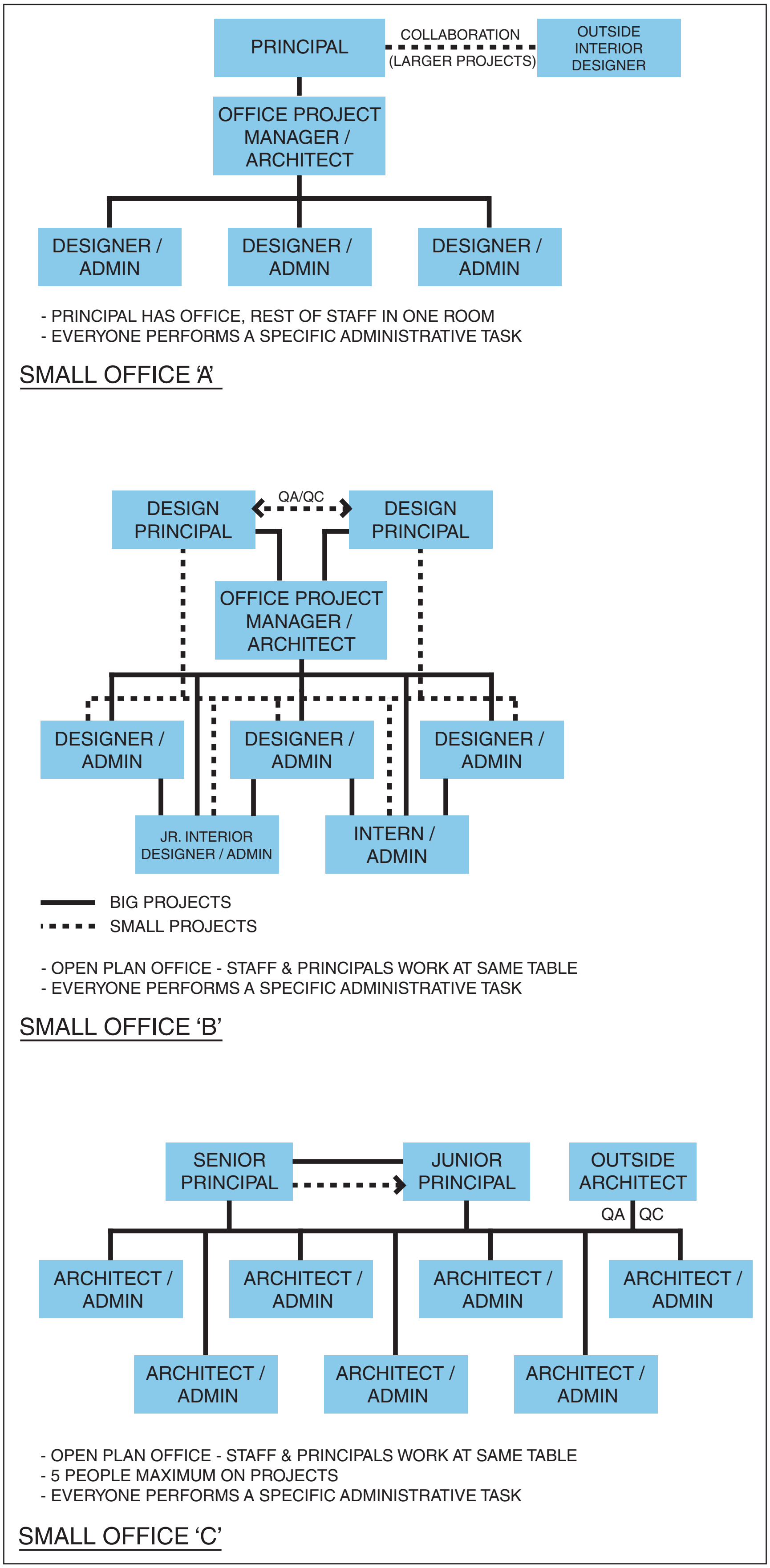
Small architecture firms, with fewer than 10 employees, have even more diverse structures, as shown in Figure 10.5, which is based on the actual structures of three small firms that were interviewed for this article. Most offices use the vertical or matrix model, with the same team throughout all design and construction phases. The hierarchy is typically flatter; architects and designers within the office take on multiple roles, including administrative tasks and marketing. Some offices find it helpful to have a buffer between the principal and the staff so that the principal has some time freed up for marketing and does not become a bottleneck for decisions. In other small offices, the design principal works directly on projects with the architects and designers with a managing principal to organize all other aspects of the office. If there are two design principals, in general they each run the projects that they brought into the office. Flexibility is key for the architects and designers; they may each have one primary project assignment, but must be ready to switch immediately to help out on other projects as required by deadlines.



Winifred Stopps and Natasha Espada

FIGURE 10.4 Large-Firm PM Structures

PART 3: PROJECT DELIVERY



Winifred Stopps and Natasha Espada

FIGURE 10.5 Small-Firm PM Structures

Midsize Architecture Firms

Midsize firms, with 10 to 50 employees, tend to be less hierarchical than the large firms but more structured than the small firms. For example, Leers Weinzapfel Associates has three principals who divide up all of the projects among them. There are typically around five project managers, each of whom may be responsible for several projects, including client contact, consultant coordination, scheduling, budgeting, and design. On smaller projects, the project manager works directly with the architectural staff; however, each of the larger projects also has a project architect to organize the work and coordinate the architects and designers. Architects and designers usually have one main project assignment, but may be called on to help out with another project as needed. The matrix structure is used for the projects—generally, the same core team takes the project from programming through construction and in-house expertise is added as required, especially in the construction documents phase.

Figure 10.6 demonstrates this configuration, along with two other midsize firm structures. In one of the illustrated firms, the principal/project managers report to a managing principal; the senior principals advise on design and technical matters for selected projects. In the third firm, the design principal acts as a design resource to all of the project managers, working on each project for about an hour a day, while the managing principal organizes the other aspects of the projects.

OPTIMIZING THE TEAM

An optimal team requires that design and project goals be clarified at the beginning of the project among all team members; this is typically the responsibility of the architect's project manager. Shared values and vocabulary and a detailed work plan should be established at the outset. In addition, clear communication and promotion of alliances and synergies within the team will contribute greatly to a successful team and thus a successful project.

Shared Values and Vocabulary

Pre-design is the perfect time to establish goals and programmatic needs, and determine a shared architectural vocabulary among the client and all members of the team. The architect may begin the design process by researching and visiting precedents together with the client/consultant group to see a range of possibilities. A joint visit to relevant existing buildings gives the client and architect a common experience and vocabulary to use when discussing design options for the new project. Along with research on other architectural precedents, architects may also provide historic research and specific building site history.

If the client would like the project to have a unique design, however, the architect may intentionally decide not to visit precedents with the client, so that the client does not get caught up in differences between conventional projects and client needs.

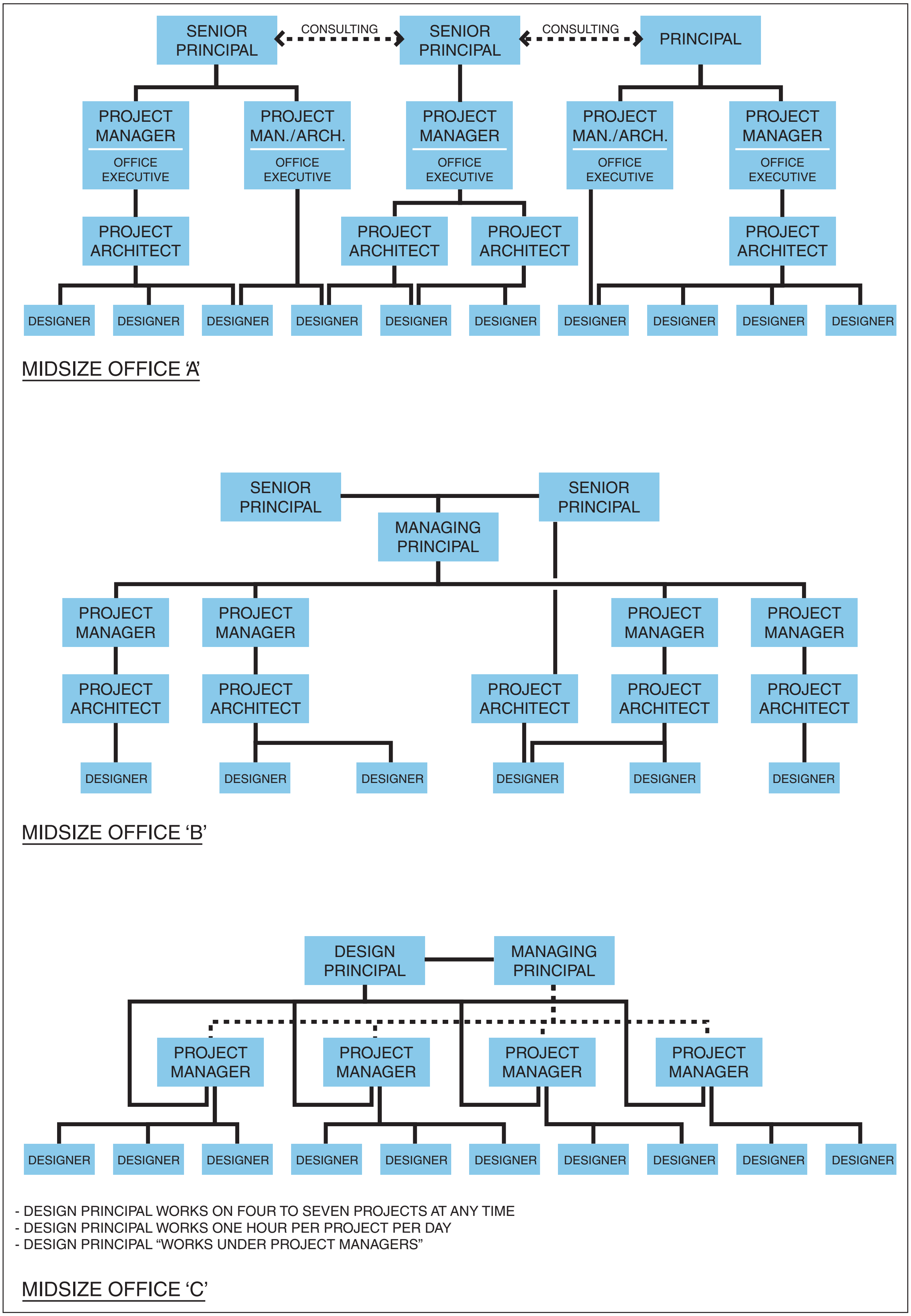
Work Plan and Schedule

An organized work plan and schedule will create a clear framework for all project members. It includes a breakdown of tasks, lists critical meetings and workshops, shows a fee schedule and related deliverables, and provides a project schedule with the inclusion of client review periods.

▶ See Project Budgets, Work Planning, and Monitoring (10.3) for related information about work plans and schedules.

Alliances and Synergies

Project teams need to have a balance between personalities, skills, experience, and interests of team members. The goal for optimizing a team is to have all team members bring their strengths to the project, grow and learn new skills, and collaborate with all team members to produce maximum results.



Winifred Stopps and Natasha Espada

FIGURE 10.6 **Midsize-Firm PM Structures**

In-House Project Team Synergy

Alliances within different types of architectural offices and in-house teams are based on the office culture and resources within each individual firm. However, the common goal is to have synergy within an office and among its employees. Respect among team members is a key component of office synergy. Every staff member has a contribution to make to the process, and if an employee cannot express and share their opinions and observations freely, it is a detriment to the process and the project.

In small offices, in order to optimize the team and make a profit, everyone has to be flexible and fill many roles, as administrative capabilities are scarce. Hiring is also required to be especially selective in a small office, as the new employees need to work well with the existing small staff, work on multiple projects, fill many roles and, ideally, expand the office culture. This allows for more responsibility and opportunities for the younger staff, as they are involved in all aspects of the project.

In midsize and larger firms, there is more hierarchy, more administrative support and higher overheads. However, teams can be composed of a larger and more stratified group, which allows for more options when planning project teams.

▶ Leader Effectiveness (5.5) further addresses group dynamics.

Alliances with Other Architects

Alliances with other architects can also optimize a team. If two architects decide to partner on a project to create a marketing advantage to win the work, they can decide to work on all phases together or to divide the work per phase; for example, one architect focuses on design and the other on the execution of the documents. With the right team, this could be a highly collaborative and successful relationship, which could, in turn, lead to future collaborations. Typically two architects with similar skills do not partner on projects together as there is no advantage to their alliance. However, it may be advantageous for small firms to partner with large firms as they can both contribute to the project differently; the smaller firm can be more dedicated to the day-to-day design process, while the larger firm has the resources to produce at a faster rate. Small firms can also benefit and possibly be more profitable from this alliance, as the collaboration requires more efficiency in tracking, more rigor, and more structure regarding layout of work plan and deliverables.

Alliances with Contractors

Alliances with contractors, such as in a design-build or integrated project delivery (IPD) project, can also be beneficial to a project and can optimize the end product. At times, a contractor may be hired as a subconsultant to give input on constructability or for cost estimating during the design phases. These types of alliances are described in detail elsewhere in these pages.

Alliances with Subcontractors and Fabricators

Architects may also choose to collaborate with subcontractors or fabricators during the design phases of a project, if a custom or specialized design is desired. The benefit of this alliance is that it can develop and promote innovation. As explained by Alex Anmahian from Anmahian Winton Architects, "The process of co-engineering the design can make a more intelligent solution to an existing product." For example, his firm created an alliance with a skylight company to develop operable fins for a boathouse. This maximized the impact on the design, as the subcontractor involved became the lowest bidder on the project because they were familiar with the design and could price it correctly. At times, this type of collaboration can be beneficial to all as it strengthens the intent of the design and may lead to future patents or new types of manufacturing for the fabricator.

PROJECT TEAM MEETINGS

Project team meetings are a platform for teamwork to take place. They are a time for all team members to participate equally while being respectful, positive, and productive in moving the design process forward. Larger projects with more stakeholders require more organized and detailed meeting schedules, but successful team meetings for all project sizes require a certain skill in order to be efficient and to allow for effective communication and information exchange.

Client Meetings

At the beginning of a project, the architect team and client group meet to establish different working groups. A client committee is often composed of the client's project manager and a member of the facilities department, although the committee may directly include more users. This group represents all stakeholders and is in charge of managing and maintaining the goals of the project while keeping the project on schedule and on budget. They are the main day-to-day decision makers, and the architect team usually meets with them every two weeks during the design phases and at key periods during the construction document phase. For smaller projects, the client group may be composed of one or two owners; a different meeting schedule may suit the needs of this project size. For larger projects, a steering committee composed of the client board's building committee or the president and CFO may also occasionally review the direction of the project.

During the programming phase, the architect will set up meetings with individual user groups to determine a programmatic wish list. If the project is large, a town hall type meeting may also take place to collectively hear the user group's concerns and desires within a larger venue. This meeting is inclusive and connects all representatives to the general group.

Larger group meetings may include the client committee, leading user group members, the architect, and consultants and occur at key points of the project to discuss larger issues and to come to a consensus of direction. These meetings may be called Global Workshops and, for example, may be used for discussions about mechanical systems, sustainability, programmatic, and/or major design decisions.

Presentation meetings to boards, trustees, the client steering committee or major stakeholders usually take place at the end of the conceptual, schematic, and design development phases. These meetings are usually scheduled at specific intervals during the year, and the presentation requires strategic thinking of larger institutional issues. Typically, the principal of the firm and the project manager lead the presentation. Informational or fund-raising materials such as models or renderings may be required to explain the project.

Consultant Meetings

At the beginning of a project, a kickoff meeting is typically held in which the architect and consultants meet, visit the project site together, and establish team goals, responsibilities of work, coordination, and strategies for information exchange. Several meetings are scheduled per phase to discuss ideas, assess their impact, and coordinate the different trades. Consultant meetings are usually structured and attended by the architect's project manager, project architect, and key members of the architectural team. At the beginning of the project these meetings concern the integration of the consultant's work with the conceptual design; later in the process, the meetings focus on detailed coordination of drawings. These meetings are very important, as decisions affect all consultants differently, and a true collaboration at all phases will produce a successful project. After all consultant meetings, project meeting notes are written up and distributed to all team members as a way of documenting and distilling information to those who did not attend the meeting. Most basic consultants are local and can meet on a regular basis, but specialty consultants may need to be remote, and well-documented virtual meetings would need to take place regularly to keep the project on track.

Impact of Building Information Modeling (BIM)

Building information modeling (BIM) has been known to facilitate the coordination of consultants and architect by decreasing the number of coordination meetings required during design, particularly with the structural and mechanical engineers. The benefit of using BIM is that all team members can work simultaneously together to solve coordination conflicts that may arise during construction. It is also a clear way for all members of the team to coordinate their work and follow the development of the project on a more regular basis. Challenges for the project team include the considerations that all members of the team need to have compatible programs, the model is required to be updated regularly, and all team members have to be respectful of protocols and mindful to not override other team member's work. The architect must lead and control the process. BIM programs, such as Autodesk Revit, are a significant financial investment and may not be as accessible to smaller firms. While the financial investment is significant, a 10- to 12-person firm may draw all of their presentation and design work exclusively in BIM and find that it reduces the amount of coordination meetings and increases the speed of producing construction documents with a smaller staff. Even very small firms with only highly experienced senior staff have successfully used BIM to increase their productivity.

In-House Project Team Meetings

Depending on the size of the project, the project manager and project architect typically lead the in-house project team meetings. The purpose of these meetings is to coordinate the in-house work, distill any information, bring the team up to speed with the latest decisions, discuss schedule and budget, resolve design issues, and provide a clear flow of information. Some team meetings may require the entire team while others may only require key members of the team who are working on a special aspect of the project. Some firms establish a specific day each week to have regular, structured meetings while others meet with the team every day. At times, informal meetings at a desk are sufficient. The layout of the office may also inform the amount of in-house team meetings required. If the office has an open plan, team members sitting near each other may be able to hear conversations and share information without requiring formal meetings. When private offices are prevalent in an office layout, overhearing team conversations from senior team members and informally sharing information may not be possible.

When an architecture firm teams up with another firm, it forces a more structured internal project schedule and meetings for out-of-house milestones.

Quality Management Meetings

At the completion of major phases, quality assurance (QA) meetings may be scheduled between the QA reviewer and the project team. In the QA process, the drawings are reviewed for general coordination, constructability, and to determine the status of the drawings; for example, what is missing from the set or what might be overly detailed. After the QA review is completed, the reviewer will mark up the drawings and the specifications and may fill out a checklist, which includes areas of coordination with consultants and sustainability goals at different phases. After this review, the project manager or principal-in-charge will set up a meeting with the design team to explain the process of review and to inform the team of areas needing attention. This is a learning opportunity for junior architects to learn how to assemble a set of drawings, coordinate engineering drawings, and develop the design into details for construction. It is also an opportunity for senior members of the firm to inform others of construction detailing lessons learned in the field and ways to improve drawing sets.

▶ Origins and Development of Quality Management (12.1) provides an overview of quality management systems, guidelines, support, and metrics to advance architecture practice.

At small firms, an out-of-house expert may be brought in to review the drawings, although usually a principal will also conduct a review. Some small firms may also have an experienced staff and multiple team members who can look at the drawings with differing and overlapping comments.

Midsize firms may also hire an out-of-house expert or may have a principal or senior architect who is not involved in the project perform the QA review for a more objective assessment.

Larger firms may have a department who specializes in the review of documents.

Design Meetings

Some midsize firms have direct one-on-one conversations between the design principal, who initiates the design, and the designers. Principal Nader Tehrani at NADAAA describes informal meetings held around a desk or computer monitor with one or two other designers at the firm, without much initial input from the rest of the project team.

Larger firms may compartmentalize the conceptual and schematic design by having a design group meet only to initiate the design and then pass it on to a separate working group to develop the design and detail the building.

However, many firms work collaboratively with a project team led by a principal and a project manager. The principal selects the project team and is responsible for setting design goals and pulling ideas together to make the design coherent. The project manager organizes design meetings on a regular basis and allows the design team to be involved from the inception of the project through construction. This structure fosters a commitment to the project and establishes ownership of the work by all team members.

Team meetings within a firm may be formally scheduled in a conference room or may occur informally in the studio or at a desk. Will Ruhl of Ruhl Walker Architects believes that the ideal size for design meetings is two to five people and that once the meeting lasts more than 1½ hours, it may become less useful for the team.

Office Charrettes

When a design team is "stuck" or simply wants to find different alternatives, sometimes the entire office becomes involved. This exercise may happen while swarming or brainstorming at the beginning of a project to generate as many ideas as possible. Office charrettes are common in some offices as a way to gather as many ideas as possible in a short amount of time. Robert Miklos of designLAB reports that they once conducted a three-day charrette for which they shut down the office and required all staff to work independently. When they met to review ideas, they adopted the ones most closely in alignment.

Design lunches are another method of gathering information by all members of a firm. A pinup of the project will elicit comments from non-team members and allows the project team to review the project objectively. During the design lunch, the leaders of the design lunch must tread a fine line between offering criticism that may inhibit discussion and promoting indiscriminate "brainstorming" without any critique, a method that may lead only to ineffectual "groupthink." A respectful debate between all office members may lead to the best result.

The firms we interviewed for this article had various views about eliciting input from outside the design team. Some felt that it diluted design ideas; these firms may use a pinup to solve specific design problems, but not to seek design direction, as they believe the design will transform itself. Others found that office charrettes or design lunches strengthened their projects and contributed to a collaborative work environment. There is no particular script a group should follow for promoting creativity within a firm; the design process and culture of the firm will determine it.

GROUPTHINK: THE MYTH OF BRAINSTORMING

The technique of brainstorming is to provide positive, nonjudgmental, and encouraging feedback to all group members in an attempt to uncover the greatest number of creative ideas in the shortest amount of time. However, a January 2012 article in the *New Yorker* written by Jonah Lehrer challenges this traditional practice. Lehrer states that brainstorming does not work, as the quantity and quality of ideas produced in a "nonjudgmental" session was much less than when ideas were critiqued: "Brainstorming didn't unleash the potential of the group, but rather made each individual less creative." Several studies suggest that debate and criticism do not inhibit ideas, but actually stimulate them. According to psychology professor Charlan Nemeth's study on teams, "…dissent stimulates new ideas because it encourages us to engage more fully with the work of others and reassess some viewpoints." This implies that criticism promotes better and more numerous ideas which the "groupthink" phenomenon would stifle.

BENEFITS OF A GOOD TEAM

Although the myth of the heroic solo architect still resonates with the general public and even with some clients, most architecture today requires teams. The best teams avoid the perils of "groupthink" and achieve a synergy in which the sum of the team's work is greater than any one individual's contributions. They create a balance between the goals of the individual, the firm, the client, and the public. The individuals on the team trust and respect each other and thus allow the sharing of the best and most creative solutions.

A good project team knows when to ask for help and realizes what new information is needed and how to find it. A great team is able to view client changes as an opportunity to improve the design.

A good project team is absolutely required as architects strive to create architecture that will use fewer of the Earth's resources. The green charrette and associated iterative design process require a full team that trusts and respects each other and works together to find the solution that uses the least energy, meets the requirements of the client, and creates great architecture.

The ideal project team validates all team members' contributions, enables all team members to perform at the highest level, responds sensitively to client and community needs, and creates a great building.

No one of us can do it alone, but as Katy Flammia of THERE*design* has said, "Architects don't actually have to know it all—they just have to know who does and put the team together!"

For More Information

The Business of Design: Balancing Creativity and Profitability (Princeton Architectural, 2011) by Keith Granet.

"Groupthink," *The New Yorker*, by Jonah Lehrer: www.newyorker.com/reporting/2012/01/30/120130fa_fact_lehrer.

"How to Manage Virtual Teams," *MIT Sloan Management Review*, by Frank Siebdrat, Martin Hoegl, and Holger Ernst: http://sloanreview.mit.edu/the-magazine/2009-summer/50412/how-to-manage-virtual-teams.

Project Management for Design Professionals (Kaplan AEC Education, 2006) by William G. Ramroth.

Professional Practice: A Guide to Turning Designs into Buildings (W.W. Norton, 2006) by Paul Segal.

PART 3: PROJECT DELIVERY

BACKGROUNDER

THE INTEGRATED DESIGN PROCESS AND GREEN CHARRETTES

Marc Rosenbaum, PE

The Integrated Design Process includes the end users and those who will operate and maintain the project. Green charrettes bring everyone together to rapidly generate conceptual design ideas in a collaborative process.

Marc Rosenbaum, PE, is a long-time student of making great buildings. He uses an integrated systems design approach to help people create buildings and communities that support personal and planetary health. Rosenbaum works on Zero Net Energy Buildings, Deep Energy Retrofits, and Passive Houses.

INTEGRATED DESIGN PROCESS

A building is not an object, it is an outcome.

—Bill Reed, AIA

A high-performing building is the outcome of a high-level team process often called the Integrated Design Process (IDP). The IDP is multidisciplinary from the beginning of the design process. It involves all stakeholders in all aspects of the project so that systems work together to achieve the project aspirations.

Participants in the IDP include end users and those who will operate and maintain the project; the design team and their subconsultants; construction professionals; and any other key decision makers and stakeholders.

(continued)

Elements of the IDP include the following:

- Careful consideration of the place—its ecology and culture.
- Everyone is a designer, bringing knowledge, skills, and insights others lack.
- The design iteration process involves all the disciplines—it is co-creative and parallel rather than reactive and linear.
- Testable objectives must be set in a process involving all stakeholders.
- Charrettes, ongoing communications, and collaboration, requiring key skills from participants.
- Owner input and support is critical.
- Commitment of all participants to the process and willingness to think outside of his/her usual approaches and methods of practice.
- Establishment of and adherence to milestones.

After the owner has selected the design and construction team members, a facilitator of the IDP is identified. The first steps in the process focus on learning about the place in which the project is located and the communities into which it is embedded, including both human and ecological. Next, the team comes together in the initial charrette to define the goals of the project. Facilitators will often present to the team related stories of extraordinary projects to teach a common language, create excitement, and to expand the vision of what is possible.

THE GREEN CHARRETTE

The first charrette has several outcomes. Number one is a prioritized set of goals and objectives. A goal is an overarching aspiration. An objective is a testable result. Objectives are set under each goal. Without objectives we can't know if we are achieving the goals. For example, a goal might be "the building should protect and enhance the health of the occupants." A testable objective under this goal would be "the building shall be mold-free." This translates the lofty into the mundane and necessary work of high-performance design. From this objective, a series of strategies arise that are incorporated into the design. Optimally, the goals and objectives are prioritized to signal appropriate emphasis to the design team.

A second critical outcome of the charrette is the identification of topic areas requiring additional knowledge, with assigned responsibilities and due dates. A third outcome is an understanding of where the key tensions lie—what real or perceived countervailing needs or constraints require creative resolution. Finally, a clear understanding of the project areas that must be optimized together is important. For example, daylighting from a sidewall is often more effective when the glazing head height is raised. Because the maximum head height is intimately tied to the structural design, these need to evolve together.

After this first intensive gathering, team members complete their assigned tasks, advancing initial design thinking, testing concepts against the goals and objectives, and pursuing promising design strategies that will achieve the objectives. With this research and analysis in hand, the team reconvenes for a second charrette. The outcome is a conceptual design vetted against established goals and objectives.

In this type of process, the participants must be able to quickly model, and give feedback to the team on, the effects design alternatives will have on structure, daylighting, mechanical systems, energy and water usage, and the like. This requires that subconsultants, especially engineers, can provide scoping calculations rapidly in an iterative discovery process. To achieve this, engineers must have exceptional command of their field, and flexibility to shift their solution concepts upon receipt of new information. This process also requires openness and honesty on the part of all participants. After this charrette, a conceptual design emerges that is well on its way to satisfying the project goals and objectives. Inevitably, a continuing process of iteration ensues.

CASE STUDY: SLOAN SCHOOL OF MANAGEMENT

An example of a project that used this process is the Massachusetts Institute of Technology (MIT)'s new Sloan School of Management, designed by Moore Rubel Yudell in association with Bruner Cott.

Key team members included the design and executive architects; a capable and nimble engineering team including geotech, civil, structural, electrical, lighting/daylighting, and mechanical; key Sloan School users; an IDP facilitator, cost and construction experts; and MIT facilities staff. A detailed set of goals and objectives were set in an intensive charrette. The entire group worked together for a portion of the charrette, and at times worked in subgroups on specific tasks.

Out of this process emerged the need to conduct an integrated systems design study. Team members collaborated on conceptualizing and analyzing a matrix of systems approaches that varied structural, envelope, and mechanical systems and evaluated each approach in terms of project objectives relative to costs (capital, energy, and operating and maintenance); performance (heating, cooling, lighting and daylighting, and ventilation effectiveness); ease of design integration; degree of risk; and user satisfaction.

This detailed study yielded some surprising results. The optimized structural design didn't favor the best daylighting solutions. The mechanical systems first perceived as being most costly (advanced hydronic-based solutions) saved enough on reduced floor-to-floor heights and penthouse sizes that they not only were the lowest cost to operate and maintain, but were part of the lowest total capital cost solution as well.

As a result of this study, a number of key design directives emerged, such as designing the building with periodic large vertical shafts to allow ventilation air distribution. This eliminated sizable lateral ducts, which kept floor-to-floor heights down and also maximized window glazing head heights. In operation since 2010, the building has been acclaimed by its users. It is operating on a fraction of the energy used by other recent campus buildings and has achieved most of the objective metrics that were set. MIT Facilities attributes this superb performance to the wholehearted commitment of participants to the integrated design process.

10.3 Project Budgets, Work Planning, and Monitoring

Stephen C. Evans, AIA

Project work planning is the central element in establishing and updating accounting budgets. Project work plans with the proper level of task detail provide the basis for project schedules, support the monitoring of project progress, and serve as a means of communication for all project participants.

THE IMPORTANCE OF PROJECT WORK PLANNING

Design excellence, exceptional client service, quality assurance/quality control, and technical expertise are all elements of successful project execution. The ability to forecast revenue accurately using simple methods is fundamental to a firm's operations and the foundation for many critical, high-level decisions such as staff adjustments and overhead budgeting. Good revenue projections represent the "lifeblood" of successful firm financial operations, and the processes in place for project budgeting, scheduling, and tracking serve as the basis for these forecasts. Project work planning is certainly a role expected of project managers, but also an opportunity for project team-building and leadership both internally and externally, including clients and contractors.

Most firms, large, medium, and small alike, earn revenue by providing professional services—architects do projects. The resources used to perform project services must be managed and measured with tools that report and analyze past performance but more importantly use that information to look into the future. Resource utilization ratios, the amount of project chargeable time divided by the total time worked by individual staff members, are measured at the firm, market sector, discipline, and project levels and are an important factor in the ability to be profitable. A well-designed annual business plan includes utilization ratios expected for everyone in the firm including management, marketing, and project staff. The controlling mechanism for using resource utilization goals and resource forecasting is once again the project work plan. The term "resource" is used throughout this article to mean staff members in a firm.

Good Project Work Plans = Good Resource and Revenue Projections

Project work planning serves as the means to achieve project and firm profitability, schedule project milestones and resources, and monitor project progress. Work plans need not be highly detailed. The following attributes characterize the process and the plan:

- Start early in the marketing phase by preparing top-down budgets.
- Prepare simple project work plans with staff resources listed at the phase level at a minimum to produce a conceptual bottom-up budget.
- Compare the two budgets and combine them into one feasible starting point for the project.
- Further refine the conceptual plan with more detailed task-level planning during contract discussions to represent the scope of services proposed.

Stephen C. Evans is the owner of Stephen C. Evans Consulting, LLC. His experience includes serving as senior project manager with Populous, director of risk management for HOK Corporate Legal, and director of operations for HOK's North Central Region and Treanor Architects.

- Finalize the project work plan with the contracted scope of services and the project team including outside consulting engineers immediately.
- Involve the client in the work plan schedule development with particular regard to the timing of their input and approvals.
- If a contractor or program manager is engaged in the project during design phases, involve them relative to their roles, input in the design, and timing.
- Monitor the project work plan regularly during the life of the project.

Project managers wear several hats in most small to medium-size firms and even in some larger firms that typically do very large and complex projects. The individual responsible for project management duties must lead the work planning efforts even though design and technical responsibilities may also be required by this person on the project. Preparing project work plans is not a "closed-door" process done by the project manager and presented to the principal and project team. Key team members, particularly design and technical project leaders, are at the table during the entire process, and it is good to have accounting staff involved at the same time. It works well for the architectural team to prepare the initial plan and project schedule followed by consulting engineers joining to add their major milestones and needs to the plan. Finally as part of a team-building exercise, the client is brought in to see the plan and how their participation is needed to meet the schedule. A proper project kickoff meeting agenda includes significant discussion and "buy-in" of the schedule produced by project planning efforts. Even in a small firm, working on smaller projects, with fewer project team members, a project kickoff meeting is advisable.

PROJECT BUDGETING

The project budgeting process starts with the determination of the gross fee for the project. It is best if this has evolved through the marketing, sales, and contracting process but that is not always possible. Although value pricing is encouraged in firms with expertise and specialized services, it is most common that the "market" will determine the appropriate level of fees available if the firm expects to procure the project. The following are common compensation options for fee calculations that begin the budgeting process formally in one's accounting system after the contract is signed:

▶ Services and Compensation (15.2) discusses methods of determining what to charge for architectural services as well as methods of compensation and strategies for getting paid.

- Lump sum fixed fees.
- Hourly with no upset based on hourly billing rates.
- Hourly-not-to-exceed fees based on hourly billing rates.
- Cost plus fixed fees.
- Unit cost pricing.
- Percentage of actual construction cost.
- Reimbursable and non-reimbursable direct costs are considerations in all options.

Compensation options are affected by client types, building types, and the project delivery methods used. The budgets established in accounting systems contain both similar and dissimilar aspects depending on the compensation option established in the Agreement Between Owner and Architect. It is also possible to have more than one compensation option in a singular agreement responding to the scope of services provided, or compensation options with consultants that are different than the prime agreement.

Revenue is recognized in professional service firms using one of two accounting methods with timing being the primary difference. The cash method of accounting recognizes revenue when cash is collected and expenses are paid. With accrual-based accounting, revenue is recognized when it is *earned* and expenses are *incurred* without regard to the time of receipt or payment of cash. The accrual method represents a more accurate means to measure the actual project and firm financial performance. The

▶ Financial Management Overview (7.2) discusses the ongoing monitoring of a firm's financial resources.

accrual method asks the question "what is the work in place," earns revenue accordingly, and is not based on the collection of cash. All firms use the cash basis for cash flow and income tax purposes.

Top-Down and Bottom-Up Project Budgeting

There are three fundamental approaches to the project budgeting process and all three are necessary for successful project execution and performance:

1. Top-down budgeting
2. Bottom-up budgeting
3. A combination of both

The development of an initial project budget based on the top-down approach is a good place to start in the process. If these budgets are based on historical project data and similar project scopes of services, they can actually be very accurate in the end in terms of projected fees to be earned by phase. A great exercise for firms to undertake would be to spend the resources necessary to look at past projects by market sector type and record actual labor and expense costs by phase into a database for future use in top-down budgeting. Top-down budgets are formula driven and based typically on a percentage of construction cost for the gross fee followed by a distribution of fees for the net service revenue representing the architect's fees, consulting fees by discipline, and direct expenses. The net service revenue is then distributed by phase again on a predetermined percentage basis.

Net service revenue: Net fee determined by subtracting consultant fees from the gross fee for the project.

Table 10.4 includes the following assumptions:

- The estimated construction cost for the project is $10,000,000.
- The gross fee is 7 percent of the estimated construction cost.
- Consultants will receive 40 percent of the gross fee.

Subtracting the direct expense and contingency budgets from the net service revenue results in a project labor budget of $378,000.

Table 10.5 includes the following assumptions:

- The amounts by phase are based on the percentages listed and the total labor budget of $378,000.
- The hours by phase are based on the dollar amounts by phase divided by an average hourly rate of $125.

Particularly with a new project type and without historical data on labor expenditures, top-down budgeting does not provide a confident level of detail necessary to perform and monitor the job. Further, it does not respond to scope of services and provide assurance that the project can be delivered within the schedule and budgeted fee. The project work plan is the basis for a bottom-up budget, and project planning builds the fees by phase based not on assumptions but the project's scope, schedule, and

TABLE 10.4 Top-Down Budget

Fee Distribution	$ Amount
Gross Fee @ 7%	$700,000.00
Consultant Fees @ 40%	$280,000.00
Net Service Revenue	$420,000.00
Direct Expense Budget	$21,000.00
Contingency Budget	$21,000.00
Project Labor Budget	**$378,000.00**

TABLE 10.5 Top-Down Budget: Fee Distribution by Phase			
Phase	**% Amount**	**$ Amount**	**Hours**
Project Planning	2%	$7,560.00	60
Preliminary Design	3%	$11,340.00	91
Schematic Design	7%	$26,460.00	212
Design Development	23%	$86,940.00	696
Construction Documents	37%	$139,860.00	1,119
Bidding/Negotiations	2%	$7,560.00	60
Construction Phase Services	25%	$94,500.00	756
Post-Construction	1%	$3,780.00	30
Total Labor Budget	**100%**	**$378,000.00**	**3,024**

tasks required to complete the work. It uses staff hours planned for these tasks and builds the fee amounts by phase based on the firm's hourly rates schedule. The bottom-up budget based on the project work plan provides a means to analyze the top-down budget and test its ability to be financially successful for the firm. More detail on the bottom-up work planning process and budget is contained in the project work planning process section of this article.

It is not uncommon for the initial bottom-up budgets to be unrealistic in terms of the market fee value for the project. Nevertheless, it may not be wise to rely solely on the top-down approach. The best practice is to work with the two approaches together, combining them into a realistic plan with the proper level of task detail and resources. The project leadership team needs to work together and consider the scope, schedule, tasks, and resources absolutely needed to do the job. It is common to work through several versions of the plan and to balance these criteria into a feasible plan that meets financial goals and client expectations. Cartoon mock-up sets and deliverable lists can also provide needed support in "landing on" the proper project budget and work plan. Although deliverable lists are essential to the technical execution of any project, they are typically at a level of detail not appropriate for project work planning. However, used hand-in-hand with the project plan, these lists are invaluable in achieving a confident position moving forward into project work.

Project Budget: Initial Accounting Setup

▶ See Developing Annual Budgets and Profit Planning (7.4) for related information.

The establishment of an initial project budget in a firm's accounting or project management system should coincide with documentation of client, consultant, and contract status for the project. Although challenging at times, this is an opportunity to verify that the project contract has been fully executed, or at least that a letter of understanding with the client regarding scope and fee has been signed. The following items should be addressed during initial project budgeting:

- Is the firm able to bill the client at this time?
- Is the firm able to recognize revenue at this time?
- Is the owner-architect agreement signed?
- If the owner-architect agreement is not signed, is there a signed letter of agreement that establishes scope of services and compensation?
- Are all consultant agreements signed?
- If all consultant agreements are not signed, is there a signed letter agreement that establishes scope of services and compensation?
- Are direct expenses reimbursable, or included in the compensation?

TABLE 10.6 Initial Project Budget: Fee Distribution

Line	Description	$ Amount	Percentage (%)	Formulas
A	Gross Fee	$100,000.00	100	
B	Consultant Fees	$40,000.00	40	A x 40%
C	Net Service Revenue (NSR)	$60,000.00	60	A – B
D	Non-Reimbursable Expenses	$3,000.00	5	C x 5%
E	NSR—Non-Reimbursable Expenses	$57,000.00	95	C – D
F	Contingency	$3,000.00	5	C x 5%
G	**Project Labor Budget**	**$54,000.00**	**90**	**E – F**

The fundamental question that needs to be answered and supported by a firm's policies is whether or not a signed owner-architect agreement or signed letter of agreement is required in order to get a project number and assign (staff) resources to begin work. At a minimum, a signed letter of agreement should be required by policy, with a time restriction placed on the ability to recognize revenue internally if the fully executed owner-architect agreement is not completed. There remain many firms with long-standing client relationships and practices that use the "handshake" approach and are less structured in the contracting process. This carries risk, of course, and all firms should consider implementing at least the minimum requirement for signed letter agreements.

The elements of a project budget are as follows:

- Gross fee
- Consultant fees
- Net service revenue
- Project contingency
- Non-reimbursable direct expense budget
- Project labor budget by phase of service
- Current percent complete by phase of service
- Budgeted resource forecast by phase of service

The example illustrated in Table 10.6 starts with a gross fee of $100,000 and is a lump sum fixed fee. The consultant fee of $40,000 is inserted and based on the information contained in Table 10.4. The percentages used for contingency and non-reimbursable direct costs are in a typical range for most projects and could be based on historical data. It is best for firms to establish guidelines for these amounts based on past project data. Contingencies should not be targeted for "extra" profit, but rather utilized for various project circumstances including unplanned direct labor, unplanned direct expenses that are not reimbursable, or unplanned consultant fees. It is important to understand that these are internal budgets that will be used to recognize revenue and pay consultants for their services. (See Table 10.7.) The client billing process is a

TABLE 10.7 Consultant Fee Distribution

Consultant Name	Discipline	Fees
ABC Structural	Structural Engineering	$15,000.00
ABC Mechanical	MEP Engineering	$15,000.00
ABC Civil	Civil Engineering	$10,000.00
Total		**$40,000.00**

TABLE 10.8 Initial Project Budget: Fee Distribution by Phase & Percent Complete					
Phase No.	**Phase Name**	**$ Labor Budget**	**% Labor Budget**	**% Complete**	**Earned Revenue**
1	Project Planning	$1,080.00	2	100.00	$1,080.00
2	Preliminary Design	$1,620.00	3	100.00	$1,620.00
3	Schematic Design	$3,780.00	7	10.00	$378.00
4	Design Development	$12,420.00	23	0.00	$0.00
5	Construction Documents	$19,980.00	37	0.00	$0.00
6	Bidding/Negotiations	$1,080.00	2	0.00	$0.00
7	Contract Administration	$13,500.00	25	0.00	$0.00
8	Post-Construction	$540.00	1	0.00	$0.00
	Total	**$54,000.00**	**100**	**5.70**	**$3,078.00**

separate accounting tool that is based on contractual amounts by phase and can actually have different amounts by phase than internal budgets. For example, internal contingencies and expense budgets would not be part of contractual fee amounts, and this alone sets up different amounts by phase between internal budgets and contractual fees billed to clients.

Table 10.8 exemplifies that revenue has been earned at the time the accounting setup occurred, and shows a total earned revenue amount of $3,078, recognizing work that was in place and complete.

It is also good practice to consider the cash flow aspects and fee utilization by phase for consultants. The architect may be compensated for 15 percent of the contractual amount for Schematic Design, but the engineering discipline may only use 10 percent of its fee for this phase. If this is the case, the architect-consultant agreement for this service should carry an amount of 10 percent for Schematic Design. It is typical for most engineering disciplines to lag behind in actual percentages complete in early project phases and catch up toward the end of Construction Documents.

Table 10.9 represents a tool that can be used for “high-level” resource planning during the initial budgeting process. It also serves as a good starting point for more detailed project work planning to be addressed in subsequent sections of this article.

TABLE 10.9 Initial Project Budget: Staff Resource Planning				
Phase No.	**Phase Name**	**$ Labor Budget**	**Average Hourly Rate**	**Hours/Phase**
1	Project Planning	$1,080.00	$175.00	6
2	Preliminary Design	$1,620.00	$150.00	11
3	Schematic Design	$3,780.00	$150.00	25
4	Design Development	$12,420.00	$130.00	96
5	Construction Documents	$19,980.00	$130.00	154
6	Bidding/Negotiations	$1,080.00	$140.00	8
7	Contract Administration	$13,500.00	$130.00	104
8	Post-Construction	$540.00	$150.00	4
	Total	$54,000.00	$132.82	407

TABLE 10.10 Earned Revenue vs. Billed Fees

		Fee Earned		Fee Billed	
Phase No.	Phase Name	$ Labor Budget	% Labor Budget	$ Dollar Amounts	% Percent by Phase
1	Project Planning	$1,080.00	2	$0.00	0
2	Preliminary Design	$1,620.00	3	$0.00	0
3	Schematic Design	$3,780.00	7	$9,000.00	15
4	Design Development	$12,420.00	23	$12,000.00	20
5	Construction Documents	$19,980.00	37	$21,000.00	35
6	Bidding/Negotiations	$1,080.00	2	$3,000.00	5
7	Contract Administration	$13,500.00	25	$15,000.00	25
8	Post-Construction	$540.00	1	$0.00	0
	Total	$54,000.00	100	$60,000.00	100
	Non-Reimbursable Direct Expenses	$3,000.00	Earned as incurred		
	Contingency	$3,000.00	Earned when utilized		
	Total	$60,000.00	Earned = Billed at project closeout		

Table 10.10 demonstrates the timing of recognizing revenue and billing the client for work complete. In this example, Phases 1 and 2, Project Planning and Preliminary Design, were not part of the compensation in the owner-architect agreement but were used internally by the architect to recognize revenue for work completed prior to the initiation of actual Schematic Design. This also exemplifies "withholding" amounts for direct expenses and contingencies internally until they are incurred and utilized, which is reconciled at project closeout. It is recommended that a "billed vs. earned" analysis be completed over time by month to see that these do not get considerably out of sequence during the project's scheduled completion dates. Earning too far ahead of billing carries risk in the collection process, whereas billing ahead of earning in a reasonable way lowers this risk considerably.

THE PROJECT WORK PLANNING PROCESS

The project work planning process has evolved considerably in the last 20 years in the direction of simplification and service to the project. There is an *appropriate* level of detail for every plan, and without exception every project needs a project work plan. Large and complex projects need simplified and manageable task lists reflecting the scope of services in the contract. Small projects can have few tasks and be planned at the phase level in most cases. Some may argue that small projects do not need a work plan. However, all firms still need information provided by a work plan—staff utilization, historic data for fee development, and forecasts for firm-wide operations and financial management, for example. Project plans should be monitored *regularly*, which is normally on a monthly basis if there are no staff or scope changes. The components and considerations for a typical project work plan include the following:

Prepare project work plans that serve the project manager and team. Do not prepare overly detailed project work plans that project managers and teams must serve.

- The contractual scope of services, the "foundation" for the phases, tasks, deliverables, and milestones for the plan
- A bar chart showing the start and end dates for phases, special milestones, and the overall project schedule

- The staff resources and hours needed to do the work, planned by day, week, month, or year
- Consultant requirements for their part of the project
- Owner requirements for reviews and approvals
- Labor or billing rates, applied to (staff) resources and used to track the fees, both planned and actual, to assess status
- Non-reimbursable direct costs, earned as incurred and part of the profit calculation

The benefits of project work planning are numerous and include the following:

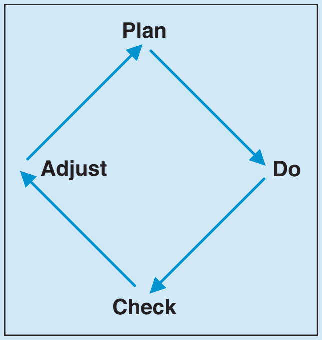
- Better understanding of the contractual scope of services with the ability to communicate the scope with graphic and numerical information.
- Used to develop fees based on the scope of services with the level of detail needed to be confident schedules and profit targets are achievable.
- When used during the contract negotiation process even at a conceptual level, scope and fees can be balanced in a quantitative manner.
- Provide the necessary information to produce resource and earned revenue forecasts for the firm.

THE WORK PLAN

Bob Gillcrist, Architect

The work plan is a tool to allow for the accurate planning and monitoring of a project. In order to be better prepared for the type of issues that affect the performance of our projects, it is important that project managers have processes in place, and develop habits that involve the utilization of these processes, to allow them to be proactive and, when necessary, appropriately reactive.

The model shown in Figure 10.7 is a simplistic approach to the stages of effective work plan development and utilization.



Bob Gillcrist

FIGURE 10.7 Plan, Do, Check, Adjust (PDCA) Diagram

Plan: For any task, there must be a plan. "Plan" here includes preparation of contracts, staffing, work plan, cartoon sets, CAD management, and other documents. Without a plan, one can never know if a task is performing properly or not, for without a plan there is nothing by which to judge its performance. The plan should be the result of input from the project manager, project architect, and project designer, at a minimum. Others can be included as necessary. This plan is used to prepare any proposal to a client, and then used in the negotiation of a contract.

Do: Put the plan into action. At this point the plan and the contract are completed and the project is underway. The plan is the step-by-step set of instructions to deliver the project in accordance with the contract.

Check: Periodically check the progress of work against the original plan. This habit achieves two things: (1) It provides you with the opportunity to see what's next; and (2) it allows you to verify that what you have completed thus far is done according to the plan. Much like a set of instructions by which you assemble something, you check the instructions after completing each step to verify that the step you just completed was done correctly and to prepare for the next step. A plan gone unchecked is no better than no plan at all.

Adjust/act: Based on the results of checking a plan, it may be necessary to adjust the plan to correct for circumstances discovered and then act on those adjustments.

To put all of this into context, a typical project scenario may look like this:

In preparation for a project meet with the key participants and establish the goals, and develop the **plan** (as described above) for achieving them. At the appropriate time, begin to **do** what the **plan** calls for. At regular intervals, **check the plan** to verify if the project is proceeding as planned. If not, **adjust the plan** accordingly to bring the project back on track. The result of any such adjustment is a modified **plan**, and the cycle continues (**plan**, **do**, **check**, **adjust/act**, **plan**, **do**,...).

- Document project team member roles and responsibilities that can be measured.
- Analyze changes and their root causes related to scope and schedule, with proper documentation for additional service considerations.
- Identify and take corrective actions if a project is not performing according to the project work plan.

Work Breakdown Structure

One thing remains consistent in all firms and all projects: Project plans and project revenue projections are necessary to see where the project is headed. The work plans can be set up in Excel or created within an enterprise software solution that has a project planning component. An enterprise solution is software with integrated accounting and timekeeping (project management) capabilities. An enterprise solution will provide important information that stand-alone Excel won't; it will synchronize actual hours with planned hours in one place and provide reports for earned and projected revenue for your firm. After that, it gets easier to spend time where most architects want to live their professional lives—providing great client service and well-designed and functional buildings that are built well, sustainable, and lasting.

It is essential to prepare the project plans to the level of detail that works for the project and the team, and not go to a level of detail that is hard if not impossible to manage. Plan to three, in some cases four, levels in the work breakdown structure (WBS) for most projects to produce a manageable plan that can be monitored and updated as required. Planning to two levels, where you simply add staff resources at the phase level, is likely not detailed enough. However, it can work well for experienced project managers that are very engaged in the project work, and for smaller projects with net service revenues under $50,000 to $100,000.

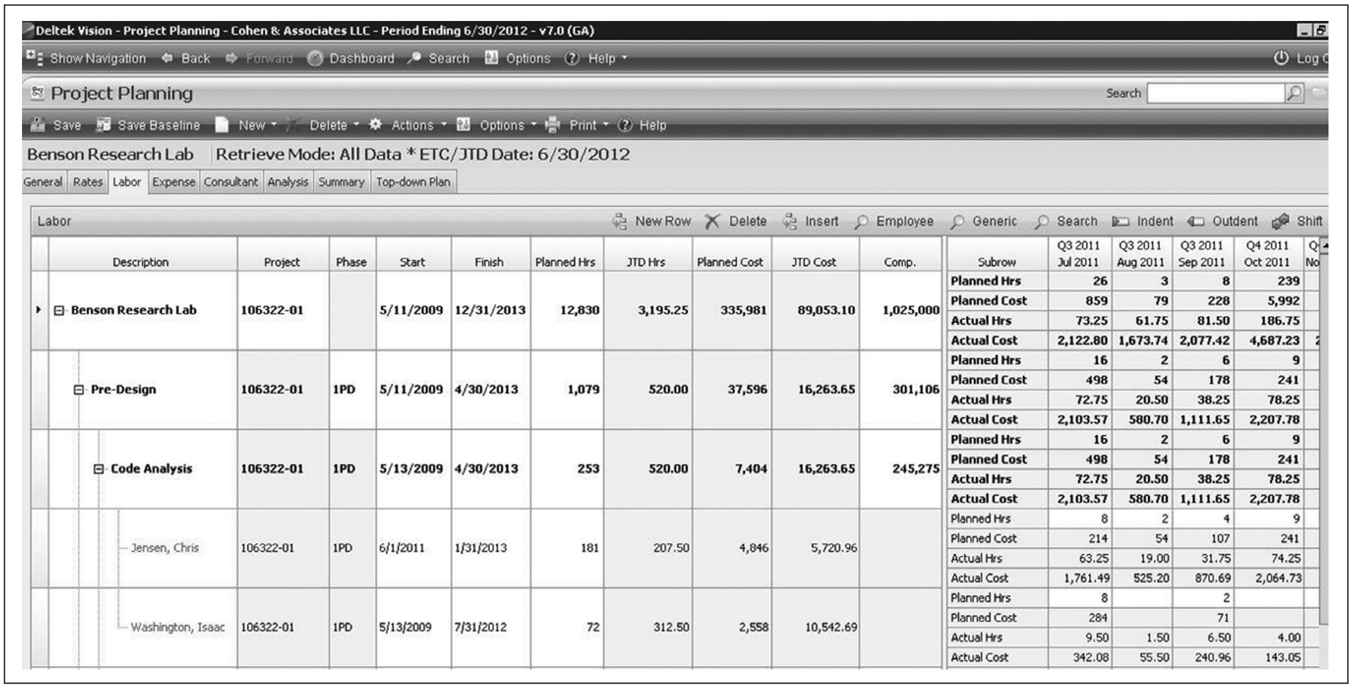
Typically, the WBS levels are as follows:

Level 1: Project name
  Level 2: Phase name
    Level 3: Task name
      Level 4: Sub-task name
        Level 5: Sub-sub-task name

An example of a common Level 3 task would be "building elevations," and associated Level 4 sub-tasks would be "north elevation," "south elevation," etc. For most purposes, staff assignments are made for the Level 3 building elevation task to be completed over a period of time, with no need to name the sub-tasks. Therefore, Level 3 is really all that is needed to manage the project. Special projects may require planning to Level 5, although this is micromanaging in most cases and risks serving the plan rather than letting the plan serve the project team.

Small project practitioners might say, "I only have small projects, a lot of them, and I don't have the time or see the need for doing project plans." Project plans for small projects don't need much detail, do not take much time, and can provide resource utilization reports to help manage staff. Let the complexity of the project guide the level of detail in the plan. Firms need to use resource utilization reports to measure the chargeability of staff, and when accuracy and regularity is achieved in this metric the firm will have measurable benefits. Do project plans for all projects, no exceptions: It's not dependent on firm size. Lastly and in parallel with project planning, deliverable lists and cartoon sets are needed for all projects. Project profitability is most dependent on tailoring scope of services and fees to the documents and services delivered. A project work plan that does not reflect the tasks and consider the deliverables for the project has little chance of succeeding.

Figure 10.8 demonstrates the principles of work breakdown structure and project work planning with resources added at Task Level 3. This is a partial view of a project



Deltek Vision Software

FIGURE 10.8 **Deltek Project Planning Labor Tab, Partial View**

work plan for the Benson Research Lab (project name, Level 1) showing the pre-design phase (phase name, Level 2) and the code analysis task (task name, Level 3). Two staff resources are planned for work on this task, with the following vertical column fields on the left portion of the plan:

- Project number 106322-01
- Phase abbreviation 1PD for pre-design phase 1
- Start and finish dates for the project, phase, task, and resource
- Planned and job-to-date (JTD) hours for the project, phase, task, and resource
- Planned and job-to-date (JTD) labor cost for the project, phase, task, and resource
- Compensation (net service revenue) for the project, phase, and task

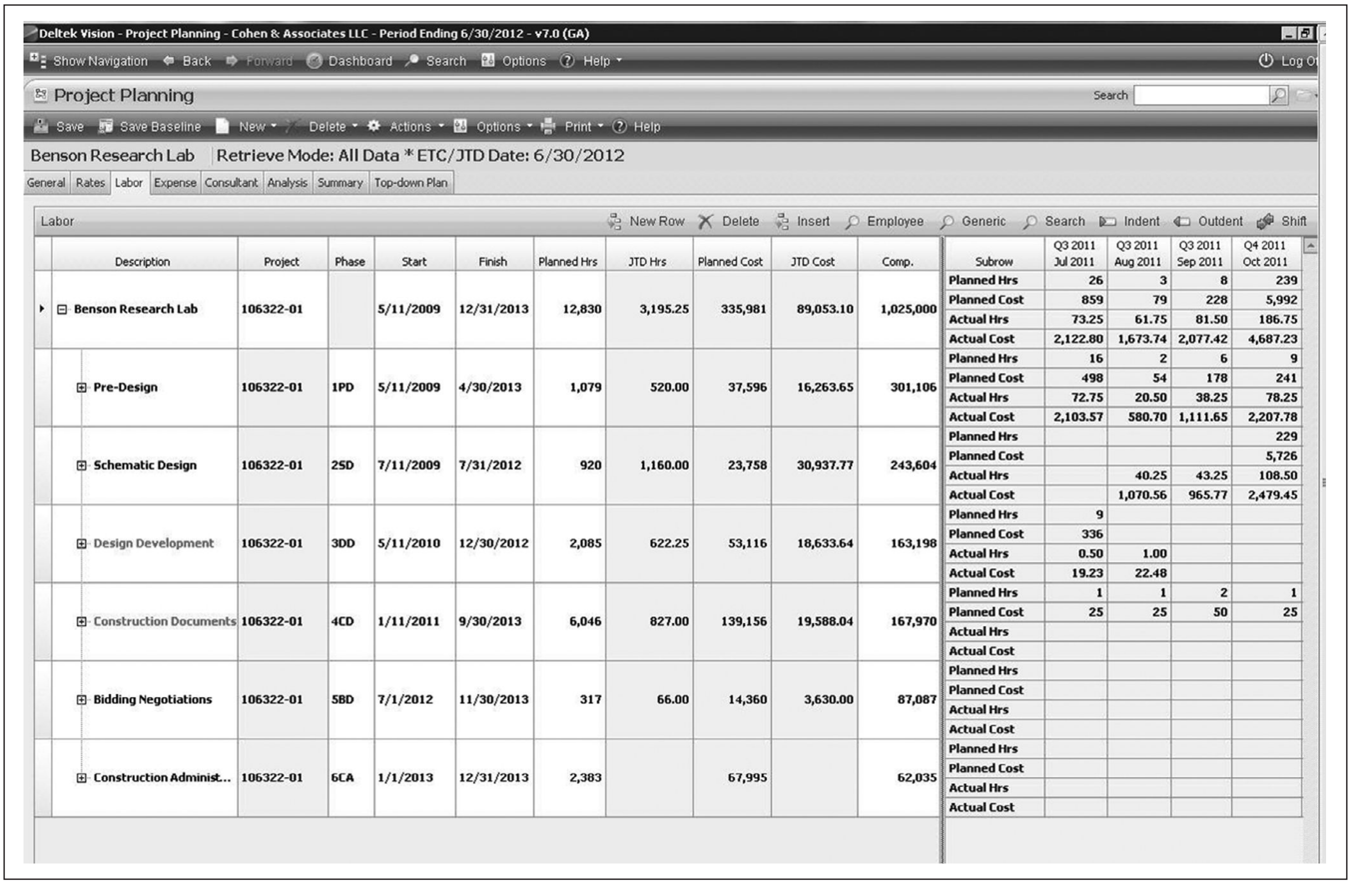
The right portion of the plan represents the calendar and horizontal row fields containing monthly data for the project, as follows:

- Planned hours and planned cost for the project, phase, task, and resource
- Actual hours and actual cost for the project, phase, task, and resource

Figure 10.8 also represents the process for producing a bottom-up budget based on task-level resource planning as discussed in the preceding Project Budgeting section of this article. Resources are "built" from the bottom up, in this case for the code analysis task in the pre-design phase, for each task identified in the entire plan, including all phases from start to finish. The planned cost (raw labor costs) is then applied to overhead and profit targets for the firm, typically done with multipliers (compensation divided by raw labor costs), resulting in compensation amounts for the project.

Planned Raw Labor Costs × Target Multiplier = Compensation (net service revenue)

Figure 10.9 shows the plan "rolled up" to the phase name level 2 with compensation amounts by phase, representing a bottom-up approach to building a project work plan and corresponding budget in the accounting system. When phase levels are expanded for all phases, as in the pre-design phase in Figure 10.8, the tasks used in the bottom-up project work plan would be visible.



Description	Project	Phase	Start	Finish	Planned Hrs	JTD Hrs	Planned Cost	JTD Cost	Comp.
Benson Research Lab	106322-01		5/11/2009	12/31/2013	12,830	3,195.25	335,981	89,053.10	1,025,000
Pre-Design	106322-01	1PD	5/11/2009	4/30/2013	1,079	520.00	37,596	16,263.65	301,106
Schematic Design	106322-01	2SD	7/11/2009	7/31/2012	920	1,160.00	23,758	30,937.77	243,604
Design Development	106322-01	3DD	5/11/2010	12/30/2012	2,085	622.25	53,116	18,633.64	163,198
Construction Documents	106322-01	4CD	1/11/2011	9/30/2013	6,046	827.00	139,156	19,588.04	167,970
Bidding Negotiations	106322-01	5BD	7/1/2012	11/30/2013	317	66.00	14,360	3,630.00	87,087
Construction Administ...	106322-01	6CA	1/1/2013	12/31/2013	2,383		67,995		62,035

Subrow	Q3 2011 Jul 2011	Q3 2011 Aug 2011	Q3 2011 Sep 2011	Q4 2011 Oct 2011
Planned Hrs	26	3	8	239
Planned Cost	859	79	228	5,992
Actual Hrs	73.25	61.75	81.50	186.75
Actual Cost	2,122.80	1,673.74	2,077.42	4,687.23
Planned Hrs	16	2	6	9
Planned Cost	498	54	178	241
Actual Hrs	72.75	20.50	38.25	78.25
Actual Cost	2,103.57	580.70	1,111.65	2,207.78
Planned Hrs				229
Planned Cost				5,726
Actual Hrs		40.25	43.25	108.50
Actual Cost		1,070.56	965.77	2,479.45
Planned Hrs	9			
Planned Cost	336			
Actual Hrs	0.50	1.00		
Actual Cost	19.23	22.48		
Planned Hrs	1	1	2	1
Planned Cost	25	25	50	25
Actual Hrs				
Actual Cost				
Planned Hrs				
Planned Cost				
Actual Hrs				
Actual Cost				
Planned Hrs				
Planned Cost				
Actual Hrs				
Actual Cost				

Deltek Vision Software

FIGURE 10.9 **Deltek Project Planning Labor Tab, All Phases**

CREATING THE PROJECT WORK PLAN

Bob Gillcrist

Consider the following in creating the project work plan:

- What are the client's budget and schedule parameters?
- What steps are required to complete the project?
- What is contained within the deliverables?
- How are milestones established and who approves them?
- What processes are addressed in the work plan
- Who are the appropriate staff/resources to fulfill these steps?
- What consultants are needed?
- When do the phases and milestones need to be completed?
- Can the project team commit to completing their parts of the project on schedule?
- What fees and profit are acceptable to the firm?

Regarding the value of work plan detail:

- Detail results in a better understanding of the project scope.
- During contract negotiations, detail helps in making informed decisions on the impact of fee reduction to scope.
- Detailed plans help to explain the project to team members.
- Detail provides the ability to monitor progress of deliverables and milestones and to control requests for work outside the contract scope of services.
- Those outside the project can understand and offer assistance if needed.
- Projects can be handed off more effectively if necessary.

SCHEDULING

There are four basic types of schedules common in the industry:

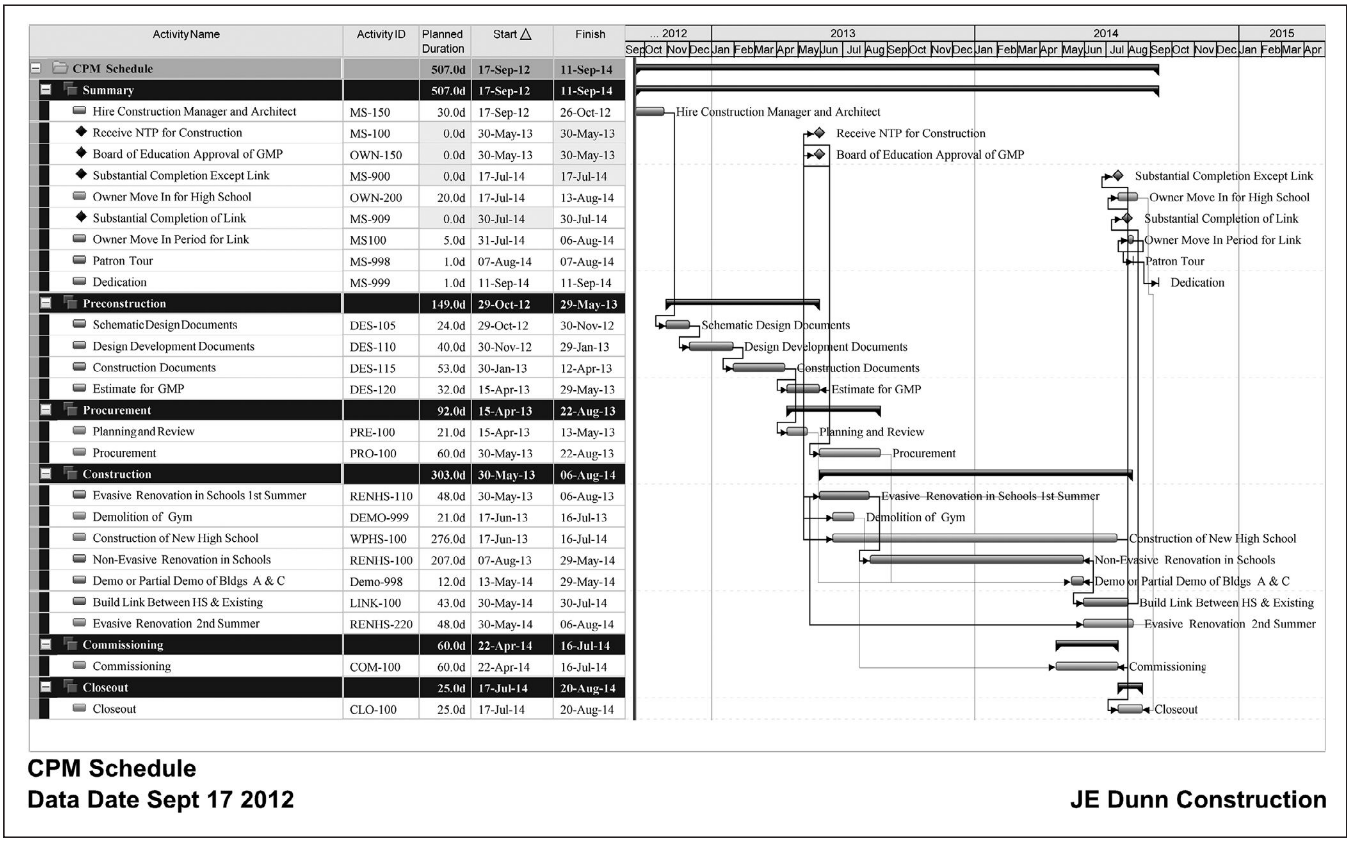
1. Critical path method schedule (CPM)
2. Milestone charts
3. Bar charts, also known as Gantt charts
4. Wall schedule

Common in the construction industry and often connected to the design schedules of architects and engineers, the CPM model was developed in the 1950s and uses interdependent activities with applied mathematical analytics. Activity lists, duration periods, and dependencies between the activities form the foundation for this scheduling method, used mostly for large and complex construction projects, research and development, plant maintenance, and others. This may sound a little too complex for even large design projects, and it certainly is that. It may be useful to apply some simple dependencies to the design and project plans, so an understanding of CPM is good for architects in general, particularly when involved in a project utilizing CPM for construction. The architect's scope of services and timing of construction contract administration duties are often incorporated into the CPM for construction. Figure 10.10 is an example of a simple CPM schedule with dependencies demonstrated during the construction phase of the project.

The other three types are commonly used in the AE industry and respond to project size and complexity.

Milestone Chart

The milestone chart (see Table 10.11) is used for short-duration projects with relatively few tasks to track and fees under $35,000. It is tempting to use this method for



JE Dunn Construction Co.

FIGURE 10.10 JE Dunn CPM Schedule

TABLE 10.11 Example of a Milestone Chart

Task	Resource	Start Date	Due Date	Budgeted Hours	Billing Rate	Labor Budget	% Complete	Earned Value
Client Interview	Nadia	6/4/12	6/4/12	4	$250	$1,000	100	$1,000
Collect Program Data	Jan	6/5/12	6/8/12	14	$175	$2,450	100	$2,450
Prepare Report	Nadia	6/11/12	6/15/12	20	$250	$5,000	50	$2,500
Concept Design	Jan	6/11/12	6/15/12	24	$175	$4,200	50	$2,100
Cost Estimate	Lisa	6/14/12	6/15/12	10	$150	$1,500	0	$0
Prepare Final Report	Nadia	6/18/12	6/21/12	12	$250	$3,000	0	$0
Client Presentation	Nadia	6/22/12	6/22/12	4	$250	$1,000	0	$0
Totals				88		$18,150	44	$8,050
							Estimate to Complete:	$8,500
							Estimate at Completion:	$16,550
							Over/Under Budget:	$1,600

larger projects, but this would simply not provide the detail needed to manage the project. This chart is easy to prepare, track, and communicate to the project team before and during project execution. The scheduling sections of the chart could be shared with clients, and in some cases all but the % Complete and Earned Value columns could also be shared as part of fee proposals and agreements, using hourly billing rates for compensation. Software solutions for project planning and tracking can easily be set up with templates for milestone charts with various levels of tasks and durations, making the information available for firm-wide tracking of financials and resources.

Bar (Gantt) Chart

Bar or Gantt charts represent the next and most often used schedule type in the profession. (See Table 10.12.)

TABLE 10.12 Example of Bar (Gantt) Chart

WBS Level	Description	Start Date	End Date	Weeks Ending 6/8/12	6/15/12	6/22/12
Project	Project name	6/4/12	11/2/12			
Phase	Phase 2: Pre-Design	6/4/12	6/22/12			
Task	Management	6/4/12	6/8/12			
Task	Design	6/11/12	6/22/12			
Task	Sustainability	6/18/12	6/22/12			
Task	Production	6/18/12	6/22/12			
Task	Project Quality Control	6/18/12	6/20/12			
Task	Budget Evaluations	6/18/12	6/20/12			
Task	Communications	6/4/12	6/22/12			

The bar chart in its simplest form shows elements of the work breakdown structure (WBS) in rows on the left side, start and end dates to the right of each, and horizontal bars on the far right of the schedule linked to a calendar grid for the overall project duration above. These charts are typically "built" in software solutions available to the profession in either a top-down manner—in which bars are produced from the start and end dates entered first—or in a bottom-up manner, where tasks are planned with resources over time, resulting in both start and end dates and bars produced graphically. Much like milestone charts, bar charts are easy to produce, not overly complicated, and provide ease in communication to the design team, clients, and contractors. The bars make overlapping tasks easy to visualize, which is important, as many design processes contain this relationship between elements at the phase and task levels. In addition to the enterprise software solutions available to the profession, there are many other computer programs available that produce very good bar charts as stand-alone documents not linked to internal accounting systems. Table 10.11 demonstrates the typical elements of a bar chart and includes tasks associated with the pre-design phase of the project.

Wall Schedule

The wall schedule is a great tool for medium- to large-scale design projects and the best means to produce a project work plan integrating the tasks required for architects, consultants, clients, and contractors involved in the design process (see Figure 10.11). On a blank wall, roll out a large continuous sheet of bond paper. As the starting point, the layout of a full wall schedule has the following attributes:

- The project time schedule is shown horizontally at the top for all phases of the project.
- The architect, all consultants, clients, and contractors as they become involved are arranged on the left in sections dedicated to their parts of the project across the timeline.

The process of completing the schedule includes the following steps:

A simple bar chart is added at the top as a guide. This may be a best estimation to be confirmed at the end of the exercise.

- The architect's project leaders determine the primary tasks needed to execute the project from all parties involved. These tasks are written on 3-by-5-inch cards and placed on the wall schedule representing major milestones, deliverables, events, and dependencies.
- Consultants are then brought into the process to review the overall schedule and tasks, add tasks of their own, and confirm the timing and dependencies of their parts of the project.
- The client is then included in the process to review and approve the schedule while assessing their own requirements for meeting the project schedule.
- If a contractor or program manager is involved, they too must review the schedule and add their task requirements over time.
- The wall schedule is completed and documented with photographs before converting it to a detailed bar chart with project tasks used for tracking and monitoring the project schedule.
- The final step is to insert the schedule and tasks into project work planning software and assign the necessary (staff) resources to do the work.

MONITORING

One can start with a great project plan with all the parts and input from the team, but without regular monitoring it will not succeed. Most projects require a monthly evaluation, which is very quick if the project is proceeding with planned resources

HOK

FIGURE 10.11 **Wall Schedule**

and hours and no significant changes are known regarding scope and schedule. The notion that projects are on cruise control can be dangerous, though, and project managers need to work with the design team to assess whether changes are occurring that affect the work plan, and why. Project changes can be in one of two categories: (1) internal/design team, or (2) external/clients, contractors, others. Internal changes must be identified, discussed with the design team, including any consultants affected, and options evaluated to take corrective action. Clients must also be notified if these changes are "visible" in project execution, and contractual obligations must still be met.

Changes caused by the client and other outside parties should be documented clearly to identify the effect on scope, schedule, fee, and need for additional service requests. This should be done immediately upon recognition that an external change has occurred, not after considerable rework has been completed giving the impression that the project is proceeding as planned. The contract should be amended formally, and the project work plan adjusted to reflect the change. There is no control over the resources and hours spent on the project job-to-date. Whether or not the update of the project work plan reflects changes caused by internal or external events, there is the ability to control the estimate-to-complete (ETC) tasks, resources, and planned hours. This is among the key elements of the work plan and related financial metrics.

Key monitoring terms:

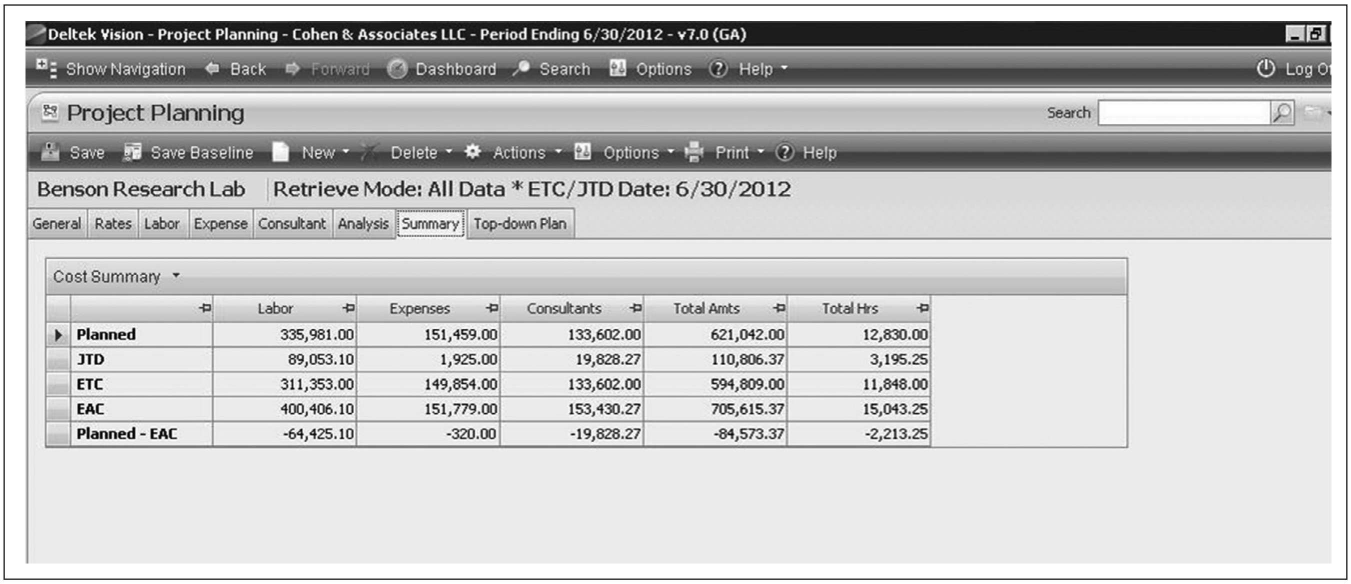
- *Net service revenue (NSR)*: Net fee determined by subtracting consultant fees from the gross fee for the project
- *Planned cost*: Labor hours and dollar amounts planned at project initiation
- *Job-to-date (JTD)*: Labor hours and dollar amounts spent as of current date
- *Estimate-to-complete (ETC)*: Labor hours and dollar amounts estimated from current date to project completion
- *Estimate-at-completion (EAC)*: JTD plus ETC labor hours and dollar amounts estimated at project completion
- *Planned estimate at completion*: Over/under calculation indicating labor hours and dollar amounts at project completion relative to planned estimates
- *Percent complete*: Current work in place for the project, phase, or task, expressed as a *subjective* percent complete and not based on the percentage of labor hours or dollar amounts spent
- *Multipliers*:
  - *Break-even*: (direct labor + overhead)/direct labor
  - *Overhead*: overhead/direct labor
  - *Effective multiplier*: current, subjective percent complete/direct labor
  - *Target*: firm-wide standard target multiplier, including profit target
  - *Planned multiplier*: net service revenue/planned cost
  - *Estimate-at-completion (EAC) multiplier*: total NSR/EAC labor dollars
- *Billed/invoiced amounts*: Amounts billed to clients based on contract compensation amounts and percent complete
- *Earned revenue amounts*: Revenue recognized in the accrual accounting system based on subjective percent complete times net service revenue
- *Billed-not-earned (BNE)*: Amounts billed to the client but not recognized as earned revenue in the accrual accounting system
- *Earned-not-billed (ENB)*: Amounts recognized as earned revenue in the accrual accounting system but not billed to the client

Estimate-to-complete is the single most important factor used in project tracking and monitoring; it must be done honestly, accurately, and regularly to achieve project success.

The effective multiplier and EAC multiplier are the simplest and quickest means to see where the project is now, where it is projected to be at the end of the project, and what needs to be adjusted to bring the project back within budget.

Figure 10.12 demonstrates the data and summary fields needed to analyze how the project is proceeding to date and where it will stand at project completion. This figure shows planned labor costs for the project at the completion date, along with both actual costs to the current date and estimated costs from the current date to the completion date.

- *Planned labor*: Raw labor costs determined from bottom-up project work plan.
- *JTD (job-to-date) labor*: Raw labor costs expended on the project from the start date to the current date.
- *ETC (estimate-to-complete) labor*: Raw labor costs estimated to be expended on the project from the current date to the project completion date.



	Labor	Expenses	Consultants	Total Amts	Total Hrs
Planned	335,981.00	151,459.00	133,602.00	621,042.00	12,830.00
JTD	89,053.10	1,925.00	19,828.27	110,806.37	3,195.25
ETC	311,353.00	149,854.00	133,602.00	594,809.00	11,848.00
EAC	400,406.10	151,779.00	153,430.27	705,615.37	15,043.25
Planned - EAC	-64,425.10	-320.00	-19,828.27	-84,573.37	-2,213.25

Deltek Vision Software

FIGURE 10.12 Deltek Summary Tab—Cost Summary

- *EAC (estimate-at-completion) labor*: The sum of JTD labor and ETC labor.
- *Planned—EAC*: The planned labor costs minus the EAC labor costs. A positive amount projects less labor will be used at the end of the project than planned, resulting in a multiplier and profit above the target. Likewise, a negative number projects a multiplier and profit below the target.

This project is in serious financial condition, considering that the projected raw labor costs will be –$64,425 at project completion. The planned multiplier for the project is determined as follows:

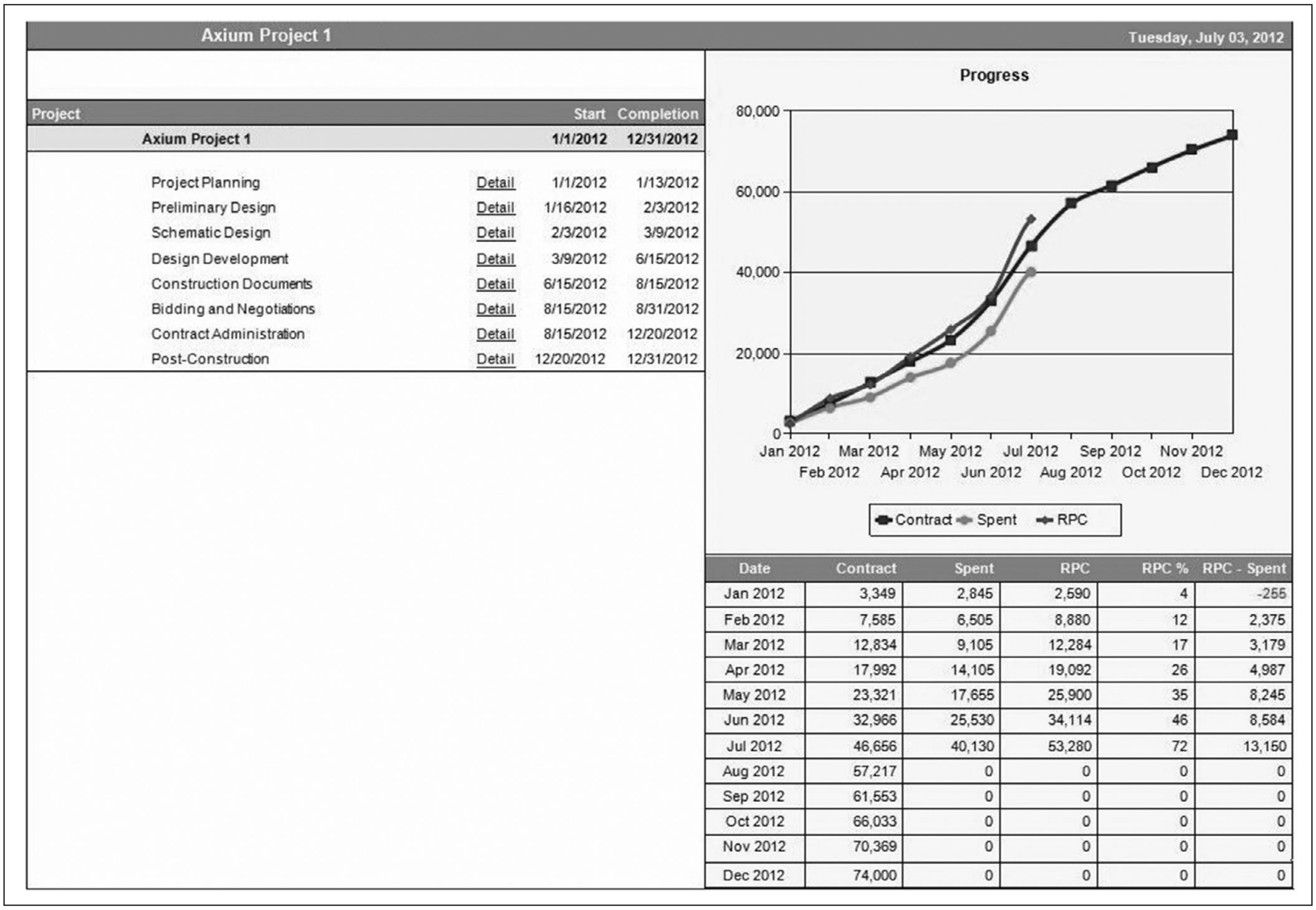
$$\text{Compensation/Planned Cost} = \text{Planned Multiplier}$$
$$\$1{,}025{,}000/\$334{,}778 = 3.06$$
$$-\$64{,}425 \times 3.06 = -\$197{,}141$$

Therefore, the project will lose $197,141, considering the firm's overhead and personnel expenses. Further steps in the monitoring process for this project are presented below.

Definition of terms use in Axium software:

- *Contract*: The amount negotiated to be invoiced for services performed on a project
- *Spent*: The total amount of time and expense expended on the project at the billing rates/markups
- *Reported percent complete (RPC)*: The amount of a project or phase that is complete as reported on a specific date in the project life cycle
- *Billed*: The amount already billed for the project
- *Work in progress (WIP)*: Billable time and expenses that have not yet been included on a final client invoice
- *Budget*: The number of hours budgeted for the project

Figure 10.13 demonstrates a useful and simple analytical tool for the monitoring process. Start and completion dates for the project phases are presented and incorporated into the associated graphs and tables. In this case, the project status at the end of July 2012 indicates progress ahead of both the Contract and Spent amounts. The reported percent complete (RPC) is the key aspect of this analysis and one that requires an *honest* evaluation of the project's progress on a subjective basis. RPC is not a



Project		Start	Completion
Axium Project 1		1/1/2012	12/31/2012
Project Planning	Detail	1/1/2012	1/13/2012
Preliminary Design	Detail	1/16/2012	2/3/2012
Schematic Design	Detail	2/3/2012	3/9/2012
Design Development	Detail	3/9/2012	6/15/2012
Construction Documents	Detail	6/15/2012	8/15/2012
Bidding and Negotiations	Detail	8/15/2012	8/31/2012
Contract Administration	Detail	8/15/2012	12/20/2012
Post-Construction	Detail	12/20/2012	12/31/2012

Date	Contract	Spent	RPC	RPC %	RPC - Spent
Jan 2012	3,349	2,845	2,590	4	-255
Feb 2012	7,585	6,505	8,880	12	2,375
Mar 2012	12,834	9,105	12,284	17	3,179
Apr 2012	17,992	14,105	19,092	26	4,987
May 2012	23,321	17,655	25,900	35	8,245
Jun 2012	32,966	25,530	34,114	46	8,584
Jul 2012	46,656	40,130	53,280	72	13,150
Aug 2012	57,217	0	0	0	0
Sep 2012	61,553	0	0	0	0
Oct 2012	66,033	0	0	0	0
Nov 2012	70,369	0	0	0	0
Dec 2012	74,000	0	0	0	0

Axium Ajera Software

FIGURE 10.13 Axium Project 1 Progress

calculated number; it is entered into the system by the project personnel in the best position to determine the actual progress of work tasks and deliverables. At the end of July, the RPC was 72 percent, applied to the contract amount of $74,000, resulting in earned revenue of $53,280.

$$72\% \times \$74{,}000 = \$53{,}280$$

As shown in Figure 10.13, the RPC minus Spent indicates the project is $13,150 ahead in this comparison, and $6,624 ahead compared to the Contract Amount.

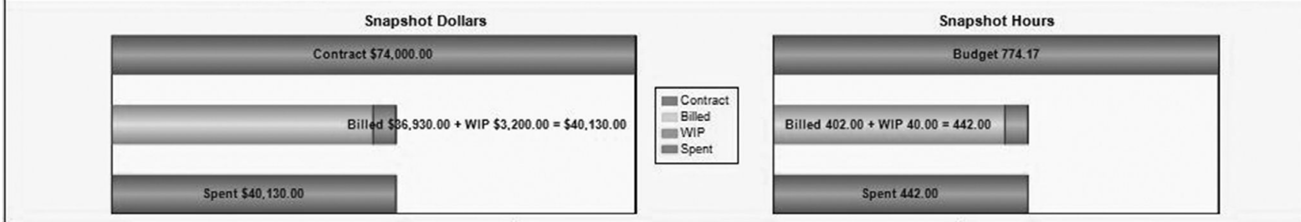
$$\$53{,}280 - \$40{,}130 = \$13{,}150$$
$$\$53{,}280 - \$46{,}656 = \$6{,}624$$

Figure 10.14 demonstrates the status of this project on the billing side. The Spent Amount is calculated by adding the amount billed to the client, $36,930, to the WIP of $3,200.

$$\$36{,}930 + \$3{,}200 = \$40{,}230$$

This project is in good condition relative to hours also, as 442 hours have been spent out of a budget of 774 hours. Therefore, 57 percent of the budget hours have been spent, compared to the RPC of 72 percent from Figure 10.13.

Axium Project 1 — Tuesday, July 03, 2012



Project	Description		Dollars: Contract	Dollars: Billed	Dollars: WIP	Dollars: Spent	Hours: Budget	Hours: Billed	Hours: WIP	Hours: Spent
	Axium Project 1		**74,000**	**36,930**	**3,200**	**40,130**	**774**	**402**	**40**	**442**
	Project Planning	Detail	1,480	1,025	0	1,025	15	10	0	10
	Preliminary Design	Detail	2,220	1,820	0	1,820	22	18	0	18
	Schematic Design	Detail	5,180	3,660	0	3,660	51	34	0	34
	Design Development	Detail	17,020	15,825	3,200	19,025	195	180	40	220
	Construction Documents	Detail	27,380	14,600	0	14,600	314	160	0	160
	Bidding and Negotiations	Detail	1,480	0	0	0	10	0	0	0
	Contract Administration	Detail	18,500	0	0	0	161	0	0	0
	Post-Construction	Detail	740	0	0	0	6	0	0	0

Axium Ajera Software

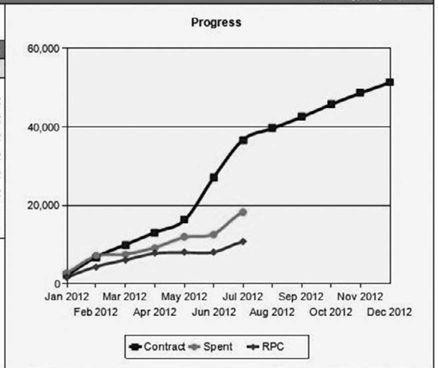
FIGURE 10.14 Axium Project 1 Snapshot

Figures 10.15 and 10.16 demonstrate a project status that is much different from Axium Project 1, in that all key indicators are negative:

- The Progress Graph shows the Spent and RPC significantly behind the Contract.
- The RPC minus the Spent is a negative amount, indicating that the project has spent more fee dollars than it is able to recognize for an earned revenue value.
- The Snapshot Dollars and Hours show corresponding Spent amounts behind Billed, plus WIP amounts and budgeted hours for the project.

Axium Project 2 — Tuesday, July 03, 2012

Project			Start	Completion
	Axium Project 2		**1/1/2012**	**12/31/2012**
	Project Planning	Detail	1/1/2012	1/13/2012
	Preliminary Design	Detail	1/16/2012	2/3/2012
	Schematic Design	Detail	2/6/2012	2/24/2012
	Design Development	Detail	2/24/2012	6/15/2012
	Construction Documents	Detail	6/1/2012	8/1/2012
	Bidding and Negotiations	Detail	8/1/2012	8/15/2012
	Contract Administration	Detail	8/15/2012	12/21/2012
	Post-Construction	Detail	12/21/2012	12/31/2012



Date	Contract	Spent	RPC	RPC %	RPC - Spent
Jan 2012	2,323	2,825	1,797	4	-1,028
Feb 2012	6,787	7,255	4,363	9	-2,892
Mar 2012	10,026	7,575	6,160	12	-1,415
Apr 2012	13,160	9,215	7,931	15	-1,284
May 2012	16,399	12,065	8,167	16	-3,898
Jun 2012	27,157	12,640	8,167	16	-4,473
Jul 2012	36,653	18,340	10,882	21	-7,458
Aug 2012	39,677	0	0	0	0
Sep 2012	42,662	0	0	0	0
Oct 2012	45,746	0	0	0	0
Nov 2012	48,730	0	0	0	0
Dec 2012	51,332	0	0	0	0

Axium Ajera Software

FIGURE 10.15 Axium Project 2 Progress

PART 3: PROJECT DELIVERY

			Dollars				Hours			
Project	Description		Contract	Billed	WIP	Spent	Budget	Billed	WIP	Spent
	Axium Project 2		**51,332**	**12,640**	**1,800**	**18,340**	**518**	**126**	**20**	**186**
	Project Planning	Detail	1,027	1,005	0	1,005	7	7	0	7
	Preliminary Design	Detail	1,540	1,820	0	1,820	15	18	0	18
	Schematic Design	Detail	3,593	4,020	0	4,020	37	42	0	42
	Design Development	Detail	11,806	5,795	1,800	11,495	121	59	20	119
	Construction Documents	Detail	18,993	0	0	0	215	0	0	0
	Bidding and Negotiations	Detail	1,027	0	0	0	7	0	0	0
	Contract Administration	Detail	12,833	0	0	0	112	0	0	0
	Post-Construction	Detail	513	0	0	0	4	0	0	0

Axium Ajera Software

FIGURE 10.16 Axium Project 2 Snapshot

In the case of both the Deltek project examples in Figures 10.8, 10.9, and 10.12 and Axium Project 2, the monitoring response for a project with this financial status must consider the following:

1. What is the root cause for the project status, which is behind schedule and overutilized in labor dollars and hours?
2. Is the root cause internal to the design team or to the client and others involved in the project, or both?
3. If the cause was due to client performance or changes and can be supported contractually, an Additional Service request should be prepared, presented to the client, and formally approved. A project work plan with the proper level of task detail could be used in part to support the additional service request both in terms of scope of services and schedule.
4. If the cause was due to the design team, including consultants, the project work plan must be evaluated and adjusted if possible.
5. Can the budget hours estimated to complete the project be reduced and still meet the firm's quality standards and contract requirements?
6. Can staff adjustments in the project plan be made to affect estimated-to-complete labor and still meet the firm's quality standards and contract requirements?

CONCLUSION

Project work planning is the key to establishing project budgets, determining schedules to perform the work, and monitoring the progress as the project moves forward. Without project work planning, these aspects of a project are random and best guesses, and it is too late to adjust or request additional fee or time as the project nears its end. Work planning does not come in a one-size-fits-all mold: Firms and project types are variable, as are project managers and teams. Start with the firm's history of project performance, the resources it took to do the job, and ability to meet profit targets; and build templates to make this effort more efficient at the beginning. Project work planning and monitoring is essential to a firm's success, must be supported by management, and is not optional.

10.4 Project Management with Building Information Modeling Processes

Scott A Kuehn, AIA, with Adam Braunstein, Charles Cordina, AIA, Stephanie Evans, AIA, Kent Freed, AIA, ASLA, and Ariel Madlambayan, AIA

The use of building information modeling (BIM) has changed firm business processes on many fronts including project management practices. Managing BIM's complexity as a design and production tool demands more control and accountability. Project managers must understand both the technology and the processes that drive effective use of BIM.

INTRODUCTION

Successful projects that use building information modeling (BIM) start with firms that have strategically created and implemented clear BIM processes. BIM is a process involving the generation and management of a digital representation of physical and functional characteristics of a facility. The processes must be integrated into the firm's project management systems for the project manager to understand the implications of BIM and to effectively create a project plan that allocates proper resources and durations, and communicates appropriate tasks and responsibilities. Setting the stage for effective project management begins before the project is awarded, with an understanding of how BIM can influence project acquisition.

► See Small Firms, Small Projects, and Building Information Modeling (11.3) for a related discussion of BIM and practice.

When traditional project delivery methods are used, many aspects of project management will remain unchanged when employing BIM, including contract terms, design thinking, and construction techniques. However, it is critical to understand where the BIM path diverges from the traditional path and to know where to look for opportunities to expand services.

PROJECT PROCUREMENT

Business Development and Marketing

As BIM becomes part of the daily project delivery practice, its use can become a major selling point with existing and potential clients. The new tools enable better team communication and coordination and enhanced services. With informed BIM processes and properly staffed project teams in place, the potential for increased efficiency, reduced cost, and centralized information afford great benefits to owners, as well as the design team and construction teams throughout the life of the project and facility.

The most obvious benefit of BIM is the capability for the team to view the project in 3D. For owners, the improved ability to visualize their building, their spaces, and their work areas introduces a new way of interfacing with the owners' user groups. As a result, design decisions can be made more quickly and in a more informed way—a great benefit to the design process and team.

Scott Kuehn, principal at H + L Architecture in Denver, leads the development and implementation of his firm's project management and quality management systems. H + L's project advisory leadership team also contributed to this article.

"BIM 101" FOR CLIENTS

When we began using BIM in 2005, we discovered that it quickly became a differentiator for us in terms of marketing and business development. Since we were one of the early adapters in our regional marketplace, we saw a terrific opportunity to spread the word and educate our existing and prospective clients on the value BIM could bring to their projects. We developed a "BIM 101" presentation specifically for our clients. Some of the key points that we introduced were the basic features of the software, which included 3D visualization, enhanced discipline coordination, and decreased drawing errors. The presentation was a success and has evolved into hands-on learning sessions with some of our clients as we become more proficient with the advanced aspects of the software.

As more firms begin to use BIM within their practices and the basics are mastered, the need to implement and integrate more advanced tools will quickly become the differentiators, as we have discovered in our practice. The integration of 4D–Time, 5D–Cost, 6D–Life Cycle Management, and analysis tools such as those geared toward sustainability are the new BIM features that firms need to master to stay ahead of the competition. As facility owners become increasingly more sophisticated, the focus is no longer the design and construction process but rather the value gained prior to construction and after occupancy, which begins with the BIM model.

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Since BIM is a database, information is readily available to be used in a variety of ways. This information can be used in conjunction with third-party software to provide enhanced services. Cost estimating and energy analysis are two examples. Leveraging the available data into other services that can benefit the owner is an important differentiator for marketing purposes.

In order for BIM to be a success, the client must first understand what it is, and have clearly defined expectations and goals about what they are trying to accomplish with the model and information. Understanding the intended use of the BIM data is really the first step in managing the perceptions, expectations, and goals. Sharing knowledge and educating the client before the project starts can be an advantage when the request for proposal is issued.

The Request For Proposal (RFP)

As more and more projects are using BIM, it is increasingly common for owners in requests for qualifications (RFQs) and requests for proposals (RFPs) to require BIM be used and a virtual model to be delivered along with basic architectural services. Some owners may have expectations without a solid understanding of the implications and may not be aware that BIM requires a higher level of owner involvement and decision making at earlier stages of the project when compared with traditionally planned projects.

Many factors are involved in determining the appropriate level of BIM utilization on a project. Expertise and experience among team members can vary greatly. The functionality of BIM software varies due to differences in product development, even within a single software platform. It can be difficult for an owner to understand the design team's capabilities and know what to expect in terms of BIM deliverables.

An awareness of these factors and related aspects inherent in BIM require marketing staff to be appraised of BIM terminology and concepts.

The Interview

When architects are selected for an interview it usually implies that the shortlisted firms have been prequalified for the work. If the chance did not present itself during business development, this is a perfect time to clarify and demonstrate how BIM can be implemented and utilized for the project. It is important to not get caught up in the heat of the moment and oversell what BIM can deliver, both in terms of technical expertise and within other project parameters such as cost and schedule limitations. A member of the interview team should be knowledgeable and fully conversant in BIM implementation and utilization issues.

Communication is always at the top of client concerns, and BIM can expand the ways that project design development and progress can be communicated to the client. Examples from other projects demonstrating visualization techniques, including examples of how BIM can support coordination and communication during the life of the project, are appropriate.

This type of information gathering and open discussion during the interview will help the project team fully understand the owner's goals, dispel misconceptions, and allow the team to begin formulating the appropriate BIM execution plan once the project is awarded.

PROJECT PLANNING AND START-UP

Setting Goals

Following project award, BIM project goals should be carried forwarded, reevaluated, and/or established. Early goal-setting is vital for a project's success, and is a prerequisite of contract negotiations.

Developing a collaborative roadmap with the client, design team, and potentially the contractor to meet the project BIM goals is essential. This is best done by developing a BIM Execution Plan.

The BIM execution plan is one of the most important project management tools of the project. It is complementary to the project plan, and, when written clearly, is a record of:

1. Roles and responsibilities
2. Internal and external BIM goals and uses (see Figure 10.17 for an example of BIM use analysis)
3. Modeling protocol
4. Process plan
5. Level of development

Our experiences have demonstrated that collaborating with the entire project team early in the process is much more beneficial in the long run. It is always important to stay within the requirements of the agreement between the architect and owner (see AIA B101™–2007 Owner/Architect Agreement).

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While some of this information sharing is not new with the use of BIM, there are certain new processes that should be mapped out due to the critical need for good communication and coordination.

The first important part of the BIM execution plan should be a project directory. Clearly defining roles and responsibilities streamlines both communication and workflow, especially with the introduction of new roles that are an inherent part of BIM.

The second major part of the plan is setting internal and external BIM goals for the project. Internal goals are those of the design team, and external goals are those of the owner and contractor. These can include (but are not limited to) such things as

On a large medical project our firm was teamed with two other architectural firms. A CM-Constructor was selected early, and the owner's representative, who had an architectural background, was also involved from the beginning. We used the Pennsylvania State University BIM Project Execution Planning Guide. One of the benefits gained from using the guide was a structured method for developing and deciding project goals and BIM objectives.

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BIM USE ANALYSIS
Version 2.0

BIM Use*	Value to Project	Responsible Party	Value to Resp Party	Capability Rating			Additional Resources/ Competencies Required to Implement
	High/Med/ Low		High/Med/ Low	Scale 1–3 (1=Low)			
				Resources	Competency	Experience	
4D Modeling	High	Contractor	High	3	3	3	
		Owner	High	1	1	1	Resources/Competency not required
Integrated work planning	High	Contractor	High	3	3	3	
Pre-Fabrication	High	Contractor	High	3	3	3	
Virtual mockups	High	Contractor	High	3	3	3	
		Owner	High	1	1	1	Resources/Competency not required
		Designer	Med	3	2	2	
Site Utilization Planning	High	Contractor	High	3	3	3	
		Designer/Civil	Low	3	2	1	
		Owner	Low	1	1	1	Resources/Competency not required

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FIGURE 10.17 Example of BIM Use Analysis

IMPORTANCE OF EXPLICIT GOALS

Explicit goals aid in the development of the modeling level of development. A possible goal of a contractor might be prefabrication. A complete understanding of this will emphasize the importance of process development, LOD, and responsibility assignments as part of the BIM Execution Plan. Schedule comes into play because the contractor may want to pursue this idea in order to save time. For example, the contractor may want to prefabricate all toilet rooms in the facility. This will require design, modeling, and documentation of the toilet rooms much sooner than the design team would typically release construction documents, creating out of sequence design decisions, such as selecting finishes for the toilet room prior to design development completion. Prefabrication drawings require accuracy by the design team that is likely beyond its historically typical work effort—even at the CD phase. This goal will need to be included in the BIM project goal statement; the written process plan, as part of the BIM execution plan, will show when, from, and to whom the information exchanges will occur; and the LOD table will indicate responsibilities and "accuracy" expectations. By doing this planning, it may be decided that the contractor will contribute data to the model in order to attain the accuracy required for prefabrication; and this activity will occur after information is exchanged (delivered to the contractor) per the process plan.

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scheduling, coordination, asset management, energy analysis, and coordination. This part of the BIM execution plan must be established early in the project with all involved, as it sets the expected modeling level of development (LOD). The LOD is the extent of specific modeling that is to be completed for the project, usually broken down by project phase and heavily influenced by project goals.

The third and perhaps most critical part is the level of development (LOD) of the virtual model. LOD is driven by the project goals. The AIA has issued E202™–2008, BIM Protocol Exhibit (see Figure 10.18), as a foundation for setting project-specific levels of detail. This can be used outright, or one can take the additional step and define a model element author (MEA) for each model component as the party responsible for developing each element to the LOD is established. LOD has roles, responsibilities, and expectations that are all bundled into one package. Best practice is to include this LOD plan or matrix as an exhibit to the contract, as well as a component of the BIM execution plan.

With or without using BIM, the need for detail increases as a project progresses. The LOD in a BIM execution plan may be differently defined by construction document packages or by project phase. Regardless, the point is that everyone downstream gets the information they expect when they need it, and everyone upstream knows what information they need to create, the extent it needs to be defined, and when. The execution plan keeps the process streamlined and efficient, which becomes very important in complex projects, or when the model is going to be used for a variety of things.

For the project manager, an understanding of the execution plan for a BIM project is important in developing fees, understanding work flow, staffing at different phases of design, and project documentation. The plan also enables communication of the complexities of the BIM process to all team members.

The above discussion reflects those parts of the BIM execution plan that are non-negotiable and must be addressed. There are many other parts that one may wish to add, depending on the project's needs. It is an effective process, at times, to include in the plan the entire project schedule, information sharing/syncing schedules, an explanation of expected deliverables at each project milestone, a written paragraph about the project model structure, etc. There is no one-size-fits-all plan, but a firm can develop an execution plan standard template to begin the process.

Since the LOD will influence fees, schedule, and staffing, this should be determined prior to contract negotiation, if possible. When the LOD is not determined early, the team must try to make LOD goals fit within the already established fee and schedule. This is not ideal, and does not fully embrace BIM—especially if the client has different expectations based on their perceived or actual knowledge of BIM.

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Project Delivery

All projects are distinctly different, and the use of BIM can be affected by the delivery method selected. The design team must work with the owner to develop a clear BIM execution plan that addresses the delivery method and project goals.

Every project has a schedule and budget. There are many perceptions of BIM and its potential impacts to the schedule for a project. If you are an owner, contractor, architect, or engineer, the perceptions will vary.

Typical perceptions are as follows:

- *For the owner*: ability to study more design options, easier to implement changes, faster project delivery, improved cost estimating and bidding, and advantages to facility maintenance and operations

§ 4.2 Table Instructions

§ 4.2.1 The table in Section 4.3 indicates the LOD to which each Model Element Author (MEA) is required to develop the content of the Model Element at the conclusion of each phase of the project.

§ 4.2.2 Abbreviations for each MEA to be used in the Model Element Table are as follows:
(Provide abbreviations such as "A – Architect," or "C – Contractor.")

Abbreviation	Model Element Author (MEA)

§ 4.3 Model Element Table
Identify (1) the LOD required for each Model Element at the end of each phase, and (2) the Model Element Author (MEA) responsible for developing the Model Element to the LOD identified.

Insert abbreviations for each MEA identified in the table below, such as "A – Architect," or "C – Contractor."

NOTE: LODs must be adapted for the unique characteristics of each project.

Model Elements Utilizing CSI UniFormat™				Preliminary Design LOD	Preliminary Design MEA	Schematic Design LOD	Schematic Design MEA	Design Development LOD	Design Development MEA	Construction Documents LOD	Construction Documents MEA	Construction LOD	Construction MEA	LOD	MEA	Note Number (See 4.4)
A SUBSTRUCTURE	A10	Foundations	A1010 Standard Foundations							300						
			A1020 Special Foundations							300						
			A1030 Slab on Grade							300						
	A20	Basement Construction	A2010 Basement Excavation							NA						
			A2020 Basement Walls							300						
B SHELL	B10	Superstructure	B1010 Floor Construction							300						
			B1020 Roof Construction							300						
	B20	Exterior Enclosure	B2010 Exterior Walls							300						
			B202 Exterior													

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FIGURE 10.18 Sample Clip of Level of Development from AIA Document E202™–2008

- *For the contractor*: more defined design, fewer coordination issues, reduced schedule delays, improved estimating and bidding, and reduced overhead costs (fewer RFIs and changes)
- *For the design team*: improved coordination, fewer errors and omissions, and lower construction administration costs (fewer RFIs and change orders)

Common misconceptions about the use of BIM can include:

- Owners, project managers, and contractors often misunderstand the time it takes to implement a change. The widespread assumption that it is as easy as "clicking your mouse" to make a change is not accurate. Implementing changes during the Construction Document and Construction phases can be difficult. The extent of the difficulties will be based on the specific BIM software, the extent of the changes being made, and the level of development (LOD) of the model. For example, if the BIM model LOD is complex and is integrated with database information, the change can affect widespread data in the documents. There are many complex pieces of the model that need to be checked and coordinated. It is not prudent to trust that the software will do it correctly.
- Clients and design professionals who are not using BIM sometimes assume that using BIM allows the AE team to do their work faster. BIM models are information-intensive, and many critical decisions need to be made early in the design process. If they are not, subsequent changes can be even more time-consuming than using 2D CAD. It is often difficult for clients and the AE team to make decisions early in the design process that would allow the schedule to be shortened. The client may

Complex BIM models will slow down computer systems. Design staff find themselves waiting for models to open and be saved. There is a great deal of inefficient time that is never considered in the schedule, fees, and overhead costs to firms. This problem is compounded when the issue exists across a team of architects, engineers, and contractors on a project.

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▶ See Project Delivery Methods (9.1) for a broad discussion of project delivery methods in practice.

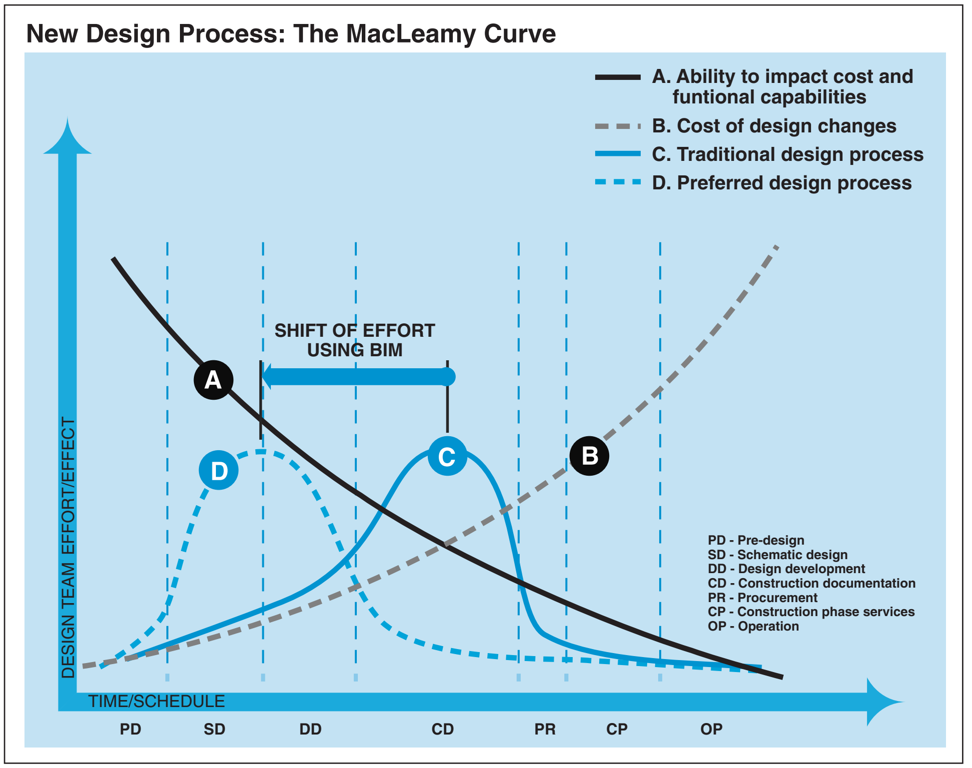

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FIGURE 10.19 New Design Process: The MacLeamy Curve

believe that decisions can be made at any time during project development. Although the mind-set of most clients is that the project schedule can be shorter, in reality the design phases may actually need to be longer.

Be prepared to make modifications to the typical schedule durations to accommodate BIM. The schematic design (SD) and design development (DD) phases are lengthened. The presumption is that construction documents (CD) and construction phase (CP) services are reduced. The presumption for CD is only relevant if decisions are made in a timely manner and no changes occur. (See Figure 10.19.)

BIM AND CONSULTANTS

When our firm first started with BIM, many engineers were still "drafting." They did not want to think about how to integrate their design with ours. Many engineering firms have drafting departments with individuals that are not trained in the AEC industry. With BIM, redlines have more meaning than just a line on paper.

A team that understands how to make design decisions early and visualize that "redline" into a complete solution is necessary. The use of BIM keeps engineers accountable for their work in real time whereas, in the past, engineers tended to rely on the architect or contractor for coordination. Moreover, the excuse that BIM software is not adequate for certain design disciplines (MEP) is no longer valid. If a consultant gives this excuse, then they are the wrong choice for the team.

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The Team

Committing a project to BIM does not necessarily mean that all team members are at the same level. The makeup of a project team can range from multiple consultants each using different BIM or non-BIM software, to a single full-service firm where all disciplines are using the same platform. The contractor or construction manager will be a vital team member for leveraging BIM, especially on projects where CM/GC (design assist), design-build, or IPD is being used.

On the owner's side, facility managers need to be equipped with the proper training, software, and support if the model is to be used for facility operations and management. This should be part of the owner's BIM goals.

Implications for Alliances and Joint Ventures

BIM can be further complicated when multiple AE firms are teamed together. This should be considered when developing project BIM goals. The challenges of working with other firms with different internal standards, remote locations, and different software can have impacts on work flow, quality control, schedule, and profitability. Additional training may also be required.

Contracts and Legal Issues

Despite the benefits and the range of issues it can bring to design, documentation, and construction, there are no professional services agreements that anticipate the aspects of BIM-related liability issues. As of 2012, professional organizations and professional liability insurance carriers have not addressed BIM issues and seem to be taking a wait-and-see approach. Until legal precedence is established, BIM-related service agreements will need to be authored by owners, design professionals, and their legal counsel.

LARGE FILE SHARING

Our firm uses an FTP site to share the model with the Design Team. The model(s) are scheduled to upload to the FTP site nightly so that access to the most current information is available to the entire team. All engineering and other consultants also upload to the site. There are proprietary sites that can be used to share models, standards, and project information. All solutions for file storage are affected by the size of the project and project team. It is important to manage the shared site, organize the site in a logical manner, archive old files in order to limit the data being stored, and consider relevant security issues. New technologies such as Revit Server and virtualization are providing "live" linkages between models shared worldwide, with continuous updating. The pace of technological change and networking capabilities will continue to evolve and bring improved solutions.

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Variables of Integration

One of the most important variables in the use of BIM is the degree to which it is integrated into the entire project-delivery process. This is of particular importance in drafting contracts. Because BIM affects the degree of change possible in the project-delivery process, the range of potential legal issues requiring treatment in the project agreements is affected.

In a relatively nonintegrated use of BIM, the architect might use BIM to assist with design, followed by delivery of 2D plans to the general contractor. This is very similar to traditional project delivery processes.

In a more integrated use of BIM, the architect might furnish copies of the digital models to the general contractor upon completion of the design for the contractors and fabricators to use as starting points for their means-and-methods models.

The use of BIM becomes fully integrated when contractors begin modeling work during the design phase. This brings important advantages, including allowing the contractor's means-and-methods planning to inform the design, which in turn increases model usage earlier in the process as the primary tool for collaboration among the parties, in some cases permitting a compression of the overall project delivery schedule. These integration and project efficiencies can be achieved if the modeling parties agree on reasonable rights of the project team members to rely on the completeness and accuracy of shared models.

▶ Risks and Emerging Practices (16.3) addresses risk management pertaining to BIM, integrated project delivery, and sustainable design.

▶ Small Firms, Small Projects, and Building Information Modeling (11.3) further addresses BIM and its use in practice.

[I]n an integrated design environment, the lines of responsibility for each project participant become blurred and will need new definition.... Who assumes responsibility for design failure in a project in which information is provided by and shared with all parties, many design details come from subcontractors, and vendors and decisions are made jointly?... In the end, if damages arise from a design error, the design professionals are the ones with the licenses and thus stand to carry a higher risk.

—The XL Insurance Contract Guide for Design Professionals: Building Information Modeling

Managing Risk

The BIM execution plan is one of the important tools associated with managing risk. This can facilitate the design and modeling activities being executed in a manner consistent with the ultimate uses of BIM. It also allows contract writers to fully integrate the processes and deliverables agreed to by the owner and the members of the design and construct team who contribute to the modeling effort, into the contract.

Perhaps the greatest source of concern associated with BIM is the fear that its use will result in an unintended responsibility for design by contractors, and an unintended responsibility for construction means-and-methods by designers. In traditional design-bid-build project delivery, architects have generally taken great care to avoid involvement in, and responsibility for, construction means-and-methods decisions.

The use of BIM does not necessarily alter the traditional allocation of responsibility among designers, contractors, and suppliers. By implementing practices such as the BIM execution plan, the collaboration enabled by BIM will not erode the designer's traditional protection from responsibility for contractor means-and-methods. This will be true as long as roles and responsibilities are appropriately defined and reasonable control is exercised over the collaborative process. Whether or not the allocation of responsibility is altered is purely a function of the roles and responsibilities assigned to the various parties in contractual agreements relating to particular project delivery methods.

Operating in Two Dimensions

Despite the movement toward a more integrated design and construction environment, in traditional project delivery, the separation between design and construction obligations must be preserved because it arises out of the current reality that a project team operates in parallel worlds. The team's collaborative efforts are based on digital 3D models, while the contract documents legally governing the contractor's work continue to be 2D plans and hard-copy specifications. Special attention should be paid to both of these dimensions during each phase of a project.

The architect's tools have evolved over the past few decades. With hand-drawn documents, the owner and construction team end up with everything the AE produces. With the development of CAD, the AE allows limited sharing of electronic files on a case-by-case basis and sometimes charges for the use of the files. Special license, waiver, release, and indemnity agreements for electronic file transfer to contractors were developed to protect copyrighted materials and potential claims against the AE for any damages that arise from the inappropriate use of the files. AIA Document C106™–2007, Digital Data Licensing Agreement, serves as a licensing agreement between two parties for the use of and transmission of digital data.

Large or small, it is our experience as of 2012 that "paper" still rules. Paper is the construction document; it is onto paper that professional seals are affixed, it is what the contract requires, and it is what the authority having jurisdiction (AHJ) requires. The building information "design" model is generally used for information and coordination, and use of the model by contractors is likely to be at their own risk.

Authorities having jurisdiction may still require stamped paper copies of documents for planning, zoning, and permit reviews. State licensing board requirements are also very specific. Although a progressive AHJ may allow final stamped documents to be received electronically, it is our experience as of 2012 that many state licensing boards and insurance companies still do not allow the use of electronic stamp and/or signature. Some state board requirements allow the use of an electronic stamp for certain engineering disciplines. State requirements should be verified before proceeding in any manner. This can be done thru www.ncarb.org or local state agency.

NEW FRONTIERS

Our part in design and preparing documents has crossed a new boundary with the use of BIM. We need to be open to sharing electronic files; continue to mitigate our risk; and see that we are compensated for any additional efforts. Educating our clients early so that they understand how our model will be shared is important and must be clearly documented in the contract and BIM execution plan.

What we have found is that no matter what we negotiate with the owner for the use of electronic files, the BIM model, and similar items, these aspects of the contract are not shared with the contractor while the owner-contractor agreement is being finalized. Likewise, owners don't often share their agreements with the contractor with the design team. This leads to the potential for conflicts between the respective agreements regarding the use of the model, which can become contentious down the road.

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Ownership of the Model

Operating in the traditional world of two-dimensional drawings was, for the most part, straightforward with regard to who created and owned specific drawings. The party that created the drawings owned the drawings.

In reality, the BIM world is considerably more complex because nearly every model includes, or is derived from, elements contributed by numerous parties. Establishing the ownership of model elements at the start of a project through the use of AIA Document E202™–2008, Building Information Modeling Protocol Exhibit, will help to establish clear divisions of responsibility and ownership.

Like other instruments of service, a building information model is subject to copyright protection. AIA Contract Documents defend the architect's copyright to their instruments of service such as drawings and specifications, including BIM models. AIA Document E202™–2008 extends this protection to a building information model, stating that a "Model Element Author does not convey any ownership rights in the content provided" to the model. This illustrates the rationale for simply negotiating ownership rights and documenting them in the project contracts. Rights to use some or all of the models may be more important to the delivery of an integrated project than actual ownership. Accordingly, an appropriate allocation of the legal rights to reproduce, use, make derivative works, distribute, and publicly display the models should be developed early in the process and incorporated into the project agreements. The allocation of the rights must be consistent with the desired use of the models. These should include, as appropriate, rights to download models from the sharing site and to create derivative works for specified purposes. Particular attention should be given to intended use(s) of the models by the owner during the life of the facility. It is also appropriate that the various modeling parties be accorded rights to use derivative models for marketing and educational purposes. Consideration should also be given to the removal of proprietary information contained in the models—a firm's standard details, logos, templates, etc.—prior to sharing of the model file.

Fee Development

The traditional design-bid-build fee structure is not applicable for BIM projects. With BIM, initial efforts are greater during the early design phases, and this creates the need to shift fees into schematic design (SD) and design development (DD). The traditional fee structure for a CAD project might be as shown in Figure 10.20. When considering fees relative to project phases, the same adjustments need to be made to the design schedule.

The design phase creates the greatest value and should claim the largest portion of the resources and therefore the fee. The traditional fee reserved for SD and DD of 35 percent can be at least 10 percent more for a BIM project. Because a well-crafted model provides a strong start on the technical documents, the normal allocation for CDs will also be reduced (as long as early design decisions are not reversed in the CD phase). Construction phase services may also be reduced, assuming that the BIM model has been coordinated to the appropriate level and is utilized by the construction team (see Figure 10.20 for a sample of fee distribution for BIM projects). The result should be fewer requests for information (RFIs) and better coordinated submittals.

Sample Fee Distribution for BIM Projects

Design Phase	Traditional Design-Bid Build	BIM Project
Schematic Design	15%	22%
Design Development	20%	40%
Construction Documents (includes Bidding/Negotiation)	45%	25%
Construction Phase Services	20%	15%

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FIGURE 10.20 Sample Fee Distribution for BIM Projects

More experienced staff will be involved from the start of the project. Younger architects have a good aptitude for picking up the challenges of the software but still require mentoring from senior staff for the construction and design knowledge necessary to build the models. Staffing projects with experienced architects who can work on the model and make the decisions at the same time is the trend.

With the development of BIM, the AE has other areas for possible fee generation:

- BIM makes visual imaging easier, and those images could be used as justification for additional fee.
- The AE's model can be used for shop drawing production, scheduling, and facilities management.
- AE fees should be adjusted upward at each advanced LOD (level of development) for the model. The complexity of the model has a large impact on the time it will take to complete the work and coordinate with all of the various disciplines.

Record Models, Operation, and Maintenance

The process for preserving models for record-keeping purposes (including related post-project responsibilities) as well as the disposition of models at the end of the project should also be addressed. Given the progress of technology, and the concerns that software and hardware available today will be obsolete 5 or 10 years in the future, the parties should consider taking steps to preserve an appropriate record that will be accessible in the future. While a detailed discussion of the use of building information models for the operation and maintenance of the facility is outside the scope of this article, the owner and the modeling parties should consider, preferably before any modeling is commenced, the intended post-construction use of the models. In doing so, the parties will be able to adjust the modeling requirements and contract terms accordingly.

Best Practices

Architects and their clients are in a unique position to drive the use of BIM and to establish an environment that maximizes the resulting value. They can do so by considering BIM from the earliest project planning stages and establishing goals for its use. It is also important to negotiate key project contracts in a manner that is consistent with the BIM execution plan, and that they address the legitimate concerns of the project participants.

PROJECT PLANNING, DESIGN, AND DOCUMENTATION

A firm moving from AutoCAD to BIM must understand and embrace that there will be differences in project planning, design, and documentation. Most of the differences are positive—once they are fully understood and embraced. The bottom line is that there will be a learning curve involved in the move to BIM at all levels, and it must be accounted for in project planning.

> In 2005 our firm chose a 25,000 SF college classroom building as the pilot project for our initial adoption of BIM. Three staff members were trained on the software. They managed, designed, and produced the project and learned much along the way that benefited our further adoption of BIM. Some lessons only come through the experience of trial and error and not just training.
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Transitioning to BIM

When transitioning to BIM, begin with a small project and gradually move on to bigger and more complex projects. Big projects pose greater challenges that are best dealt with incrementally: hardware at the desktop and server levels, system infrastructure, breaking the model into parts to allow multiple staff to work without hindering one another's progress and to increase processing speed, etc.

Train staff directly before they begin work on their BIM project; staff trained on BIM and then assigned to AutoCAD work will forget much of the BIM training. Train staff incrementally as needed to match a gradually increased BIM workload.

Carefully consider the design complexity of your first BIM project and understand that the greater your reach outside your proficiency level, the greater chance for problems down the road.

Staffing Implications

Project staffing for a BIM project presents new challenges and new roles. The project must be staffed with the appropriate people filling the appropriate project roles. The biggest operational challenge remaining is the increase in the technology divide between BIM users and non-BIM users and staffing new project roles.

There are also new roles within the BIM project environment that must be considered, in addition to the typical ones of principal-in-charge, project manager, and project architect. These are the BIM manager, model manager, and modeler. Depending on project and firm size, this could be one person, or it could be multiple people serving in each capacity. Similar to traditional project roles, each focuses on a slightly smaller realm of the work than the person ahead of them:

- *The BIM manager* is similar to a project manager, and as such, should have similar management and leadership skill sets. This person's responsibility is to oversee the BIM aspect of the project as a whole, including the consultant teams. Their holistic view of the project means everyone is starting from the same ground zero, and that project standards and processes are followed in order to reach the stated project goals. BIM managers orchestrate the BIM collaboration via the model managers. The difference between this role and an IT or CAD manager is that the BIM manager is a day-to-day project team member. This person must understand building construction if they are to oversee the construction of the models.
- *The model manager* is similar to a project architect, and as such, should have similar leadership skills and construction knowledge. Their responsibility is to oversee their individual model and modeler team. They also oversee that the project standards and processes are being followed in order to reach the stated project goals, but view the work in more detail and with regard to the actual construction of components. Their communication with the project architect(s) helps to make sure that the critical building information is incorporated into the model. They also maintain the "hygiene" of the model, verifying the model organization and keeping irrelevant information and components from cluttering the project.
- *The modelers* create all the parts and pieces of the model that make the whole and build in the parameters that make BIM, well, BIM. We purposely do not say they are similar to an intern—this is where traditional 2D line drawing and BIM diverge. In order to model, one must have a working knowledge of how buildings go together. Although interns typically fill this role, it can be a mistake to throw in a brand-new, fresh-out-of-school intern, no matter how advanced their software capability. Something must be modeled before the team can mark up a drawing, and so mentoring becomes even more critical. The project architect may find it useful to sit down with the team and discuss the critical project components, including what is appropriate to be modeled vs. drafted (since it is generally not good practice to model construction tolerances, as one example) and perhaps charge the modelers with some of the product research. Starting the project with a discussion on actual components parallels the modeling effort and is complementary. The modelers can bring information back and work with the project architect on appropriate implementation, and thus everyone is approaching the work side by side. This is also a great opportunity for the modelers to openly communicate about modeling progress and pitfalls, allowing all team members to have an understanding of each other's work as well as facilitate discussions on what should or should not be modeled. The more knowledge of the BIM process and software by the entire team, the more effective the mentoring and communication becomes.

Designing and Documenting with BIM

Now that the BIM execution plan, contracts, and team are in place, the fun begins. But when should it begin? If the proper understanding of the software and an experienced team is in place, BIM can be utilized very early in the design process, even at the programming phase.

There are additional software programs that can be used to supplement this typical work flow; we have begun experimenting with software that enhances BIM capabilities, with some success—one of these programs bridges the gap between programming and design. Large-scale projects with multiple user groups and design software being utilized benefit most from this type of tool.

There are advantages and potential risks to this approach. The decision rests with how definitive and complex the proposed program is and with how many different design alternatives will be explored. The key is maintaining the modeling at the same level of decision making to avoid wasting time. For example, do not model materials, doors, and windows while room adjacencies are still shifting around. Instead, model "generically" at first—that is, without selecting materials, and using a preliminary "z" coordinate(s) until the time is right to make it specific.

As a practical matter, not every project contributor will be trained in BIM. Use of BIM does not preclude the use of other design software, or even hand drawing. Staff not trained in BIM but skilled with these other tools can continue to contribute to the design process with the tools most familiar to them. They should communicate their design work to the modelers daily for efficiency. There is a time and conversion "penalty" in translating other forms into BIM, so once the level of modeling gets specific in terms of materials and assemblies, it is best to advance the work in the model only.

The crucial point here is that in moving to BIM a firm needs to commit to continuously updating the model with all relevant information. One of the prime benefits of BIM as the model is a repository for all relevant information that is available to all model users at all times. If all participants do not keep their design progress and changes up to date in the model, then the team is back to working in silos and seeing each other's updated information primarily at project milestones. When everyone updates their model continuously and shares information on a regular basis, implications of changes can be seen, evaluated, discussed, and approved or revised in an unbroken process. This greatly improves project coordination and accelerates the progress toward resolution of issues earlier in the design process.

But even before this, it is important that you have modeling standards in place. A 3D modeling template that includes basic documentation standards from which to begin the work is critical, as it can foster consistency across projects. It can also contribute to project efficiency, as you are not "reinventing the wheel" for each new project.

When ready to start three-dimensional forms, think ahead in the process to where the project is headed. If this is done alongside a full understanding of the tools (functionality/capability) available within the software, the design model can easily transition to a construction model. The project is continuously evolving—start with one model; keep adding the layers of detail as needed, and important information is less likely to get lost along the way. This will also minimize the need to spend time re-creating information.

GETTING STARTED

An option for firms getting started with BIM is to partner with a firm with substantial BIM experience. The novice BIM firm must have a couple of BIM-trained individuals on staff to make this arrangement effective. The in-house BIM staff can input design progress daily and share it with the partner firm. A few years ago, our firm took on a partner without BIM-trained staff for a project type in which they had greater experience. They developed the design in another 3D program while we input their work into BIM, adding detail and coordinating consultant information. Receiving only weekly updates from them proved inefficient, as the level of revision in a week's time meant significant rework and wasted development of the previous version on our end. On subsequent projects with the same partner, their new BIM-trained staff input their design work into our shared model a few times a week, resulting in much more streamlined collaboration.

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3D MODEL TEMPLATES

We have made a major time investment in the creation of a Revit template for firm-wide use. As a result, all of our models have their information organized in the same manner, all of our tags and annotations are standardized, and all of our standard and most common Revit families and details are easily accessible for use. In addition to this, we have a firm library of less typical and even project-specific families and details. We are learning now, after just "jumping in," that organization and ease of accessibility of these families is absolutely key, and we are now in the process of revamping our library structure based on our lessons learned to further expedite individual searches.

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There will inevitably come a point in time when the team needs to evaluate the effort being put forth. Is it in line with the BIM execution plan? Is the level of detail appropriate for the project phase? Are items being modeled that should really be 2D details? Is the appropriate amount of time being spent putting together the actual drawing package? This team evaluation is not particularly new to BIM, but is as critical.

Quality Assurance and Quality Control

When it comes down to the bottom line, "you can only lead a horse to water…," and so it is with BIM. The tool is a tremendous asset in the constant struggle of achieving quality, but it will only work when all team members use it and use it correctly. The expectations, responsibilities, and information exchanges set up in the BIM execution plan need to be followed in order to achieve success. If all team members are doing their part, one advantage of the BIM process is that the coordination can be somewhat automated.

BIM program files contain both the "model" per se and 2D graphic details often (but not always) derived and developed from the model. All the views of the model (section, elevations, plans, and interior elevations) and the 2D graphic details are viewed as "sheets" which will be printed to produce the drawing portion of the contract documents for use by the builder. As such, it is still important that the drawings are correct, legible, and coordinated. Views that produce the drawings are semiautomatically generated, but still need drafting work. It is a common misconception that "the drawings create themselves." The great value of having elevations and sections created simultaneously is still impeded by additional 2D graphic work that must be done to clean up views. This entails line weight editing, dimensioning, annotation, tagging, etc., all of which is susceptible to human error due to misunderstanding, missed coordination opportunity, and sloppiness. The traditional tools (checklists, team redline drawings and specification sets, quality control reviews) are still required. Quality assurance and quality control are as important as ever.

▶ Origins and Development of Quality Management (12.1) provides an overview of quality management systems that improve a firm's performance.

Construction Phase Services

To consider issues during the construction phase, with regard to BIM, work backward. The project manager must understand the destination to know the best course to take. This relates to the project goals. What does the owner need for record and for effective use of the building? What is the contractor's stated and agreed-upon use of the model? For the architect performing construction phase services, what gets updated and/or posted so there are current documents to reference? The paper or electronic version of paper documents, or is it the BIM model, or all of the above?

If a client is in need of AutoCAD-format floor plans, the protocol for making document changes can be different than if the client desires an as-built BIM model. The design team may find it easier to export the drawings from BIM into AutoCAD and make changes there, thereby abandoning the 3D file completely.

If a client is interested in an as-built BIM file, it should first be understood why, how will they utilize it, and who is responsible or who should deliver it. All of this should come to light in the project goals and BIM execution plan. From an architectural project management point of view, if the design team is to deliver an as-built BIM file, and the design team is receiving compensation to deliver it, the most cost-effective method is to maintain the model as changes occur during the construction process, whether these are driven by owner requests, discovered conditions, RFIs, etc.

It is also possible that because of owners' more complex needs for the model—facilities management, asset management, etc.—it makes more sense for the contractor to maintain the model. The proper equipment and product data can be input into the model during construction. We place language in our Division One section in the form of a "Licenses Waiver, Release and Indemnity Agreement for Electronic File Transfer to Contractor" to inform the contractor of our limits to electronic data usage. The

As of 2012, most of our clients have not required a BIM model as an as-built deliverable even though they have required Revit or BIM be used during design and documentation phases. To date, they have only wanted the floor plans in AutoCAD format.

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recurring theme in this article is communication. Reiterate the importance of sharing information with the client and remind them of the agreements that are in place so that the issues are resolved and coordinated up front.

CONCLUSION

There are many variables influencing successful project management using BIM. Many firm processes and management practices are affected and need to be evaluated and restructured to leverage the benefits and manage the potential pitfalls of BIM integration. Managing BIM's various uses and blurred lines of authority and accountability demands detailed control and understanding of the process. BIM is a complex design tool that requires an in-depth understanding of the software to effectively manage the work. This said, there are many fundamental and traditional project management best practices that will remain tried and true, as BIM is not a substitute for good project management. If anything, project management skills will become even more important, especially in the areas of team building, project coordination, conflict resolution, and communications.

For More Information

Pennsylvania State University BIM Project Execution Planning Guide: http://bim.psu.edu/Project/default.aspx.

AIA Digital Practice Documents C106TM–2007, E201TM–2007, and E202TM–2008: www.aia.org/contractdocs/AIAS076721.

10.5 Design Phases

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Architectural design is the defining and differentiating skill set of architectural practice. It involves translating the needs and aspirations of the client into built form through the creation of drawings and specifications that define the work.

DESIGN

Design, by its nature, is multivalent. It involves the integration of diverse, often conflicting, project requirements and circumstances into a gestalt—a whole greater than the sum of its parts. At its best, the result is a solution that appears simple, almost inevitable—a functional, cost-effective, and beautiful resolution of the client's problem appropriate to its place and time. While the best solutions appear simple, however, the design process is unique and complex. Design is simultaneously intuitive—drawing on personal experience and subjective artistic judgment—as well as rational, drawing on analysis and the objective integration of functional and technical requirements. Despite this complexity, however, design is practiced by thousands of skilled architects as well as other professionals around the world.

There is a common misconception that design begins as an act of epiphany—a momentary stroke of genius in which the essential aspects of the solution come to the designer fully formed. While this may occasionally occur, far more often design begins

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with something much less dramatic—a carefully constructed definition of the situation at hand contained in the building program. From this building program a designer, or team of designers, develops a framework for decision-making and begins the iterative process of generating and evaluating alternatives—methodically refining the project and zeroing in on the final solution. There may be moments of epiphany along the way that provide the occasional "leaps" forward in a process. Design, however, is characterized by gradual, carefully considered "steps."

Most architectural problems have multiple workable solutions. As a result, design is fundamentally about making choices from among alternatives. Having a clearly defined and logical framework for making these decisions is essential. This framework is typically the outgrowth of research and the recognition of synergies and opportunities presented by the design problem. Along the way, there are a number of influences that are important to consider.

DESIGN INFLUENCES

Whether simple or complex, each architectural assignment is unique, with particular circumstances and requirements that affect the design process. The following are some of the most important issues that shape and influence a project's outcome.

Client

Each project has a client and/or user group with specific needs and aspirations. This client usually brings expectations and, occasionally, preconceptions about their project and the desired outcome. Ultimately the practice of architecture is a service profession, and the client is the principal party being served. As a result, the client is usually the most important influence on the design process. They are the reason the process takes place and one of the primary judges of success or failure. Keeping the client's desires foremost during the design process is fundamental.

Cost

With few exceptions, projects have cost parameters that must be met for the project to be feasible. Often these costs are not fully understood at the beginning of a project and are refined through the process. Economic and market forces make construction costs fluid. To address these fluctuations, frequently construction costs are analyzed relative to a benchmark for similar buildings or facilities. The project's relative position on this cost spectrum influences the approach that is most appropriate. Through design, cost is carefully balanced to create value. Hence, a project's cost has a significant impact on the design process.

Schedule

The time frame in which a project is to be both designed and constructed can greatly impact the design process. A compressed time frame may suggest alternative delivery options requiring construction to begin prior to the completion of design. In addition, a tight schedule often affects the type of alternatives explored. Conversely, the schedule may be extended or the completion date may be unknown (as with a public referendum or speculative project), suggesting a design process that is partially completed, is inactive for a time, and then recommences. Regardless, the schedule is one of the most influential project parameters.

Program

Every project has unique requirements. These requirements go beyond an inventory of spaces to include functional adjacencies, technical requirements, performance goals, and aspirations. In short, the program defines the architectural problem. Solving this problem is the fundamental, almost definitive, purpose for design. As a result, the building program is the primary reference point and the foremost consideration during design and informs every step in the process.

Site

The project's site, including orientation, climate, prevailing weather patterns, typography, watershed, and geotechnical issues, is an important factor that greatly informs the design process. Different sites present unique challenges to be addressed and opportunities to be leveraged. How an architectural proposal occupies, reinforces, and shapes a site is often critical to its success. Like program, the project's site is extremely influential.

Context

The context, both built and landscape, as well as historic and cultural, are important factors that influence the design process. Often architects establish a stance regarding context by answering questions like: How should this project contribute to its surroundings? Should it reinforce existing patterns? Should it serve as a foil or act in contrast? As a result, the context can suggest solutions, or an array of solutions, that should be explored. Moreover, the context can reinforce the appropriateness of one solution over another. For all these reasons, context can greatly affect the design process.

Community

Increasingly, communities have collective goals and values that can influence the design process. These values are codified, both officially and unofficially, as a type of ordinance or covenant that can affect the alternatives that are investigated and how they are evaluated. How a design proposal responds to these concerns is important and often can mean the difference between a project being realized or shelved. All of these community concerns are influential.

Sustainability

How a building uses natural resources—during the construction process, over the course of its existence, and even during its deconstruction—is an increasingly important driver. While the client's interest in sustainability may vary, the environmental impact of an architectural proposal is an important consideration. Through systems selection, material selection, even site selection, sustainability informs the alternatives that are developed during the design process and can often affect the way they are evaluated.

Building Technology

Determining the appropriate building materials and systems is a fundamental outcome of the design process. As a result, both an interest in new technology as well as a respect for traditional methods is a significant influence. For most of architectural history, the materials and systems that constitute a building are responsible for much of its outward expression and form as well as shaping the interior spaces. As a result, building technology is an important factor that significantly influences the process.

Regulations

Most projects fall within a regulatory and legal jurisdiction with rules and ordinances that must be met in order for a project to be realized. Building codes, zoning codes, energy codes, even tax law can affect the design process. Understanding these requirements is essential.

An architect, and the design team, must be mindful of all these influences during design. Over the course of the design process, to varying degrees, each of these issues plays a role in defining the project and shaping the solution. Only by successfully responding to each of these influences can an effective design solution be developed.

THE DESIGN PROCESS

Design is often discussed in mysterious terms as if it is an arcane activity cloaked in secrecy and reserved for the initiated. Design, however, isn't alchemy. Rather, it is the visual and analytical process used to reconcile the apparently competing and often contradictory interests and create a clear, comprehensive solution. These influences are disparate, but they have areas of overlap and synergy. Through design, these opportunities can be identified and reinforced and the synergies can be exploited.

Design is a unique analytical process that involves two fundamental procedures: *understanding* a project's multiple parameters and *synthesizing* these parameters into a holistic strategy. While complex, the design process is not impenetrable. It is a rigorous, methodical process of inquiry and invention.

▶ Quality Management in Schematic Design (12.2) explores quality management in programming and schematic design.

Understanding

Whether a project is large or small, simple or complex, the first and most important part of the design process is having a clear understanding of the range of issues at hand. Without this, the process will be unfocused and, as a result, will lack the necessary rigor essential to a successful outcome. After all, how can anyone successfully solve a problem without knowing what the problem is? For most projects gaining this understanding is the result of both research and analysis. Each project has specific, often unique, requirements that must be understood. Some of the most common are the following.

Program

Typically, the foremost area of analysis for any project is the building program. The building program can be a formal document resulting from an independent programming effort or a less structured list of requirements that evolves toward greater clarity through the process. Regardless of form, however, analyzing the building program and drawing out the critical information is an important first step.

This analysis can take many forms. As a part of this program analysis, architects often research general information regarding the building type or category of project. This general research includes a review of *precedent* to discover how similar problems have been solved in the past. Reinventing the wheel is often counterproductive, and this research into precedent can help determine the range of possibilities available and what effective attributes of similar projects may be applicable to the current assignment. In addition, *benchmarking* is used to evaluate how these projects have performed relative to one another. This is a useful analytical tool in determining what levels of performance are common for a building type, as well as extrapolating the appropriate level of performance for the project at hand. Both precedent studies and benchmarking efforts are general but can shed significant light on the project and are often important first steps.

More specific programmatic analysis is also important. The building program, first and foremost, identifies the type and number of spaces within a building as well as the requirements for each space. Compiled, this information describes the size of the project to be designed. In addition, the building program describes the functional adjacencies. These relationships must be thoroughly analyzed and understood. Comprehending the spatial categories implied by the program, as well as the interrelationships between these categories, is a common touchstone for developing alternative organizational strategies.

Ultimately, to be effective, both the general building type and the specific building requirements must be fully understood before the design process can advance. Researching the building program is a key step in the process of *understanding*.

Site

The project's site is another key element that must be analyzed to fully grasp the design problem. For building projects, this analysis includes understanding the site's topography—the slope and drainage patterns present on the site. The topography can present opportunities and challenges to be resolved during design. In addition, how the site both influences and is influenced by the larger watershed around the site is often a topic for analysis.

As important as the site's topography is the site's orientation—particularly its orientation relative to the sun, wind, and prevailing weather patterns. Recognizing these natural forces and how they impact the site can greatly affect the range of options to be explored and can suggest possible configurations.

Geotechnical issues are another important site-related issue that can greatly affect the design alternatives investigated. The bearing capacity and stability of the soils can encourage the use of certain structural systems and discourage others, as well as impact building placement on the site. Understanding these geotechnical concerns is critical.

Finally, access and connectivity to and from the site are important factors to understand. Most building projects are occupied and used by people. As a result, how vehicles and pedestrians move by, to, and through the site are important factors to comprehend.

When combined, all of these site issues significantly affect a building's potential placement and configuration. Grasping the full complement of site issues is critical.

Context

Another element that must be understood, distinct from the project's site, is the larger context. This can include being aware of the built environment and landscape adjacent to the site. What is the character of surrounding buildings? What materials and construction methods are prevalent? What types of paving, lighting, trees, etc., are present in the area immediately surrounding the project site? Creating an inventory of these characteristics can be helpful. They all make up a physical context that may be responded to—either by extension or by contrast—during the design process.

This physical context resides within a larger cultural context that is important to appreciate as well. What is the history of the place? What are the collective values and aspirations of the community? What previously occupied the site? This cultural context can be as influential as the physical context in informing the design process and the solutions ultimately proposed.

Combined, this full context—both physical and cultural—must be understood and, ideally, a philosophy established for the design response. Buildings contribute to their context. How they contribute is important. As a result, understanding the context is imperative.

Regulations

Most architectural projects fall within a regulatory jurisdiction that provides a legal framework. Developing a complete understanding of this framework, including applicable zoning regulations and building codes, is essential. Many of these regulations are compulsory and must be complied within the built work. In addition, many communities have covenants that restrict certain types of construction or material use and encourage others. Environmental regulations can also affect projects in many jurisdictions. All of these regulatory documents can significantly affect the range of options that are viable. Careful analysis is a requisite. Generally these regulations describe "what" must be done, but not "how." As a result, understanding the full impact of these regulations can reveal areas for innovation, as well as setting limits.

Building Technology

How buildings are made is an essential area of expertise for architects. Architecture is made up of materials and systems that come together to create form and shape interior environments. However, building technology is continuously evolving and advancing. Developing a comprehensive knowledge of construction means and methods is a principal facet of practice that informs many of the decisions made during the design process.

Some architectural assignments are located in regions with a strong, prevailing building tradition and superior trades. This local tradition can inform systems selections and material choices. In addition, the practices of the local construction industry can be impactful, suggesting which building systems are most applicable. Finally, every project can be seen as an opportunity for technological innovation. Innovation, however, requires a thorough grasp of the current state of the industry and where meaningful improvements can be made.

Sustainability

Increasingly, the project's long-term environmental impact must be recognized and addressed. Analyzing a project's likely energy, water, and material use is critical. Searching for ways to reasonably reduce a project's "carbon footprint" is a worthy area for investigation. Most buildings have long lives measured in years, decades, and even centuries. As a result, their environmental effects—positive and negative—endure.

It is important to note that analysis, research, and, as a result, *understanding*, are continuously evolving throughout the design process as new, additional information becomes available or is revealed. It is important to establish a baseline of understanding to allow the process to advance. This baseline is the result of compiling analysis in all these areas: program, site, context, regulations, building technology, and sustainability. Once these areas are understood, the process of synthesizing this information can begin.

Synthesis

The process of synthesis—drawing together the analysis and ultimately identifying the most applicable resulting strategy for exploration and refinement—is what many, particularly the lay public, consider design to be. However, synthesis cannot take place without a foundation of careful analysis and understanding. Synthesis is a constituent process of design that is increasingly a collaborative endeavor. It often involves a team of professionals rather than a single architect. To effectively marshal a team, information and design values must be commonly interpreted and shared. This is important to keep in mind as we consider these following steps.

Establishing Goals

For any project to successfully move forward, a common set of objectives should be established. These objectives can include performance and financial goals in addition to aesthetic intent. For the process to be successful it is essential that, once established, these objectives are understood by the entire design team, including the client. Ideally, most of these goals are measurable and an appropriate metric is determined for evaluating outcome. Subjective goals, such as beauty, are often included as well. The full complement of these goals begins to establish a framework for future evaluation.

Consultation

Often the expertise of specialized consultants is used to augment the analysis conducted during the *understanding* process. This expertise frequently includes insight provided by structural, mechanical, and electrical engineers, but can also include the consultation of experts practicing in highly specialized areas applicable to specific building types. This consultation is usually an ongoing part of the design process. These professionals are actively participating as part of the larger design team assisting in the identification and development of design alternatives.

Prioritizing Analysis

The process of *understanding* results in a significant amount of raw data—data in turn augmented by information and insights provided by specialized consultants. Without prioritization, this data can be overwhelming and often contradictory. It is critical for the design team to prioritize the project data in a way that is consistent with the established goals and objectives. Ideally, this prioritization provides focus and greater clarity. Like the goals, the priorities need to be mutually understood by all members of the design team. The success of most projects depends on this type of careful, internally consistent prioritization to allow for clear decision making.

Creating a Generative Logic

In addition to commonly understood goals, it is important to establish a generative logic for developing alternative solutions. This logic is often the place where intuition and subjectivity influence the process. The generative logic is the "vision" or the "concept" that guides and directs the design process. In short, it is a core set of architectural values that result from the established goals and the prioritized analysis. These values are used to judge subsequent alternatives and determine which is superior and worthy of further refinement. Often the creation of this logic is led by an individual drawing upon the broad expertise of the team. It is critical, however, that this logic is understood by the whole design team and occasionally revisited and confirmed. The generative logic is the linchpin for the entire process moving forward. It is what allows for productive iteration, evaluation, and, ultimately, selection of a preferred alternative.

Iteration

Most questions have more than one possible correct answer. As a result, simply answering the question isn't adequate. Rather, finding the best answer—the most appropriate answer—is the hallmark of good design. In most instances, the full range of possible solutions can only be understood by evaluating alternatives. Once the project goals have been set and a generative logic has been established, the hard work of generating alternatives begins. Designers have many ideas, but identifying the best idea is critical. Through iteration—the act of solving and resolving the problem—designers explore, develop, and document their concepts.

Evaluation

Design, however, involves more than simple iteration. Design is about making choices. The goals and the generative logic provide the standard or framework for making the relative comparison—for choosing. Ultimately, the iterated alternatives must be judged relative to the established goals and the generative logic for the process to be productive. It is through this process of iteration and evaluation that the process advances. Is the alternative presented consistent with the generative logic? Does the alternative presented assist the project in meeting the established goals? These are the fundamental questions that are repeatedly considered.

The design process comprises multiple waves of iteration and evaluation. Alternatives are generated. These alternatives are evaluated, and the most effective—those most consistent with the established logic and goals—advance. In turn, this evaluation leads to new, more refined alternatives being generated, evaluated, and advancing. Through this cyclical process, the solution is increasingly refined and improved.

Selection

At the end of each wave of iteration and evaluation is a period of selection in which the best alternative (or multiple alternatives) is chosen to advance to the next wave. Selection is made relative to the initial project goals and the generative logic—that is, the framework created by the design team for making these decisions. Careful, consistent selection leads to greater and greater detail and resolution.

There is a common misconception that "good design" is simply choosing the "prettiest" solution. In fact, "good design" is selecting the solution that is most consistent with the goals and logic created for the project. For architects, as visual professionals, selecting the prettiest option is often easier than selecting the most consistent. Consistency takes discipline and rigor but results in greater unity of expression and purpose. At its best, this process yields a result that appears simple, almost inevitable—as if it couldn't have been any other way.

The design is frequently described as a linear process—methodically moving from one step to the next. Reality is seldom this tidy. The process of iteration and evaluation often reveals new ways of considering the problem—ways that affect decisions made during previous stages in the process. As a result, design can move forward for a time, then circle back to an earlier stage and begin to move forward again. In addition, the generative logic and, to a lesser extent, the goals can evolve through this process as well. That is why it is important to view these facets as significant but not unchangeable, and why revisiting them periodically is worthwhile. As the design solution evolves and is refined, so, often, are the generative logic and goals. These important values need to be continuously challenged and validated.

THE CONTRACTUAL FRAMEWORK

This design process takes place within a carefully defined, legal, contractual framework. This framework, at a minimum, defines the general parameters of the design assignment, the parties involved, and each party's responsibility to the project and to one another. Ideally, this agreement is detailed and identifies the anticipated size of the project and construction cost. In addition, schedule information should be included to define a time frame for providing services as well as a description of the services themselves. The most commonly used contractual agreement between the client (owner) and the design team leader (architect) is the AIA Document B101™–2007 Standard Form of Agreement Between Owner and Architect.

▶ See Agreements with Owners (17.1) for more information on the AIA Contract Documents' B101™–2007 contracts.

AIA Document B101™–2007 is a time-tested agreement that has evolved over more than a century of editing, revision, and use. This contract is supported by significant case law and, as a result, is the standard of the building industry. Fully executed, this contract clearly identifies the project parameters, including the following:

- The client (owner)
- The designer (architect)
- A general description of the project
- The size of the project
- The anticipated construction cost
- The preliminary schedule for completing the work
- The anticipated compensation

In addition, AIA Document B101™–2007 defines two groups of design services—standard services and additional services—and defines which of these services are included. Moreover, it legally describes a design process that moves through a series of five established project phases in an orderly fashion, resulting in greater and greater clarity and resolution of the design solution. These phases are:

- Schematic design
- Design development
- Construction documents
- Bidding and negotiation
- Construction contract administration

AIA Document B101™–2007 assumes that as each phase is completed, both parties formally acknowledge the accomplishment before moving to the next phase. In addition, it assumes a completely linear process—one phase logically following the previous phase with no reassessment or course correction necessary. Often some modification is required as a project moves through the process and more information becomes available or is discovered. The contract should include mechanisms for acknowledging and incorporating these modifications. Nevertheless, having a clearly defined framework is important and provides each party with a mutual understanding of the project and their responsibilities. Equally important, the agreement provides a legal definition of the design process and a way of gauging progress and establishing compensation.

The Schematic Design Phase

The first project phase identified in AIA Document B101™–2007 is schematic design. Much of the early understanding and synthesis takes place during this phase, including defining the project goals and establishing the generative logic that will be used through the subsequent phases.

As the initial phase in the process, schematic design is general and broad in its scope. Through the exploration of alternatives, this phase begins to define the fundamental components of the project and their interrelationships. In addition, multiple organizational strategies are often explored, and the general scope and scale are defined. Initial aesthetic approaches are investigated and discussed. Preliminary systems concepts (particularly structural, mechanical, electrical, and enclosure systems) are analyzed. Increasingly, a stance regarding sustainability is established during this phase as well.

By the close of schematic design, the size, scale, and scope of the project have been generally determined. The organization and interrelationships of the project's major components are established, as well as the project's site orientation. Common deliverables provided by the architect at the close of this phase include:

- Site plan
- Floor plan
- Elevations
- Key sections
- Written narrative or list of major material components, systems, and assemblies
- Tabulation of building area relative to the building program
- Preliminary construction cost estimate

The advent of building information modeling (BIM) has changed the type and detail included in these deliverables. BIM includes more detail earlier in the process than what was traditionally delivered. As a result, the decisions made during schematic design have increased in importance because they now provide the basis for the creation of a digital model. The full impact of this shifting paradigm is evolving, but it reinforces the need for clear, disciplined evaluation and selection of alternatives during this phase due to the increased cost and impact of future revisions. Moreover, it bolsters the requirement for each party to acknowledge the end of this phase, as well as formally accept the deliverables.

► Small Firms, Small Projects, and Building Information Modeling (11.3) and Technology in Practice Overview (11.1) further discuss the use of BIM in practice.

The Design Development Phase

The second phase identified in AIA Document B101™–2007 is design development. As its name implies, during this phase the design is further refined and resolved. Design thinking becomes less global and more particular. During this phase the general organizational strategies and concepts developed during schematic design become specific architectural configurations involving plans and sections. As a result, it is important to revisit the project goals, priorities, and generative logic established in schematic design to see that design decisions made and details developed during this phase remain in alignment.

By the close of design development the project becomes defined to the point that significant revision is unlikely. The size, scale, and scope of the project are refined. All of the building systems are determined and begin to be integrated. In addition, the sustainable buildings strategies have been identified. The key building details are developed as well, and the major building materials are selected along with their corresponding specifications and performance requirements. Finally, the construction cost estimate is refined and broken out in increasing detail.

Deliverables at the end of this phase are similar to those provided at the end of schematic design; however, much greater detail is included. As a result, the scale of the drawings is usually adjusted to reveal this increased level of resolution. The project specification, primarily a narrative at the end of schematic design, is now typically an outline specification identifying specific products and major assemblies. This document is organized in a manner similar to the final specification. Finally, all of the documentation reveals the integration of building systems and coordination with allied consultants.

Increasingly clients are opting for alternative delivery methods to design and build projects. "Fast-track" and "packaged bidding" have become more and more common.

These delivery methods typically have only a minor impact on the schematic design phase; however, they have an increasing impact during the design development phase. Often the type and level of details are modified to allow for more complete cost estimating prior to construction documentation. This may require some systems to be highly resolved and others to remain more conceptual. In addition, because the systems are not all fully developed, disputes can arise regarding the estimated cost of systems not fully understood or the discovery of unanticipated systems conflicts. It is important to be aware of these possibilities and, if possible, include contingencies in the construction cost estimate to provide for possible eventualities.

As discussed during the schematic design section, BIM has affected the level of resolution developed during design development as well. The BIM model allows allied consultants to construct their systems within a shared information model. As a result, the level of integration implied is often higher than for a traditionally designed project. This integration results in an increased understanding of the impact of various systems on the project and reveals potential points of conflict. Moreover, as a result of this higher level of resolution, BIM has begun to blur the distinction between design development and the subsequent construction documents phase. Finally, this change has had an impact on client expectations, as "virtual" building becomes more the norm. As with schematic design, it remains important to formally acknowledge the end of this phase before moving into the construction documents phase.

Design During the Construction Documents Phase

While the design development phase results in a high level of resolution, design does not end at the conclusion of that phase. Rather, the priorities established during schematic design and refined during design development are fully detailed and specified during the construction documents phase. At the close of this phase, the documentation is sufficiently clear and complete for the construction contractor to establish the price for construction and build the project. The documentation includes drawings, reference documents, technical specifications, and contractual and administrative requirements for the project. Most of these documents are informed by the generative logic established at the onset of the project. Their refinement and completion involves consistent design decisions, not merely technical competence. The materials and assemblies specified should support the design priorities and assist the project in meeting the established performance objectives. It is essential that the architects involved in this phase, if different from those involved in the previous phases, understand the goals, priorities, and logic that have guided the project's design and development. This knowledge will assist in consistent decision making in preparing the final construction documents.

Design and Construction Contract Administration

Despite significant planning efforts, construction is a fluid process. Most projects are one-of-a-kind buildings that have no opportunity for "beta testing"—they are prototypes. As a result, it is common for changes to the work to be required by unforeseen circumstances and changing owner requirements. Design continues to play an important role during this construction process. The design team should remain mindful of the project goals as changes are being considered. Often these changes require generating and evaluating alternatives, and the project priorities and generative logic remain in effect. Ideally, changes to the work don't need to be compromises but are, rather, extensions of the architectural values established at the project's onset. This is possible if the role of design during construction is recognized and exploited.

Additional Services

In addition to the standard services and phases outlined in AIA Document B101™–2007, this agreement also references a number of additional services that the owner may engage an architect to perform. These include programming, space planning, landscape design, signage, furniture selection, etc. Design plays an important role in most of these services as well. Most can extend the project priorities and contribute to meeting the established project goals.

CONCLUSION

Design is an architect's core competency—it is an architect's raison d'être. The process is one of the truly distinguishing activities that defines the profession and separates it from other disciplines. As discussed, it is simultaneously a visual and analytical process—informed by both research and intuition. As such, it transcends science and art to be a unique amalgam distinct from engineering or the visual arts.

Design begins with understanding the problem and moves through a quasi-linear sequence of iteration, evaluation, and selection to define, refine, and, ultimately, resolve the client's needs and aspirations. It is a complex, often collaborative process guided by a set of mutually established goals, priorities, and a generative logic that results in a gestalt—something larger than the simple sum of its parts. Design is at work during all phases of an architectural project and informs all of the decisions made throughout construction.

Ideally the results of this rigorous, disciplined process are a clear, consistent, and direct statement of enduring architectural values that surpass the client's pragmatic, functional needs to address their emotional aspirations. It is more than perfunctory. At its best, the design process yields solutions that are deceptively simple, poetic, and ennobling—architecture capable of withstanding the test of time.

For More Information

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The Nature & Aesthetics of Design (A&C Black, 2000) by David Pye.
Analysing Architecture (Routledge, 2009) by Simon Unwin.
Designing Architecture: The Elements of Process (Routledge, 2012) by Andrew Pressman.

BACKGROUNDER

PROGRAMMING

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Architectural programming is a pre-design activity in which the parameters of the project are defined—both quantitatively and qualitatively. This definition forms the critical foundation for the beginning of the design process.

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PROGRAMMING

Architectural programming is often described as "problem seeking." It is the essential preliminary step that informs the subsequent design process. For design to be successful, the design problem must be clearly defined. Only by understanding what the problem is can an effective solution be developed. As a result, thoroughly defining the project—fully seeking the problem—is imperative.

Architectural programming involves broad inquiry into the circumstances surrounding a particular architectural problem, as well as highly specific analysis of the particular building requirements. It is important to keep in mind that, while programming involves design thinking, it is not design per se. Programming is intended to define the problem rather than propose a solution.

Programming can be divided into a six-step process:

Research the Project Type

"What have others done?" This is often a useful question to ask at the beginning of the programming process. Few projects are truly groundbreaking. The vast majority of design assignments are, in one way or another, similar to an existing set of projects. Reinventing the wheel, particularly out of ignorance, is not very productive. Hence, researching *precedent* is often a constructive first step in the process. Once these *precedents* have been identified, gathering information on their relative performance is also useful. This *benchmarking* process provides specific, quantitative insight and can begin to suggest best practices. Finally, visiting similar facilities to absorb more subtle but important traits is worthwhile.

Identify Goals and Objectives

Following research into the general project type, it is appropriate to ask: "What do we want to do?" As noted, benchmarking can begin to identify best practices and shed light on what is possible. As part of the programming effort it is important to codify the goals for the design process to follow. Mission statements and vision statements are often included in the program. Moreover, functional and organizational goals are outlined as well as financial and operational objectives. If there are understood intentions regarding sustainability, these are included as well. Finally, if there are preconceptions about the "image" or "character" of the building, these should be included in the program. Many of these preliminary goals may evolve over the course of the design process, but including as much information as possible about the aspirations for the project can greatly assist the design team.

Gather Data

A complete building program contains a great deal of data, and this data must be assembled. Once the goals have been established, it is important to determine the most effective means for gathering information. The most common means used is simple observation. This is particularly useful if the occupants of a new facility are presently housed in an existing facility. In this circumstance, interviews can be effective as well, asking questions like: What could use improvement? How do you work with others? In large organizations, interviews can be replaced with questionnaires. These create large databases that require organization but can become a very powerful means of data collection and retrieval.

Analyze Information

Once the program data are gathered, they must be analyzed to be meaningful. Analysis transforms raw data, creating understandable and therefore useful information. Some of these data are global in nature, pertaining to forces outside the project or organization. These global forces may include other related buildings on a campus, for example, or divisions within a corporation. Analysis may suggest an impact on adjacencies between spaces within the project. At the other end of the spectrum is data regarding individuals and their specific needs. Once analyzed, this information often affects the spatial criteria included in a program. Preliminary site analysis is frequently included in the program as well to fully describe the site conditions.

Identify Programmatic Strategies

Armed with fully analyzed and organized information, the next step is to identify programmatic strategies. It is common for an architectural program to identify possible organizational approaches revealed by the analysis. Ideally, these approaches are kept abstract and aren't prescriptive. Programs often include diagrams depicting groups within an organization, the relationships between these groups, and the relationships between individuals within these groups. In addition, the flow of goods, services, and people is often illustrated. Commentary regarding change and the appropriate level of flexibility is generally included as well. Finally, preliminary concepts regarding sustainability may be documented. Again, these are broad strategies, not proposed solutions, but they offer additional clarity to the analysis and enhance its effectiveness.

Establish Quantitative Requirements

These broad programming strategies are augmented by highly specific quantitative requirements, and the foremost programmatic requirement is the project's size. In nearly all cases, the program includes an inventory of all the individual spaces to be contained in the building. This inventory is often illustrated with diagrams depicting each space. In addition, the technical and systems requirements for each space are outlined, as well as the key adjacencies and, most important, the dimensions.

Compiled, this inventory can provide an accurate net area for the project. The precedent study of similar buildings can be helpful in determining the appropriate area for additional, nonprogrammed space. The gross area is simply the product of the net area determined by the inventory and a factor for additional space determined by the precedent study. This building area is one of the primary findings that results from successful architectural programming.

In addition to the size of the project, the preliminary cost is often discussed in the architectural program. At this predesign stage, costs are generally estimated using unit costs discovered as part of the precedent study. At this early stage, it is important to include an appropriate factor to compensate for the particularities of your construction market. In addition, because this cost is conceptual, it is critical to include adequate contingencies for both design and construction to accommodate unknown and undetermined conditions.

The ideal architectural program thoroughly defines all aspects of the architectural problem without suggesting a solution. It is a "pre-design" exercise and, as such, is abstract but comprehensive, forming the foundation critical for a successful design process.

BACKGROUNDER

ADVANCING DESIGN VALIDATION

Drake A. Wauters, AIA, CSI, LEED AP BD+C

Designing buildings to meet higher performance goals, such as the 2030 Commitment or Net Zero, requires heightened insight into the reasonably foreseeable effectiveness, operational burden, and life span resulting from program and design decisions. Design Validation, an ISO 9001 term, means using checkpoints throughout the design process to achieve best results.

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INTRODUCTION

Design validation, a key design audit concept of the ISO 9001 Quality Management Systems, aims to provide a factual approach to decision making. At checkpoints throughout the project planning phases, measures may be taken by the design team to help verify that the design will meet the owner's project requirements. The results of such reviews are documented and shared with the client and design team.

► See the backgrounder Utilizing ISO 9001 in an Architectural Practice (12.1), for further discussion of International Organization Standards and quality management.

Designs that can be developed early and carried through to construction with limited later stage redesign affords both clients and design teams the greatest chance to meet project challenges, elevate coordination, and control costs ("With Less Rework Productivity Increases as Quality Improves," AIA Best Practices, 2011, by Micheal Lough). Controlling costs was highlighted as an important measure of sustainability as far back as 2003 by the Office of the Federal Environmental Executive (OFEE) in the policy paper "The Federal Commitment to Green Building: Experiences and Expectations" (2003). In general, the benefits from design validation include greater opportunities to increase building performance, prevent miscues, and enhance project success.

IMPROVING ARCHITECTURAL PROGRAMS

Before the synthesis of design, there is the building program: the list of spaces, functions, adjacencies, and characteristics reflecting the client's mission. Conforming the design to the program is typically understood as a mandate, and programs are often viewed as fixed information. However, if both the client and design team are open to allowing interplay between design concepts and the program, new ideas may emerge through creativity that save resources, lead to better designs, and increase sustainability. For instance, alternatives could lead to repurposing existing facilities, combining facilities, sharing resources, reducing circulation or building volume, reducing exterior skin area, or providing for greater levels of future flexibility.

A frequent design challenge is controlling spatial growth, especially when programs are used as a simple checklist. This growth can lead to negative sustainability and cost impacts. In 2007 the U.S. General Services Administration (GSA) recognized that project oversizing was a common challenge when interpreting programs, so they instituted a requirement to submit a Spatial Program Validation BIM to validate compliance with net and gross area limits. This works on any project, since showing clients the spatial impacts of alternatives is an essential tool for building consensus. If improvements in the program are an option, the benefits can also be validated through this channel.

Whether clients are open to alternative approaches to a program response or not, such studies can be offered as a means to help meet sustainability and cost goals. In any case, program compliance through the design is best confirmed with the client before the close of the schematic design phase. If improvements to the program are approved, the revised program should be issued as well.

IMPROVING SCHEMATIC DESIGN

The first design phase of synthesis, schematic design, may become more powerful with the use of new analysis tools in addition to broad-brush concepts and renderings. With conceptual energy and carbon footprint modeling tools now available through the major BIM system vendors, clients and design teams can be more certain that the sustainability of even early ideas and alternatives are better understood and meet the energy use intensity values. This level of early design validation was not readily achievable before these tools became available.

As addressed in the AIA's *Energy Modeling Practice Guide,* enhancing sustainability at the conceptual stage is more effective then applying sustainable measures after the concept is developed. For instance, determining the best site orientation, massing, fenestration, shading, and insulating values while creating design concepts may mean that meeting project goals can become less costly. Alternatively, by identifying the most sustainable design concept, the performance goals for the project can be improved upon within the cost budget.

Another key aspect of validating design is completing code and zoning compliance deliverables by the completion of schematics. As with sustainability, validation confirming regulatory compliance at this stage will help eliminate the risk of rework during successive phases of the project. In past years, it was common for compliance studies to be completed during design development or even early construction drawings. This late compliance validation pushed discovery of design challenges further along the decision tree of the design process, exposing projects to greater risks from late rework, and reducing flexibility in responding to requirements. With sustainability as a central mission on increasingly large numbers of projects, rework late in the design becomes even more invasive, as the impact from late changes can be far-reaching and unforeseen. The risk of late rework from surprises due to code or zoning regulations or from overlooking program requirements can be mitigated through design validation.

Open design team and client reviews, written comment cycles, and peer reviews are essential to confirming buy-in from all stakeholders. It is important at the completion of each design phase that the client and design team are comfortable that the owner's project requirements, the program requirements, and owner aspirations are being met.

IMPROVING DESIGN DEVELOPMENT

The next design phase, design development, may also be enriched through design validation. When the schematic design has been validated, the design team can focus more completely on continuing to develop the design, including critical building system selection, continued spatial modeling, and constructability reviews. These are central to successful design development efforts enhanced through possible reduction or elimination of out-of-phase design changes that could unravel the process.

Confirming the viability of spatial systems planning is at the core of design development but may be taken to higher levels through 3D modeling tools and the open sharing of three-dimensional information. Confirming spatial relationships and characteristics of the aesthetic, structural, building system, and site aspects, including constructability and maintenance reviews, is critical. This level of design refinement and spatial validation should not be left for the construction document phase, as the risks of rework and coordination shortfalls are too great.

As with schematic design, open design team and client reviews validating the design before the design development phase is complete are essential. At the close of this phase, basic design challenges should be addressed. Reasonably foreseeable common design risks—too much glazing to meet the energy budget, systems will not fit or cannot be accessed for maintenance, construction may be too complex, structural members obstruct other systems, or code or zoning compliance is not resolved—should be addressed prior to moving forward.

BENEFITS FROM ENHANCED DESIGN VALIDATION

When sustainability and energy impacts are addressed early (site utilization and orientation, building massing, fenestration and sun control devices, assembly insulating values, and heat gain from sunlight), there is far less risk that drastic redesign of the project will be triggered by the results of more detailed energy models completed late in the process.

Enhanced project durability is another benefit of validated early design. Peer and constructability reviews should provide the fresh eyes to help avoid late design phase, construction phase, and operations and maintenance performance shortfalls. Greater focus during the construction documents phase afforded by virtually eliminating out-of-phase redesign will allow the design team to complete construction documents with as few distractions as possible. In this environment, the design team may be able to fine-tune the project and achieve better application of the full suite of AIA Best Practices. The effectiveness and durability of well-conceived and detailed projects is arguably always better than projects compromised through late redesigns and decisions made in crisis mode.

Reduced risk of rework mean that projects may proceed from milestone to milestone in a more predictable manner with fewer surprises. Interdisciplinary coordination and detailed technical design may be improved when not sidetracked for rework. The project aesthetic aspirations may also be more carefully realized when such distractions are reduced. With validation, cost studies and estimates can be more accurate. Client comments may be closed out with greater confidence, as redesign is minimized which could have undone previous design work approved by the client. The benefits of design validation are many for the client, architect, and the consultants.

For More Information

"Quality Management" (chapter 14) and "Sustainability" (chapter 16), AIA Best Practices: www.aia.org/practicing/bestpractices/index.htm.

An Architect's Guide to Integrating Energy Modeling in the Design Process (AIA, 2012): www.aia.org/practicing/AIAB094452.

"Design and Development Validation." ISO 9001:2008, Chapter 7.3.6.

GSA Building Information Modeling Guide Series: 02 – GSA BIM Guide for Spatial Program Validation (GSA Public Building Service, 2007): www.gsa.gov/graphics/pbs/BIM_Guide_Series_02_v096.pdf.

"The Federal Commitment to Green Building: Experiences and Expectations" (Office of the Federal Environmental Executive [OFEE], 2003): http://www.ofee.gov/Resources/Guidance_reports/Guidance_reports_archives/fgb_report.pdf.

10.6 Construction Drawings

Grant A. Simpson, FAIA, and Michael F. Czap, AIA

Construction documents are the most significant expression of the architect's ideas and vision for a project. To successfully prepare construction documents requires attention to detail and consideration of the comprising elements so as to express them in a fashion that fosters comprehension by the document users.

INTRODUCTION

Construction drawings are the most prominent and labor-intensive deliverables associated with the architect's professional services. They are seldom the recipient of much praise but are often cited as the major problem when difficulties arise on a job site or when standard of care evaluations of the architect's services are made. There are some who contend that the quality of construction documents prepared by architects and engineers has been steadily declining over time.

Construction drawings consist of technical drawings, which graphically illustrate the size, shape, scope, location, and dimensions of project elements, including primary building materials and systems. Drawings must be reasonably well coordinated and, together with the specifications, be sufficient for their intended purpose.

Construction drawings are not usually a complete stand-alone description of the project's design and more often than not are accompanied by specifications. On smaller projects the specifications might literally be incorporated into the drawing sheets, whereas on larger projects specifications are typically bound into a separate project manual.

▶ Construction Specifications (10.7) further discusses specifications both as a legal document and as an important means of communicating design intent and quality of materials.

Specifications, in a broad sense, describe the expected quality of building elements, materials, and systems and define the installation standards and expectations for those items. Both drawings and specifications are needed to make up a completed set of construction documents. An exacting segregation of the information between drawings and specifications is very difficult to achieve, and there is usually some overlap.

Architectural construction drawings are instruments of professional service that are used to facilitate construction of a project. They are not "products," like a toaster, that a manufacturer provides but rather a form of technical art, prepared for a project that will usually be built only once. A manufacturer, on the other hand, may build tens or hundreds of thousands of the same toaster, allowing the toaster designs to be fine-tuned almost to the point of perfection.

▶ See Architects and the Law (5.1) and Risk Management Strategies (16.1) for more information on standard of care.

Accordingly, construction drawings always contain some measure of mistakes. Construction drawings are not expected to be either 100 percent complete or to be entirely accurate. The standard of care is not perfection. Nonetheless, the drawings must be carefully planned and crafted so as to be sufficient for their intended use.

In addition to construction documents by the architects and engineers, there are many other sources of information necessary to build a project, including shop drawings and submittals that are coupled together with the contractor's and subcontractor's

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knowledge, expertise, and craftsmanship. Note that shop drawings and submittals are generally not considered to be part of the contract documents.

In this examination of construction documents, particularly construction drawings, it is helpful to understand who the significant users are:

- *Contractors and subcontractors* who interact on a daily basis with the documents during construction
- *Architects* as they work with the contractors during construction
- *Authorities having jurisdiction* who review the documents for code compliance
- *Architects' clients*, who to a lesser extent refer to them for illustration of the project design

There are other minor users, but the primary audience is the contractors who will build the project, and construction documents should be prepared with this audience in mind. If the documents are user-friendly for the builders, they will more likely be viewed as being more successful than those that are difficult to follow and use.

Construction documents are the most significant expression of the architect's ideas and vision for a project. To successfully prepare construction documents requires careful attention to detail and consideration of the comprising elements and systems so as to be meaningfully expressed in a fashion that fosters both understanding and comprehension by the document users.

► Construction Contracts (17.4) addresses the construction agreement, general conditions, and other parts of the construction contract.

CHANGES IN PRACTICE

The practice of architecture has changed substantially. There is greater emphasis on aesthetic design, while project delivery demands have intensified within shortened time frames. Project relationships are more complex, with multiple stakeholders and managers, often with competing interests.

The profession is more narrowly focused, with entire firms or internal practice groups specializing in project types such as multifamily, educational, workplace, hospitality, or health care. Value is often perceived by architecture firms in their ability to market, plan, and design, but less so for proficiency in constructability or building systems integration.

The preparation of construction drawings has become more challenging for many reasons, including the following:

- Building codes, accessibility standards, and other forms of regulation have become more complex and often overlap and conflict.
- Many building systems are now proprietary. Manufacturers have created significant differentiation within individual products such as exterior cladding systems, sealants, roofing, and drywall systems that greatly affect how they are detailed, specified, installed, and perform.
- Project delivery methods continue to evolve beyond the traditional design-bid-build approach with construction mangers and alternative approaches such as design-build, fast track, and integrated project delivery.

The architecture profession remains in the midst of profound technological change. While generally bringing increased productivity with greater accuracy and rapid visualization, the tools architects use in the twenty-first century bear no resemblance to those of a generation ago. This, combined with advances in communication, has served to foster expectations for more rapid project delivery with fewer errors.

Overall, the ongoing, exponential increase in computing power, coupled with worldwide interconnectedness and enabling software, is beginning to alter the design and delivery process with ramifications for how architects and other design professionals work together and the nature of the deliverables produced.

► Integrated Project Delivery Overview (9.3) further discusses IPD methods in practice.

► For more extensive treatment of building information modeling (BIM), see Technology in Practice Overview (11.1); Project Management with Building Information Modeling Processes (10.4); and Small Firms, Small Projects, and Building Information Modeling (11.3).

THE LEGACY OF CONSTRUCTION DRAWINGS

Once, not so long ago, construction drawings were called "working drawings," and they were prepared in a drafting room rather than in a "studio." The head supervisor of the "draughtsmen" was the "chief draughtsman," and he typically ruled the drafting room with an iron hand. Indeed, there are stories of old chief draughtsmen who even kept the key to the toilet room at their desk. It could be a miserable day if the chief was not happy with your work. (See Figure 10.21.)

All working drawings in the drafting room passed under the critical eye of the chief. In contrast to the typical studio of today, all work was carefully planned before any lines were drawn. There was no such thing as copy and paste as with today's computers, and every inch of every line on every drawing was drawn by hand. To make the labor even more intensive, erasing work that had been drawn incorrectly was difficult and frowned upon and had a cumulative detrimental effect on the drafting medium.

The drafting medium evolved from linen to tracing vellum to Mylar. The sheets of drawings were referred to as "tracings." Common to all of the drafting media was a property known as "tooth." The tooth of the media made it possible for the media to hold a drawn line: ink, lead pencil, or wax lead. Erasing on a tracing nearly always damaged the tooth to some extent, and excessive erasures could eventually ruin a tracing. Accordingly the work on a tracing was very carefully planned, and carefully crafted, so as to avoid the need to erase. Contrast that with today's computers, which make erasing or copying and pasting as easy as the push of a button. The need to carefully plan the work on a sheet out of concern for the tooth is no longer necessary.

Younger workers in the drafting room were often assigned the task of tracing floor plan backgrounds or favored typical details. First the original floor plan or detail was drawn by a more experienced worker, or even by the chief, and the younger worker laid a new tracing sheet over the original and painstakingly copied it by hand, creating a new tracing that could be incorporated into the drawing set or sent to consultants. Through the experience of tracing, the younger worker learned the time-honored art and craft of drawing and lettering as well as drafting room methodology.

RTKL Associates, Inc.

FIGURE 10.21 Offices of RTKL, Baltimore, Maryland, Circa 1950

In the 1960s, the entrance of baby boomers into a maturing profession brought about many changes in the architect's office. These young people yearned for greater responsibility and career growth. Architecture firms were also trying to improve productivity and better organize their businesses. A lasting result of this was that the "drafting room" evolved into the "studio," the iron-handed chief draftsman was decentralized into project architects and project managers, and many great learned teachers slowly faded away.

About the same time, along came the introduction of sepia print tracings and, later, electrostatic copying. These inventions made the laborious work of tracing backgrounds and details obsolete because they could be mechanically copied. What had been an important step in the education of apprentice architects was eliminated.

With the advent of computers and computer-aided drafting, many of the more painstaking aspects and much of the inherent inaccuracy of hand-drawn tracings was eliminated. What also changed was the experience level of the draftspeople who were now preparing drawings on computers. Computers and drafting software were often quite foreign to more experienced draftsmen, who by this era were called job captains, project architects, and project managers, and the primary computer users tended to be younger, less experienced interns. The experience quotient turned upside down as more experienced architects could no longer teach drafting and were less able to participate in the process of preparing drawings.

A similar sea change is taking place with the increasing penetration of building information modeling, or BIM, into the practice of architecture. Just as more experienced professionals in manual drafting resisted 2D CAD drafting in the early 1980s, 2D CAD specialists are often resisting the use of BIM.

Once again the experience quotient will churn as a younger generation of architects and interns will tend to become the most qualified BIM users. An encouraging development with considerable momentum has been that designing using BIM software tends to require greater building material and system expertise up front to create a model that is usable later. This means that there must be involvement of experienced architects in the model production process, since the technology conflates design and drawing production as never before.

▶ See Demographics of Practice: 2012 AIA Firm Survey (2.2) regarding the rate of BIM adoption in the architecture profession.

Through it all, the time-honored processes and methodology of preparing construction drawings remains as important today as it was at the beginning of the twentieth century. As in the past, architects must tend to and take care to infuse the artistry, craftsmanship, and quality inherent in sufficient construction drawings as they endeavor to communicate the ideas and vision of their projects.

THE IDEOLOGY OF CONSTRUCTION DRAWINGS

An ideology is a comprehensive vision or perspective consisting of a group of ideas that are consistent with each other and frame the way we look at something. Developing and implementing an ideology for the preparation of construction drawings can lead to consistently higher-quality work and make for a more enjoyable enterprise in which to engage.

The development of construction drawings is sometimes viewed as a lesser task, a necessary evil, an effort requiring unimaginative people, or even one worthy of being outsourced to another firm. In reality, the quality preparation of construction documents can be an inspired undertaking calling for creativity teamed with disciplined thought and effort. Distinction in this endeavor only serves to enhance a firm's reputation and improve the delivery of design excellence.

Innovation and creativity are two words usually associated with aesthetic design. However, they can also be applied both to the methods of preparing construction drawings as well as how architects convey that information to the document users. Modern architectural construction drawings can be so much more than a discrete assemblage of electronically generated parts and pieces. They can graphically weave a story not unlike a great novel. The very act of producing the drawings can be done in such a manner as to help foster a better understanding by the preparers of what they are doing, with the beneficial result of higher-quality work.

As construction drawings are developed, what goals and expectations should be established? Here are some suggestions:

- Produce drawings that are user-friendly.
- Organize drawings so clearly that indexes, certain references, and perhaps even sheet numbers can become unnecessary.
- Create drawings that are graphically descriptive to such an extent that references and schedules can become superfluous.
- Utilize techniques that lessen the printed graphic density to the extent that drawing scales can be significantly reduced.
- Organize and place information in context with related elements that enhance understanding and visually reveal mistakes.

LEAN ARCHITECTURE

By Michael F. Czap, AIA

Lean architecture is the ongoing process of rethinking and improving architectural methodology. It is the pursuit of better work by applying "lean" principles to every aspect of professional practice. It is about smarter information flow and understanding how we perceive and process information in order to become better communicators among ourselves and with the ultimate users of our services.

Why lean? "Lean" has become the terminology best associated with understanding and advancing process methodology in manufacturing, software development, management, construction, and health care.

Other management approaches worth noting are Six Sigma, developed by Motorola for reducing variation among individual processes; and the Theory of Constraints by Elihu Goldratt, which seeks to optimize an entire system by the identification and elimination of constraints. There is much for architectural firms to learn from each of these, and their tenets can be applied to every office, team practice, and phase of work to bring about improvement in project delivery.

Borrowing from these approaches, we can establish three goals for project delivery:

1. Structure our work effort so projects "flow" better, by identifying processes and tasks that contribute value and eliminating those that don't.
2. Reduce variation in the ways we work and in the deliverables we produce.
3. Identify and eliminate (or mitigate) barriers and constraints that hinder us from doing good work.

These can be applied to the task of preparing construction drawings in several ways:

- Thinking through and resolving project issues such as codes and constructability during the earlier design phases and not allowing problems to accumulate
- Employing consistent drawing and modeling practices across the firm or office
- Determining what are appropriate amounts of documentation that effectively convey scope and intent
- Developing processes for dealing with repetitious information that streamline its input and visually reveal mistakes
- Utilizing standardized sheets and details, and drawing the atypical situations only
- Approaching construction drawing development with a critical path methodology by identifying what needs to happen at the appropriate design phases, and building in coordination efforts between disciplines
- Implementing formal methods of sharing mistakes to help prevent them from happening again
- Viewing team members and consultants as internal clients by understanding the parameters affecting their work and ensuring that the information they require, along with that which they provide, flows to all concerned in a timely and coordinated manner

In addition, newer approaches such as integrated project delivery incorporate lean techniques and are becoming more widespread as architects, their clients, and contractors realize the value of front-loading projects with thinking, "pulling" decisions forward to resolve project issues earlier, and allowing work to proceed in a deliberate fashion. This effort is coupled with the intentional development of an integrated BIM model and drawings that are coordinated each step of the way.

These goals are realistic and achievable and can be the basis for innovation and creativity in the preparation of construction drawings.

METHODOLOGIES IN CONSTRUCTION DRAWINGS

In her seminal book *The Death and Life of Great American Cities* (1961), Jane Jacobs described cities as "problems of organized complexity," which necessitate "dealing simultaneously with a sizeable number of factors which are interrelated into an organic whole." Buildings and the documents that describe them (whether electronic or on paper) are similarly an "organized complexity," consisting of overlapping building systems and components, logically arranged and coordinated with each other. Well-designed document production processes can aid in the planning, design, integration, and quality documentation of building systems and make the deliverables easier to understand and follow.

Methodology is described in Merriam-Webster's dictionary as "a body of methods, rules, and postulates employed by a discipline: a particular procedure or set of procedures." Establishing a methodology for construction drawing preparation provides a basis for the development of processes, which in turn bring consistency to our efforts and leverage knowledge across teams and offices. Processes are best derived from an overall methodology.

A methodology will manifest itself in the form of prototypical drawing systems that can be used to simplify and streamline documentation. Elements such as partitions, doors, cabinetry, building accessories, and even accessibility clearances can be easily scheduled using drawing practices that cover a majority of situations found, with additional notes or drawings for atypical conditions only.

The following fundamental methodologies are considered essential to the development of better construction drawings.

Reduction of Redundancy

Mies Van der Rohe famously observed, "Less is more." His comments are thought of in regard to design, but can also be applied to construction drawing preparation and presentation. The question is not which drawing elements should be omitted but rather what is a "sufficient" level of information that will effectively convey intent—and how can the organization of that information simplify the understanding of and access to it?

Reduction of redundancy is the effort to manage the duplication of drawing elements within construction drawings. The more times the same items or components are shown or described, the greater the opportunity to make mistakes or create confusion.

BIM and CAD software allows architects to move, reuse, and reshuffle drawing components so easily that modern drawings are often fraught with redundant information. The rapid populating of sheets with details, schedules, and notes tenders an illusory appearance of completion—however, the drawings may be incomplete and poorly coordinated.

Redundancy creeps into architectural drawings in insidious ways. Architects routinely illustrate floor plans too many times and at scales too large for the information presented. If the drawing methodology in use requires multiple blow-ups of the same area of a plan, consider reducing the graphic density of the drawing, allowing fewer and smaller-scale versions of the plan area.

Graphic density is the totality of visible line work and text on a drawing. It consists of all drawn elements, such as walls, doors, windows, symbols, notes, dimensions, schedules, etc. Accurate drawings can become difficult to read and visually confusing when the graphic density is too great. This calls for an eye as to what clearly conveys design intent, with an understanding of good drawing hierarchy—or which elements take visual precedence over others.

Redundancy in dimensioning is also rampant. It is common to try to have a greater degree of dimensional control than is necessary. Prioritize what is important and bring control and precision where needed, leaving dimensions off where not required to convey design intent. Consider developing a written office guide that incorporates sound professional judgment with an understanding of how the contractor will construct the building. Fewer dimensions may better communicate the desired accuracy, with greater clarity.

Working in Context

Working in context (WIC) is a process to simplify the preparation of and augment the understanding of drawings. It is based on the premise that the organization and presentation of information is as important as the information itself. It is analogous both to defragmenting construction drawings and to telling a story. It is seeing that the "whole is greater than the sum of the parts" by combining related drawings to create more understandable groupings of information that are more simply referenced and easier to find.

Working in context may be a new term, but it is not a new idea. Previous generations of architects used these ideas well to graphically communicate the often very complex fenestration and spaces they were imagining. The stunning richness of the architecture of generations past was conveyed in surprisingly simple ways. Much thought was given as to how to combine the various drawings in a meaningful manner to best communicate within the context of the design. In fact, many sets of construction documents for very complex designs were prepared using no referencing overlay system at all. (See Figure 10.22.)

Architects have long understood the benefits of presenting in context. It is common to see display boards with a rendered site plan coupled together with cross sections, perspectives, and other vignette drawings. This is done because architects know that combining multiple different views together helps the client better understand and connect ideas. When designing, architects will routinely sketch plans, sections, elevations, and perspectives all on the same sheet of paper (or napkin) because this process helps designers think through what they are doing.

As a practical example illustrating how WIC is used, product manufacturers frequently offer a single exploded-view drawing illustrating how to assemble a ceiling fan or little red wagon, as opposed to having several pages of written step-by-step directions. Sometimes they include assembly instructions consisting only of a series of numbered illustrations with little or no written text. Although the manufacturer may provide a toll-free 800 number, it is their goal to eliminate the need for a user to call by providing clear, concise, visual instructions that bridge national, cultural, and even language differences.

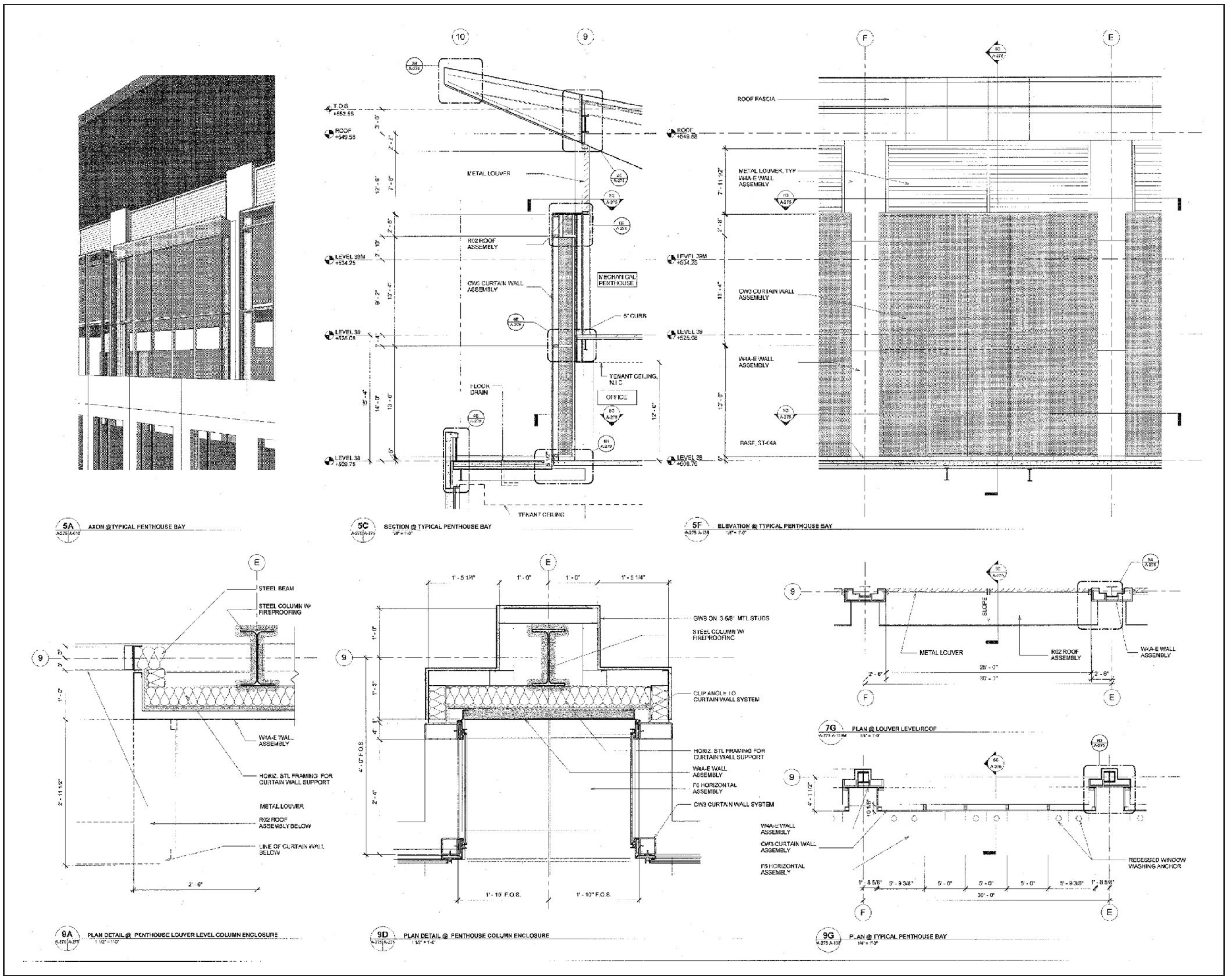
Architectural construction drawings are intended to illustrate design intent and are not envisioned to be a complete set of instructions for how to put together a building. Nonetheless, valuable lessons can still be learned from considering the manufacturers' simplified but thorough approach to documentation.

Architects can also learn from efforts by international standards organizations to develop signage and symbology that are graphically based—completely eliminating the need for words and understandable by most anyone. In this day of a flattening world and global practices, architects would do well to rediscover how to communicate more simply and in visual terms.

The ability to graphically "virtualize" a complete building may make BIM the ultimate WIC tool. It makes possible the intermingling of 2D and 3D drawings. New BIM users have been heard to say, "I've never seen a building this way before" and "I would never have discovered that roof condition if I hadn't rotated the model." These same capabilities that allow dynamic user interaction with a building model can also be a tool to communicate design and planning concepts in construction drawings as well.

The construction documents are not intended to be a complete set of instructions on how to construct a building. Construction means, methods, techniques, sequences, procedures, and site safety precautions are customarily assigned as responsibilities of the contractor to give the contractor latitude in preparing bids and carrying out the construction phase. The contractor determines the assignment of work to specific trades and subcontractors. The contractor also manages logistical matters such as the sequence of operations, scheduling, design of temporary supports and facilities, selection of appropriate equipment, and project safety.

—From the 14th edition article "Construction Documentation" by Fallon and Crocco



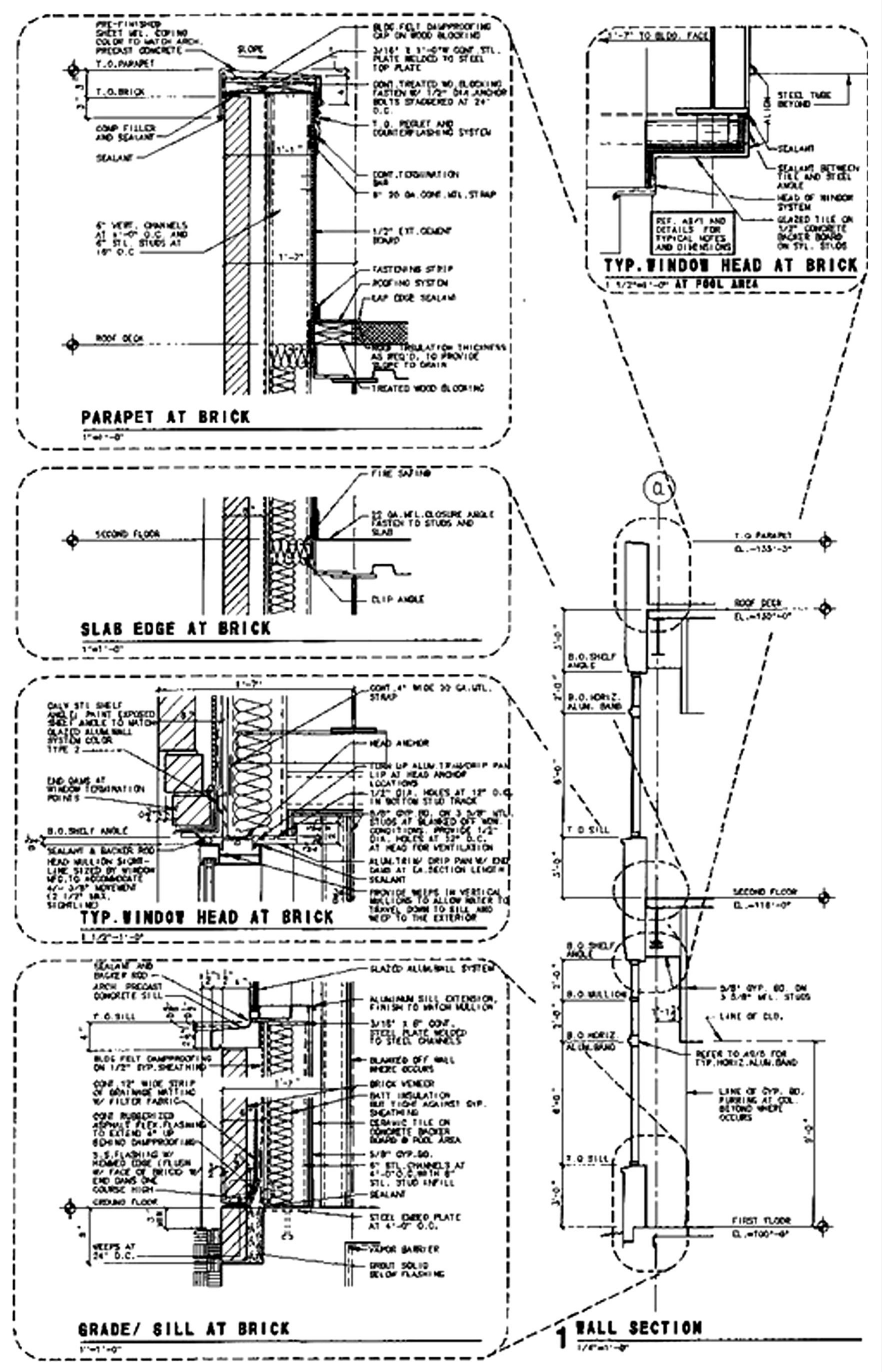
RTKL Associates, Inc.

10.22 Drawings of the past show the use of working in context.

Referencing Systems

Referencing systems are employed to help document users navigate a set of drawings, and many methodologies have developed over the years. (See Figure 10.23.) In generations past, drawings of complex buildings were produced using the simplest form of referencing, which often was not to reference at all but rather to locate drawings in a manner both intuitive and contextual. Architects of that generation combined the good practices of what is today called "wayfinding" in signage and graphics design, as they planned and organized their drawings. Contemporary influences in the 1970s led to development of a "mail slot" type of organization wherein drawings are sorted and located by type—plans, elevations, sections, or details—often segregated on separate sheets, and resulting in the need for complex referencing systems due to the fragmentation of information. Other types of referencing include:

- *Roadmap referencing:* It is common for smaller-scale floor plans to serve as a "roadmap" to find other, larger-scale detailed drawings through the addition of graphic section marks, interior elevation targets, and plan detail marks. The same thinking can be applied to wall or building sections, and, in that case, there is a contextual advantage by locating the larger-scale details on the same or adjacent sheet. If the details are stacked together in the correct order, minimal or no referencing may be needed.



HKS, Inc.

FIGURE 10.23 Example of Referencing in Construction Drawings

- *Bubble referencing:* When larger-scale details are placed next to the smaller-scale drawing where they occur, the use of "bubbles" can easily link to where details apply on a plan or wall section. Bubbles are nearly the simplest form of referencing, with no referencing mark at all being simplest.

Instructional Systems and Default Scheduling

Instructional systems are drawings and notes that graphically coach the drafter or contractor to an understanding of project conventions such as scheduling or documentation methods.

Default scheduling employs a methodology to schedule building components such as toilet accessories, doors, partitions, accessibility clearances, cabinetry, sealants, metal fabrications, etc. These take form as pre-organized, ready to use, "drop-in" sheets complete with pre-coordinated schedules, details, general notes, and graphic instructions to the drafter and contractor. With the use of BIM, the schedules build automatically as information is added to the model or can be prepopulated, based on previous work—ready to be edited for a particular job.

The general rule is to:

- Employ a system that covers the majority of situations found.
- Define defaults.
- Identify and document the exceptions.

With default systems the architect creates standards which the contractor must meet if no specific standard is given or shown. For example, the architect can make the following statement within the drawings: "Unless otherwise noted, all doors are to be 3′–0″ × 7′–0″ solid-core wood panels with a hollow metal frame and hardware set No. 1." In doing so, the architect can make it nearly impossible to omit certain items—in this case a door without a tag.

A common misconception is that the system of scheduling must cover every possible permutation or variation imaginable. To the contrary, the most effective default systems cover about 90 percent of the situations likely to be found, with the remaining atypical conditions covered by specific notes, schedule entries, or unique details.

Default scheduling system sheets can be prepared for use on all types of projects and bring a consistent "look and feel" to drawing sets and engender commonality to documenting among multiple project teams.

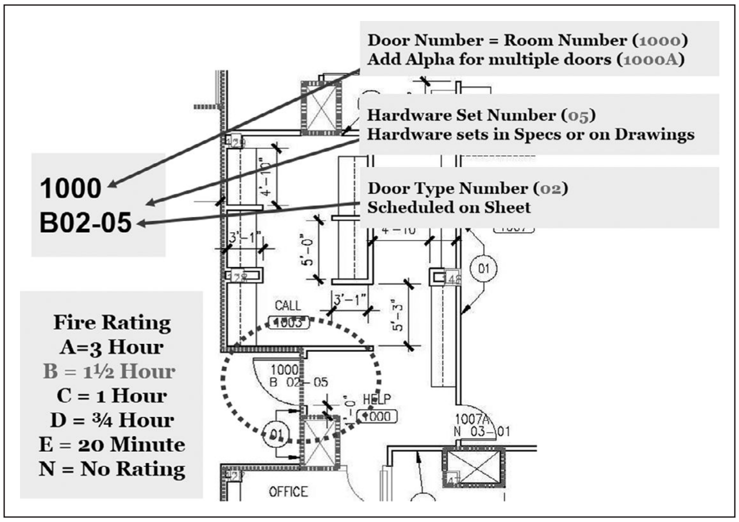
Used together, instructional and default scheduling systems provide powerful, yet easy to understand and use tools for documenting. It is important to note that there is not likely to be a time savings in thinking through the issues affecting a project, but there can be an increase in the level of quality and accuracy with a reduction in the time spent documenting.

Working in context as a presentation methodology, coupled with instructional and default scheduling systems and BIM, offers significant new possibilities for today's architect. Consider the following examples:

Door Types Scheduling

Doors are better scheduled on the floor plans utilizing the door tag itself to convey multiple attributes beyond that of a mere door number. Fire ratings, hardware set numbers, and other features can be combined into an intuitive, easy-to-read tag that shows pertinent door information in context with the adjacent partitions and fire ratings—as opposed to leafing through several sheets to find a traditional phone book–style door schedule. (See Figure 10.24.)

A separate door types schedule records each type of door once. Where traditionally a school with 75 identical classroom doors listed each one individually, the architect can instead schedule a specific "door type" one time and then reference it many times on the floor plans via the tag. Simply looking at the floor plan will



RTKL Associates, Inc.

FIGURE 10.24 **Door Types Scheduling**

reveal if the correct door type or rating is scheduled, imparting visual quality control. The door and tag with the door type information can exist as an intelligent component within a BIM model, and simply inserting the door will populate the door schedule.

Partition Types Scheduling

Many architects use partition typing to convey wall construction information to the contractor. Each partition is tagged on the floor plans according to nomenclature reflecting various stud sizes, gages, types of wall board, and different ways to terminate the partition above. A word of caution, this can easily devolve into an overly complicated system that is hard to understand and difficult to implement.

Most drywall contractors construct partitions in a simpler manner than architects may realize. The contractor will make many partition elements "typical" in order to un-complicate the work for their employees. For example, they may substitute more expensive 22-gage metal studs where 25-gage studs are scheduled, to simplify on-site management of materials and prevent a worker from accidentally pulling from the wrong pile of studs.

Architects can learn from the contractor and create simpler partition types that incorporate the concepts of setting defaults and the use of "typicality," or finding the common elements among the various drawing pieces. Partitions can then be scheduled graphically using linework, poché, and line type ("fire tape") to indicate different types of walls and to convey fire ratings. Done correctly, the very act of drawing or modeling wall linework and delineating fire tape simultaneously "schedules" the partition. It is worth noting that line type tape must show clearly at a desired scale (i.e., half-size printing) and may require some experimentation for a given printer or plotter to achieve the desired result.

Consider a system that sets four default partitions:

1. Base partition: 3⅝″ metal studs with ⅝″ gypsum board each side, extending to deck (fire rated as per the fire tape shown on the floor plans)
2. Typical steel and concrete column furring: ⅝″ gypsum board on 1⅝″ metal studs
3. Typical basement wall furring: ⅝″ gypsum board on ⅞″ furring channels
4. Typical framing for nonrated chases: ⅝″ gypsum board on 2½″ metal studs

Simply including these four notes covers a majority of partitions for many projects and eliminates the need to tag these respective "typical" partitions (thus reducing graphic density). As noted above, the architect's task is to find and document those partitions that do not meet the above criteria for the four typical partitions.

It is possible to develop partition typing systems with 15 or more graphic defaults. The magic and artistry of construction documents is limited only by the architect's imagination.

Toilet Fixtures and Related Accessibility Clearance Scheduling

Toilet fixture accessories, handicapped accessibility clearances, and associated dimensions can be scheduled as well, using a "plug & play" system.

Individual handicapped and non-handicapped version(s) of water closets, urinals, wall-hung sinks, countertop sinks, and showers can be drawn on a master system sheet with dimensions, applicable accessories scheduled, and required clearances noted. These component pieces can then be "plugged" by reference into adjacent contextual full toilet room layouts, which are themselves then "plugged" by reference into the floor plans. (See Figure 10.25.)

Metal Fabrications Schedule

Fabricated items such as countertop supports, braces, various brackets, kickers, and toilet partitions or medical equipment supports can be detailed on a master schedule sheet and then incorporated by reference into other drawings.

Location of Schedules

Where are these types of drawings best located? Most organizing systems sprinkle the various schedules in and about the set of drawings. Placing scheduling and instructional sheets at the front of the set is not unlike the table of contents in a book, as they provide information key to understanding and using the sheets that follow. Consulting structural and MEP engineers organize their drawings in this manner routinely.

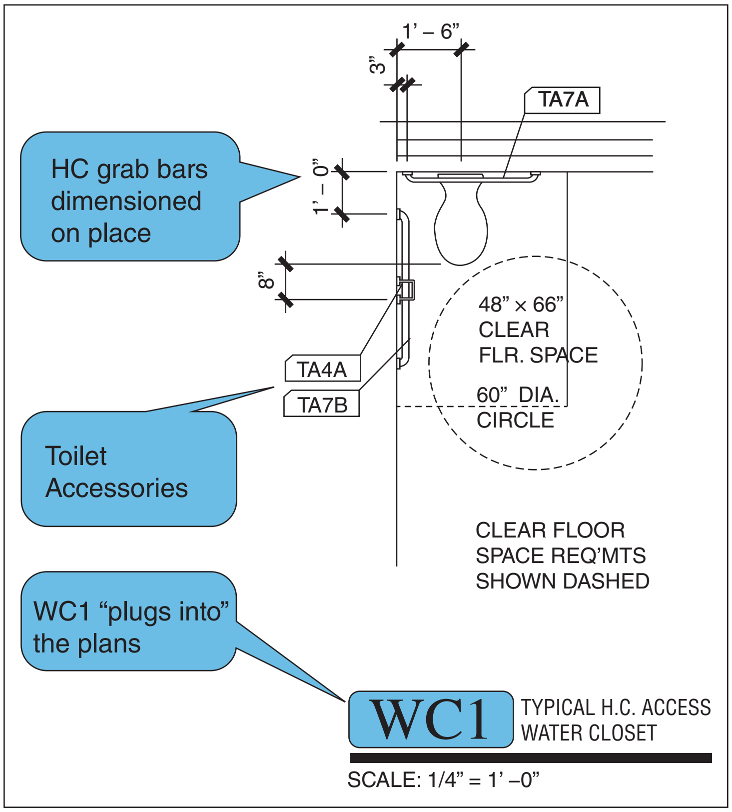


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FIGURE 10.25 Accessibility Clearance Schedule

PART 3: PROJECT DELIVERY

DIMENSIONING

Dimensioning is one area of practice that is not well understood nor properly applied in many sets of documents. Good dimensioning practices have not changed appreciably over time. Here is a summary:

HIERARCHY

The following hierarchy, from outermost dimension to innermost dimension, represents generally accepted methodology:

1. Overall building dimension (singular).
2. Structural column grid closed to edge of slab or face of masonry (or other exterior cladding material).
3. Building offsets.
4. Exterior wall features, such as windows, doors, column cladding, wing walls, etc.
5. Interior building partitions and elements. If possible, the interior dimension strings should occur within the footprint of the exterior walls.

GENERAL RULES FOR ARCHITECTURAL DIMENSIONING

1. Dimensioning requires an understanding of the sequence of construction. Assemblies being installed must be located relative to assemblies that will already be in place. For this reason many building features are located from fixed structural elements or attributes, such as from the edge of a slab, or from a column centerline. Dimensions must be referenced from fixed reference points, and multiple reference points must be tied together.
2. Provide dimensions for things that are important or which must be controlled.
3. Note on plans when dimensional control of an area or element isn't necessary so that the lack of information isn't viewed as an error or omission (e.g., "three equal spaces").
4. Explain your objective for difficult dimensions with notes. For example, "This segmented wall is composed of eight equal angular segments of 30° each." Provide this informational explanation in addition to the degree marks on the plans.
5. Assuming that the building structure, column grid, or slab perimeter will be the primary dimensioning reference, dimension strings should be continuous and closed between such elements to define the perimeter and/or the column grid.
6. For nonstructural elements, such as partitions or casework, in general, do not close dimension strings between structural elements (for example, between two column grids). This allows you to control where contractors will be able to work out construction tolerances without putting them in the position of needing to send RFIs.
7. Actual dimension strings may not be the best choice if there is an opportunity to describe the location of an element with a note such as "align" or "three equal offices"….
8. Determine and dimension to the "critical" side of a partition. If there is not a particularly critical side, then try to dimension to the right side or to the top side of a partition on the plan. Once you have selected one side of a partition to dimension to, never locate another partition or building element from the other side of that same partition without a good reason. For example, it is acceptable to place an isolated dimension that might define a millwork or toilet partition width from the other side of the partition. Develop and use common sense.
9. Always dimension corridor partitions from the corridor side of the partition. The clear drywall width of corridors is the "critical" dimension. It is important to take into account any finishes that might affect the clear corridor width.
10. Always dimension toilet room drywall partitions from the toilet room side of the partition. The interior clear dimensions of toilet rooms are the "critical" dimensions.
11. It is generally best to not use fractions smaller than ⅛" anywhere on floor plans. Only use fractions smaller than ⅛" on details, and then very judiciously.
12. It is best not to repeat dimensions, either on a drawing or on more than one drawing.

Adapted from RTKL "Guide: Doc for Dimensioning"

Developing methodologies can be as simple as identifying productive work methods, memorializing that into a system, and then sharing with others. They can also take form as systematized graphic templates that are integrated into BIM or CAD software.

Processes and methodology can become an end unto themselves and devolve into a potential project delivery hindrance. It is important to review them from time to time with an eye to changing technologies, always asking if there is a better way. They should also be adaptable to clients and projects. The very act of process adaption can yield fresh insight into how to do something better and can result in an improved process.

Types of Drawings and Components

Site Drawings

Site plans are drawings of an area of land, usually the property where a building will be constructed. They show the building outline and location, along with site elements such as sidewalks, parking, signage, adjacent structures, and streets. The site plan serves to define the relationships of built elements.

Architectural site plans are generally used in conjunction with companion drawings from civil engineers and landscape architects. Care must be taken by the architect not to repeat critical design information that should be shown only on consultant drawings.

Plans

Plans are drawings of horizontal building elements such as floor layouts showing walls, doors, and windows. They are drawn assuming a "cut plane" of nominally 6 feet above the floor level, with floor plans with items below that usually shown with solid line work and items above it dashed.

In addition to indicating the overall layout and relationships of building elements, as noted previously, smaller-scale plans serve as a roadmap to the remaining drawing set by indicating where to find additional drawing information for various building elements.

Larger-scale plans generally communicate a finer level of detail, such as the placement of smaller items like plan details, equipment, toilet accessories, flooring patterns, and material changes.

Elevations (Interior and Exterior)

Elevations are drawings of vertical elements such as a building façade or interior cabinetry. Like floor plans, elevations illustrate relationships of materials and systems and indicate informational criteria such as dimensions and notes.

Reflected Ceiling Plans (RCPs)

RCPs are a plan view showing what the ceiling above looks like, and delineate differing materials, systems, lighting, and other types of fixtures. Think of it as placing a mirror on the floor and then drawing what would be reflected there from above.

Sections

Sections are vertical cuts drawn through buildings, walls, or cabinets. They are generally larger in scale than plans and elevations and are used to display in greater detail the components used and how they interface. For larger projects, sections do not need to be drawn at a scale any larger than the floor plans.

Details

Details are companion drawings to plans, sections, and elevations and are usually the largest-scale drawings found within sets. They show how building materials and systems interface and include more highly detailed dimensional criteria and material noting.

Symbols, Abbreviations, and Notes

Symbols are diagrammatic conventions used to provide a visual reference on drawings for identifying and tagging elements such as doors, windows, borrowed lights, and partitions. They are also used to create references by indicating locations on smaller-scale drawings such as plans, where details, wall sections, or elevations are to be cut—and specifying where that larger-scale drawing can be found. They can provide pointers to additional information found in schedules, items too small to be seen easily, and where else in the drawings related explanatory information may be found. Symbols are generally defined graphically in a legend located in the front of a set of drawings.

Symbols are best kept simple in form and presentation, with an eye to reducing their impact on graphic density. It is important that symbols do not visually detract or overpower physical elements such as walls, doors, and structure.

Abbreviations are common short forms of words. They are useful where space is limited and, like symbols, can visually convey a larger meaning. For example, OFOI can be defined: "owner furnished and owner installed." PTM can be defined as "patch to match." Ideally, every abbreviation used in a set of documents should be identified and defined in the drawings, but this can be burdensome. Lists of abbreviations are also commonly included in the project manual.

Notes are a common method used to convey instructions and information. They should be kept short and concise and clearly state intent. "Provide 2-by-4 wood framing…." It is not necessary to preface notes with redundant phrases such as "The contractor shall…" or "See specifications," as it is inherent that notes are directed to the constructor and the specifications are a companion construction document.

PLANNING CONSTRUCTION DRAWINGS

It is important to avoid the tendency to work as hard as one can without first planning what is to be accomplished, or, as aptly put by Stephen Covey in his best-selling book *The 7 Habits of Highly Effective People* (1989), "Begin with the end in mind." If the architect will first determine in detail what the construction drawings should be, a roadmap is created for the entire team to follow and serves as a reference to know where the drawings are in the production process at any time.

Planning is the first step in having a well-coordinated set of drawings, and the development and use of cartoon sets can aid in this process. Cartoon sets are a miniature set of drawings, usually printed on half-size or 11 × 17 sheets, that graphically illustrate in mock-up form how the final construction document set should be organized and what drawings will be required. Cartoon sets can be very detailed and/or utilize representative sketches. They are especially critical for determining how to implement methodologies such as working in context or the reduction of redundancy.

Set Organization

A potentially divisive conversation among architects is the topic of drawing set organization and sheet layout. There are probably as many opinions as there are architects. Today's CAD and BIM standards are generally based on ideas of document organization that were developed in the latter 30 years of the twentieth century.

In the 1960s and 1970s, new ideas and systems of drawing organization were developed that allowed large firms to segment their workforce within more focused areas of expertise. Individuals might only work on stairs or interior elevations. Some drawing sets grew to reflect this team organization, leading to the fragmentation of information within.

Prescriptive standards such as the National CAD Standard and similar works tend to embody this approach. They provide a comprehensive, logical organization of standards representing what has been recently done. However, some independent professional judgment is usually required for adapting the standards to different project types and sizes.

BACKGROUNDER

CHRONOLOGY OF STANDARDS DEVELOPMENT FOR CONSTRUCTION DRAWINGS

The development of office standards is a time-consuming overhead task, and the quality of office drawing standards varies greatly from one firm to another. Consequently, even the best of efforts can prove futile if clients and consultants do not share and use the same standards. This situation has prompted a number of independent efforts aimed at bringing industry-wide order to the production of construction documents. The following profiles several of these efforts.

CONDOC DRAWING SYSTEM

ConDoc, developed by Onkal "Duke" Guzey, AIA, and James Freehof, AIA, in the late 1980s, was the first system for organizing construction documents. Based on a simple, uniform arrangement of drawings, a standard sheet format, a sheet identification system, and a keynote system that links drawings and specifications, ConDoc improved quality control, information management, productivity, and bidding results.

Organization of Drawings

A uniform arrangement is established for locating project data within a set of drawings and for identifying individual sheets. Drawing sets are divided by disciplines, with each discipline assigned a discipline letter prefix. Discipline drawings are subdivided into groups of like information, with each group assigned a group number. Finally, each sheet within a group is assigned a sequential number. For example, A101 represents the architecture discipline (A), group plan (1), and sheet number (01).

Standard Sheet Format

Sheets are composed using a standard, modular format that may be subdivided into module blocks. The standard sheet has three zones. The first zone, on the right side of the sheet, contains the sheet title block and drawing keynote legend. Zone 2 is the graphics zone and contains a nonprinting modular grid. Zone 3 is the perimeter or border, with alphanumeric grid coordinates.

Keynote System

This process establishes a connecting link between graphic information shown on the drawings and the related text in the specifications. Keynotes minimize the amount of text needed on drawings without restricting the notation process. Drawing notations are identified by keynote symbols. In general, notations with their respective keynote symbols are located on each sheet in a keynote legend, while only the keynote symbols are placed in the drawing. Each note may be repeated in the drawing as often as needed by simply repeating the symbol.

THE UNIFORM DRAWING SYSTEM

The creators of ConDoc shared their system widely through seminars and other events, and produced a detailed workshop handbook. In 1994, recognizing the need for a more detailed system fully described in a self-contained publication, the Construction Specifications Institute embarked on a project to create the Uniform Drawing System (UDS).

The first three UDS modules, published in 1997, build upon ConDoc's organizational concepts. The Drawing Set Organization Module (Module 1) establishes consistency between disciplines through the use of standard discipline designators, sheet types, and file names. The Sheet Organization Module (Module 2) establishes graphic layout standards delineating drawing area, title block area, and production data area, as well as a grid system of blocks or modules for organizing drawings and related information on a sheet. The Schedules Module (Module 3) defines a standard format for numerous schedules used in construction documents. In 1999 the UDS was expanded to include Drafting Conventions (Module 4), Terms and Abbreviations (Module 5), and Symbols (Module 6). In 2000 the UDS was completed with the publication of Notations (Module 7) and Code Conventions (Module 8).

CAD LAYER GUIDELINES

Developed and first published by the AIA in 1990, the layer list in CAD Layer Guidelines is the only comprehensive system for the standard naming of CAD data file layers. The second edition, published in 1997, contains enhancements and refinements of the original edition. CAD Layer Guidelines offers a consistent, comprehensive yet flexible layer-naming system that can be adapted to particular needs while maintaining the integrity of the system.

In 2001 the publication was completely revised and updated and given a new name, AIA CAD Layer Guidelines: U.S. National CAD Standard, Version 2. The original layer-naming system has been amended to enable U.S. design firms to conform to ISO Standard 13567, Organization and Naming of Layers for CAD, while largely preserving the integrity of data located according to earlier editions. The layer list has also been expanded for disciplines such as civil, civil works, structural, mechanical, plumbing, telecommunications, survey/mapping, geotechnical, process, and operations.

THE U.S. NATIONAL CAD STANDARD

The National Institute of Building Sciences recognized a need for a single, comprehensive national standard for electronically produced construction documents. A single standard supports the seamless transfer of building design and construction information among a broad array of users throughout

(continued)

the building life cycle, including architects, planners, engineers, contractors, product manufacturers, building owners, and facility managers.

The NIBS Facility Information Council (formerly the CADD Council) provides an industry-wide forum for the standardization of computer-aided design and drafting. Membership in the council is open to all individuals and organizations with an interest in the subject matter. Components of the CAD standard include the following:

- CAD layering
- Drawing set organization
- Sheet organization
- Schedules
- Drafting conventions
- Terms and abbreviations
- Symbols
- Notations
- Code conventions
- Plotting guidelines

THE U.S. NATIONAL BIM STANDARD (NBIMS)

NIBS organized the National BIM Standard Project Committee in 2005. The mission of this committee, as defined in its charter, is to improve the performance of facilities over their full life cycle by fostering a common, standard, and integrated life cycle information model for the architecture, engineering, construction, and facility management industries. The basic premise underlying the development of this standard is that the true value of a building information model lies in its accessibility to different stakeholders at different phases of the facility life cycle. The ability of each stakeholder to insert, extract, update, or modify information in the model requires a shared digital representation that can be manipulated by a variety of software applications. This interoperability must be achieved through open standards that allow for the unfettered electronic exchange of graphic and non-graphic information.

From the 14th edition article "Construction Documentation," by Fallon and Crocco

At this point some readers may develop the opinion that working in context and other methodologies discussed here are in conflict with the National CAD Standard (NCS). Nothing could be further from the truth. The National CAD Standard can be an excellent guide for basic project organization and symbology and a starting point for any type of project. The goal is to combine sound documentation methodology and good professional judgment with the NCS to organize the drawings to be intuitive and contextual.

Set organization generally varies depending on the type of building. Multifamily, hotels, and similar projects with multiple repeating unit types lend themselves toward a different type of project organization that combines living unit information for repetitive identical rooms together, as opposed to a museum that would require less repetitive and more unique detailing of individual galleries.

QUALITY MANAGEMENT OF CONSTRUCTION DRAWINGS

Quality is generally perceived and measured by comparison to a like product, standard, or service. The quality of an automobile is evaluated based on its reliability but can also be appraised by the type of materials used along with fit and finish. Yet another comparison can be of performance and road-handling characteristics.

Similarly, quality in architectural service is reflected in design by the use of proportion, form, spatial character, and the choice of materials. It is displayed in the technical appropriateness of building systems that "meet and greet" versus "smash and clash." It is also found in the sufficiency of the architect's documents and the client's experience along the way.

Essential factors for improving quality in construction drawings are:

- Preventing mistakes from happening versus trying to detect and correct later
- Understanding that quality is dependent on each preceding action
- Planning and designing quality into the ways architects work

If 5 items out of 100 are incorrect, how will they be found? Most likely all 100 will have to be checked. It is much more effective to coordinate as the drawings are prepared and to draw or model only what is known and to graphically identify what isn't. An area of a model or drawing that is temporarily left unfinished can be a powerful visual reminder of work or research remaining to be done.

► See Quality Management in Schematic Design (12.2) for related information.

Color Coding Drawings

There have been many methods in use over the years to verify the accuracy of drawings using colored pencils and highlighters combined with a process of review. They go by various names such as "blue line checkset" or "green line checkset." Each involves a methodology of reviewing information between disciplines and color coding what has been verified as accurate, what is not accurate, and ultimately recording graphically when the corrections are made. For example, a green highlighter can be used to color all information that is verified correct, with a red highlighter or pencil to note that which is not. Once corrections have been made to the drawings or model, a third color, yellow, is applied over the original red color. The yellow and red colors combine to make orange and provides a visual indicator as well that the correction has been made.

To ensure that each individual item is picked up and corrected, it is good practice to mark them one by one and not just put an "X" through a group of comments.

Electronic Collision Detection

Contemporary software has the ability to combine multiple BIM models and 3D CAD files together to identify clashes in three dimensions. Project teams using such software can schedule regular clash detection coordination sessions with a goal of minimizing or eliminating most conflicts by the time of document issue. It should be noted that historically the architect has not been responsible for providing a coordinated 3D model of a building. New practices are now emerging where architects, engineers, and contractors collaborate during the design phases to achieve this based on the concurrent development of multiple BIM models that, when combined, constitute the entire "virtual" building. The standard of care for both designers and builders may change in the future to require this type of process to minimize coordination issues during construction.

Technology

Opportunities abound to improve almost every aspect of architectural practice with improved coordination through the use of technology. It is important to remember that ultimately technology must serve process and only exists to enable better work with less effort.

▶ Risks and Emerging Practices (16.4) discusses possible risks pertaining to BIM, IPD, and sustainable design.

- Consider the task of producing construction drawings to be that of information management. Devise methods to record client comments, decisions, and preferences with a goal of "handling" the information as few times as possible. The fewer times information is transcribed, the less likely that mistakes will be made.
- Construction documents should exhibit graphical refinement. Current printing and display technologies can provide greater clarity using color and 3D imagery. Many architects mistakenly believe their job is to draw or model and forget that a fundamental goal of the work is to effectively communicate information to a builder.
- Devise simple solutions and use technology to automate the mundane and repetitive tasks. Establish construction document standards that are succinct and easily comprehended so interns and new employees quickly get up to speed.
- Remember that the use of technology is not a replacement for thinking through the issues of a project.

Critical Path Thinking

Architects can benefit from approaching construction document development from a critical path standpoint by identifying what needs to happen at the appropriate phase, and building in coordination efforts between disciplines. The heart of the RediCheck System by William T. Nigro, AIA, or other good checking processes is to be "phase driven," or to check for certain things at certain times. It is of little value to confirm final dimensions during the schematic design phase, and neither would it be appropriate to wait to achieve dimensional control of the structural grid until completion of the construction documents phase.

▶ Checklists (12.3) addresses how to develop and formalize the use of checklists for quality management.

The architect should be proactive, not allowing problems to accumulate throughout the design phases but rather working to solve the issues of the project "puzzle" to meet the client's design goals and budget, comply with code requirements, and create a design that is constructible. These aspects of the project, when worked out during the earlier design phases, allow the task to shift to documenting a viable design solution by completing and coordinating the model, drawings, and schedules.

The design development phase is of pivotal importance and can serve to lay a good foundation for the subsequent development of quality construction drawings. The CD phase should not be "continuing design" but rather one of documenting a design solution that has already been developed and thought through.

An important objective of the design development phase is "weaving" the various building systems and elements into a fairly well-coordinated whole. Some goals for this phase are:

- Confirm and finalize major building systems, including MEP, with their routing.
- Finalize the life safety strategy.
- Verify that accessibility clearances are provided.
- Achieve horizontal and vertical dimensional control of all major building elements, including the structural grid, expansion joints, and slab openings. Note that this will require considerable coordination of other building elements and systems.

Careful development of the BIM model or 2D CAD files at this time will also help prevent the need to go back during the construction drawings phase for costly rework or redesign.

REFERENCE DRAWINGS

The development of reference drawings is an excellent way to capture and consolidate firm knowledge of building systems with related detailing and to leverage it across an entire office or firm. Building systems sheets comprising well-researched and coordinated reference details for roofs, exterior skin systems, partitions, stairs, etc., provide a ready resource to be used over and over again.

Reference drawings are different than traditional standard detail libraries in that they are vetted by the senior technical staff and routinely revisited as part of a cycle of learning within the firm and incorporating "lessons learned." In other words, standard details have to "earn" their way to reference detail status.

Reference drawings are generally 2D and 3D details that can be accessed individually or, better yet, combined contextually into an overall system sheet. The advantage is that drawing detail information seen in context as part of a grouping of other related system details leads to a better understanding of the overall system of which they are a part and can help prevent mistakes or incorrect assumptions.

A word of caution is to be wary of placeholders—or the arbitrary placement of look-alike details into a set of documents that provides an appearance of completion, but may introduce similar but inaccurate and uncoordinated information.

3D Documentation

It has been said that a "picture is worth a thousand words." The ability to communicate graphically through the use of perspective drawings and 3D views such as isometric and axonometric in architectural practice has long been known to be of value—it just required the exceptional skill of an artist or draftsmen.

Conventional construction drawings require the drafter or contractor to mentally translate and organize two-dimensional information to obtain a three-dimensional understanding. This often entails the viewing of multiple plans, sections, and elevations in order to "see" the overall picture. The ability to do this is an aspect of spatial intelligence as described by Howard Gardner in his book *Frames of Mind: The Theory of Multiple Intelligences* (1983).

CAD software provided glimpses into the possibilities of easier 3D drawings, but it took the advent of BIM software to offer it as a by-product of the modeling process.

Three-dimensional drawings, enabled by BIM software, offer another approach to usefully convey information in construction drawings. They can clarify intent and provide an overall picture of what the built product or element should look like. They can be used for 3D key plans and areas of complexity such as multifaceted exteriors with non-orthogonal elements or complex intersections of different building systems. 3D images are also of great value for interior spaces such as an atrium or intricate interior building elements like a reception desk.

Because the visual perception of the environment is in three dimensions, encompassing length and width and depth, and due to the ease with which BIM software enables 3D views, their use in combination with traditional 2D drawings is increasing. This provides an opportunity for architects to tell a more accurate and complete story of project design intent.

BACKGROUNDER

DOCUMENT AUDITS/PEER REVIEWS

Micheal J. Lough, AIA

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Firms should establish as a part of their overall Quality Management program a systematic, multistep, and clearly defined program of document audits. Within this program, some audits should be either second-party or third-party; these are also referred to as peer reviews. A document quality audit program should address procedures for ongoing team reviews, management responsibilities, peer reviews, quality control, some form of measurement, and a program of continual improvement.

TERMS

- *Audit:* a systematic, methodical process whereby the documents are evaluated to determine the extent to which the project requirements are met
- *First-party audit*: an audit by the project team already responsible for the project
- *Second-party audit*: an audit by an auditor with an interest in the firm but not direct responsibility for the specific project
- *Third-party audit*: an audit by an auditor independent of the firms responsible for the project
- *Peer review:* a second-party or third-party audit
- *Auditor* or *peer reviewer:* a person with the competence and skill set to conduct an audit
- *Inattentional blindness* (also, *perceptual blindness*): the phenomenon of not seeing the obvious right in front of our eyes

ONGOING TEAM REVIEWS OF DOCUMENTS

The architectural design team should have in place a procedure addressing ongoing team reviews of the documents as they develop. For larger projects, it is important to monitor team performance on a weekly basis during the development of the documents. Team leaders should conduct meetings weekly with the architectural team to review progress. Each member of the team should have clearly defined responsibilities and specific goals that are tracked on at least a weekly basis. The agenda for these weekly team meetings would include a review by each team member of progress made since the last meetings, checking this progress against the goals set at the previous meetings, a review of current issues, and setting specific goals for each team member for the following week. There would also be opportunities for open discussion. Setting weekly goals for the team is much more productive and efficient than focusing on a deadline that may be several weeks away. These weekly meetings give the architectural team a chance to see the entire project develop, and enable team members to interact and address coordination issues between their various project tasks. These meetings should be conducted by a senior member of the team to aid in monitoring the development of the project in the collective group.

In addition to these weekly team meetings, team leaders on the project should touch base frequently, even daily, with the individual team members and make themselves available to address any questions or issues raised.

MANAGEMENT RESPONSIBILITIES IN DOCUMENT REVIEWS

Management needs to make sure that the project team conducts document audits, and that second-party or third-party peer reviews are a part of the quality management process. Management can be actively engaged as auditors or the audits can be delegated. Management should weigh the pros and cons of the alternatives. A sole proprietor or a firm with a single principal does not have the option of management-conducted second-party audits and should consider third-party audits. In small and midsize firms there may be the option of having second-party audits by a principal not directly responsible for the project. The larger the firm, the more likely management will delegate the actual audits of projects.

AN AUDIT PROGRAM

First-party audits should be conducted, to some extent, at least once a week as part of the ongoing team reviews of the documents. The team leaders should be working directly with the project team and reviewing some aspects of the development

(continued)

of the documents daily. As a part of quality management there may also be first-party audits that are formal or more focused than the ongoing document reviews.

A peer review program should consist of multiple peer reviews over the course of the project, rather than a single peer review conducted toward the completion of the construction documents. Except for very small projects there should be at least three peer reviews, one conducted at the schematic design phase, one conducted at design development, and one conducted at 75 to 90 percent completion of construction documents. The function of a peer review program needs to be more than just catching errors and omissions prior to the issuance of construction documents. They can play an important role in righting documents earlier in the process, which is more efficient and more likely to result in a high-quality result.

One of the challenges is how to fit this process within demanding schedules that project teams generally face. The simple answer is not to extend project schedules to address peer reviews but to adapt the peer reviews to the project schedule. What this would mean is that each peer review commences with the scheduled issuance of the documents, and the issues raised by the peer review are addressed early in the next phase. Hence, the last peer review is scheduled for a 75 percent or 90 percent construction documents issuance.

PEER REVIEW CRITERIA

A peer review of developing Construction Documents (including Schematic design and design development documents) would be a review for:

- *Compliance*. Compliance to regulatory requirements such as zoning and code requirements, as well as compliance to programmatic requirements and performance requirements.
- *Completeness*. An assessment of the completeness of the architectural drawings, consultant drawings, specifications, and other requirements respective to the phase.
- *Coordination*. A review of coordination within the architectural drawings, coordination with the structural and MEP/FP drawings, coordination between consultant drawings, and coordination with the specifications.
- *Technical detailing*. The focus might be primarily on the detailing of the exterior envelope, but can and should include technical detailing throughout the project.

PEER REVIEW AUDIT FOLLOW-UP

Peer reviews, as second-party or third-party audits, are the opinions of the auditors. A peer review is a tool for the project team and does not shift either overall management responsibility or project team responsibility away from management or the project team. Peer reviews are also generally not an exhaustive review and should not be assumed to have identified every omission and deficiency in the documents. They do not replace, for example, the team's ongoing document review process. However, a good peer review should bring a great deal of value to the project, and the reviews should be factual, informed, clear, specific, technical, and with a tone toward mentoring. They should be critical but constructive and focused on the project, not on individuals.

Management should read and be familiar with the content of the peer reviews, and management should have some level of oversight in the follow-up process. A good peer review would include an executive summary that widens the potential management audience to the content of the report.

The primary responsibility for follow-up resides with the project team. The project team cannot take every comment at face value and should evaluate the commentary of the peer review and determine which comments require action and which do not. A comment that clearly points out a conflict or defect in the documents, albeit minor (unless the comment is trivial), should be addressed by the project team. If an error exists, is known to the project team, and is ignored, the team is not performing efficiently. Very likely, an error ignored will cause an RFI to be issued during construction. When the design team responds to the RFI, the time spent addressing the issue will likely be greater than if the design team had addressed the issue prior to the start of construction.

Project team management should assign a responsible party to each comment offered by peer review that needs to be addressed, whether that be architectural staff or consultant. Scheduling and tracking mechanisms need to be put in place to help facilitate follow-up and confirmation that sufficient responses are integrated into the documents.

CONCLUSION

Because of the largely subjective nature of architectural construction drawings, there will continue to be as many ways and ideas about the preparation of the drawings as there are architects preparing them. Some architects will continue to organize their work around recent practices such as the mail slot concept or in accordance with other pre-established standards; others will explore new organizational and presentation concepts that draw from the rich tradition of the past and leverage the latest technology, neither of which can ever fully represent the needs of all projects. Nonetheless, architects can recapture the artistry and magic that professional judgment and pride of craftsmanship can bring to construction drawings to better illustrate the ideas and design they are trying to convey.

10.7 Construction Specifications

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Specifications are an important means of communicating design intent and quality of materials, and, as legal documents, define the administrative and procedural matters that govern the conduct of the work. Design professionals must understand the content and organization of the specifications and how they affect the administration of the owner-contractor agreement.

INTRODUCTION

This article will outline the purpose, process, and methods of organizing and developing written construction documents (specifications), including the importance of coordination with the drawings. It will also include the process of research, preparation, and application of specifications for construction materials and systems. The development process, from preliminary project descriptions to full construction document specifications, will be discussed. Computer applications and automated editing procedures for specifications will be visited, as well as alternatives to producing specifications in-house. While there are other, much more in-depth discussions on proper and effective preparation and use of specifications, this article will serve to outline the basics.

HISTORICAL PERSPECTIVE

Specifications are a fairly new tool for communicating design intent. As the "master builder," architects for centuries served in the role of both architect and builder. Specifications were unnecessary, as the palette of building materials was very limited and applications were only as diverse as the architect's design. With the advent of the building contractor as a separate entity, it became more important to accurately communicate design intent, and thus the importance of specifications increased. With the industrial revolution of the late eighteenth century and the technology explosion that began in the last half of the nineteenth century and continues today, the development of literally thousands of new building materials and products makes effective use of specifications even more important in communicating type and quality of materials, products, and systems.

PURPOSE OF WRITTEN CONSTRUCTION DOCUMENTS

In general, specifications are intended to communicate the type and quality of materials while the drawings communicate the quantity and setting. Schedules, which can occur in either the drawings or the specifications, bridge the gap between the two by giving specific information that can be difficult to communicate in graphic form. Schedules are used for items such as doors, windows, and finishes, and can communicate specific locations for products like joint sealants and waterproofing when more than one is used on a project.

The importance of specifications as a legal document cannot be overstated. Specifications, like drawings, contracts, and conditions of contract, are enforceable contract

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documents that define and bind the owner and contractor to specific legal responsibilities. But at the same time, they are also subject to interpretation if they are not clearly written and well coordinated with other construction documents.

Drawings must also be coordinated with the specifications to minimize confusion, which can lead to excessive RFIs (requests for information or interpretation) and change orders. Excessive RFIs can be a result of poor coordination and result in change orders. Excessive change orders as a result of poor coordination can leave the design professional exposed to claims from the owner.

Poor coordination can be exhibited in a variety of forms, including the following:

- Specification phrases that say "as indicated in the drawings," but no reference or an incorrect reference exists on the drawings
- Drawing phrases that say "as indicated in the specifications," but no reference or an incorrect reference exists in the specifications
- Specifications that include materials that are not required for the project
- Drawings that indicate materials, but they are missing from the specifications
- Specifications that indicate a specific type of material, but the drawings indicate another

ORGANIZATION OF SPECIFICATIONS

Specifications, as the primary component of the project manual, are organized in both the United States and Canada using a document called MasterFormat. MasterFormat was introduced in 1963 by the Construction Specifications Institute (CSI) as a means of providing an organizational framework for information in the project manual. The document includes standardized naming, numbering, and sequencing of information so that readers and enforcers of project manuals can find information in the same location regardless of who authored the specification. As originally conceived, the basic organization of the information of the project manual is sequenced as follows:

- *Bidding and Contracting Information*, which includes instructions to bidders, bid forms, information available to bidders (like soils investigation reports), general conditions, supplementary conditions, samples of owner-contractor agreements, and other contractual information.
- *Specifications*, which are generally subdivided as follows:
  - *General Requirements*: Commonly known as Division 1, information in this set of sections is intended to communicate the administrative and procedural requirements that govern all of the technical sections. Information includes such topics as payment procedures, submittals, quality control, substitution requests, and contract closeout documents.
  - *Technical Sections*: Organized around a 16-division format and 5-digit numbering system, technical sections were generally organized by the sequence of introduction of materials on the project (e.g., Division 2—Sitework; Division 3—Concrete; Division 7—Thermal and Moisture Protection; Division 9—Finishes).

MasterFormat has been updated several times to accommodate new materials and technologies, and methods of contracting. The most recent and sweeping update occurred in 2004 (and was updated again in 2010 and 2012). It expanded the format to 50 divisions, some held in reserve for future use. Each section now follows an expanded 6-digit numbering system (with option digits following a decimal). Generally, information occurs in the same sequence as in the 16-division edition, with the primary exceptions being that the mechanical and electrical sections now occupy Divisions 21–28, and site/civil information now occupy Divisions 31, 32, and 33. The 2012 MasterFormat includes significant room for expansion of technologies as well as divisions to accommodate process equipment and systems. It also includes divisions for infrastructure and off-shore construction. Figure 10.26 shows a list of how the 50 divisions are organized.

The Construction Specifications Institute

MasterFormat®

DIVISION NUMBERS AND TITLES

PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP:

DIV. 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

SPECIFICATIONS GROUP:

GENERAL REQUIREMENTS SUBGROUP:

DIV. 01 GENERAL REQUIREMENTS

FACILITY CONSTRUCTION SUBGROUP:

DIV. 02 EXISTING CONDITIONS
DIV. 03 CONCRETE
DIV. 04 MASONRY
DIV. 05 METALS
DIV. 06 WOOD, PLASTICS, AND COMPOSITES
DIV. 07 THERMAL AND MOISTURE PROTECTION
DIV. 08 OPENINGS
DIV. 09 FINISHES
DIV. 10 SPECIALTIES
DIV. 11 EQUIPMENT
DIV. 12 FURNISHINGS
DIV. 13 SPECIAL CONSTRUCTION
DIV. 14 CONVEYING EQUIPMENT
DIV. 15 RESERVED FOR FUTURE EXPANSION
DIV. 16 RESERVED FOR FUTURE EXPANSION
DIV. 17 RESERVED FOR FUTURE EXPANSION
DIV. 18 RESERVED FOR FUTURE EXPANSION
DIV. 19 RESERVED FOR FUTURE EXPANSION

FACILITY SERVICES SUBGROUP:

DIV. 20 RESERVED FOR FUTURE EXPANSION
DIV. 21 FIRE SUPPRESSION
DIV. 22 PLUMBING
DIV. 23 HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)
DIV. 24 RESERVED FOR FUTURE EXPANSION
DIV. 25 INTEGRATED AUTOMATION
DIV. 26 ELECTRICAL
DIV. 27 COMMUNICATIONS
DIV. 28 ELECTRONIC SAFETY AND SECURITY
DIV. 29 RESERVED FOR FUTURE EXPANSION

SITE AND INFRASTRUCTURE SUBGROUP:

DIV. 30 RESERVED FOR FUTURE EXPANSION
DIV. 31 EARTHWORK
DIV. 32 EXTERIOR IMPROVEMENTS
DIV. 33 UTILITIES
DIV. 34 TRANSPORTATION
DIV. 35 WATERWAY AND MARINE CONSTRUCTION
DIV. 36 RESERVED FOR FUTURE EXPANSION
DIV. 37 RESERVED FOR FUTURE EXPANSION
DIV. 38 RESERVED FOR FUTURE EXPANSION
DIV. 39 RESERVED FOR FUTURE EXPANSION

PROCESS EQUIPMENT SUBGROUP:

DIV. 40 PROCESS INTEGRATION
DIV. 41 MATERIAL PROCESSING AND HANDLING EQUIPMENT
DIV. 42 PROCESS HEATING, COOLING, AND DRYING EQUIPMENT
DIV. 43 PROCESS GAS AND LIQUID HANDLING, PURIFICATION, AND STORAGE EQUIPMENT
DIV. 44 POLLUTION AND WASTE CONTROL EQUIPMENT
DIV. 45 INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT
DIV. 46 WATER AND WASTEWATER EQUIPMENT
DIV. 47 RESERVED FOR FUTURE EXPANSION
DIV. 48 ELECTRICAL POWER GENERATION
DIV. 49 RESERVED FOR FUTURE EXPANSION

www.masterformat.com

110 South Union Street, Suite 100
Alexandria, Virginia 22314
800-689-2900, www.csinet.org

Construction Specifications Institute

FIGURE 10.26 MasterFormat 2012 Edition

PART 3: PROJECT DELIVERY

Resistance to changing from the 16- to 50-division format has been significant, especially by some owner groups as well as some design professionals who are reluctant to implement the changes. However, the 50-division organization format has now been adopted by master specification providers, construction materials Internet search engines, and most governmental organizations; and the 16-division format is no longer supported by CSI.

The CSI's efforts to organize construction specifications also includes a format for organizing information within each section using a document referred to as SectionFormat. SectionFormat divides the information into three parts: Part 1—General, Part 2—Products, and Part 3—Execution. Within each part, information is organized in a consistent sequence of subparts so that the information can be accessed easily by those who need to read and enforce the specifications.

Although less significant in its use, CSI also publishes a document entitled PageFormat, which intends to propose a consistent format for organizing the page format for a specification section.

Masterformat, SectionFormat, and PageFormat are available from CSI at http://www.csinet.org.

MEANS AND METHODS OF SPECIFYING

Technical specifications can be prepared in several manners. These are typically classified as descriptive, performance, reference standards, and proprietary. Often, it is advisable to use a combination of each.

Descriptive specifying requires use of technical descriptions of exact characteristics of materials and products. Writing descriptive specifications can be a tedious and time-consuming process. For this reason, it is often advisable to combine this method with proprietary product names and model numbers to accurately communicate the basis of design. An example of this would be in specifying lumber, where characteristics (size, grain, species, appearance) are combined with structural performance requirements for a complete specification.

Performance specifying relies on describing the performance qualities of a material or product. A good example is specifying the strength of concrete. Performance specifying usually is also combined with using reference standards. For example, the strength of concrete must be tested relative to a specific testing standard. Performance specifications are often mandated by government agency clients, as they do not want mentions of proprietary products to be perceived as giving preference to listed manufacturers and products. Taken to its ultimate application, performance specifying is often used by owners who are soliciting to design-build entities in order to allow them to bring the best product or application to the project. A pure performance-based specification for a roof membrane would be "maintain building in a watertight condition for not less than 20 years."

Reference specifying incorporates reference standards published by industry associations and testing organizations and allows specifiers to use industry-accepted standards of practice and performance. The most widely known standards associations are the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), and Underwriters Laboratories (UL), although there are hundreds of standards writing and trade associations that publish reference standards. These groups either develop and organize performance standards, or test material products and assemblies for compliance with published standards.

Proprietary specifying using proprietary products and materials is often preferred because of brevity and simplicity, and because the specifier may be familiar with the qualities of the specific products being specified. These specifications are frequently supplemented with reference standards and performance requirements. Guide specifications prepared by product manufacturers can be helpful source documents, especially for specialty products in which the specifier has limited experience. It is important, however, to ensure that the manufacturer has not limited competition by listing requirements that might prohibit their competitors from also bidding for the work.

Creating competition among manufacturers is an important part of preparing specifications in order to for the owner to receive maximum benefit. This is particularly important on publicly funded projects, which usually require full and open competition. Several brands of products (usually at least three) are specified, under the theory that qualified manufacturers should be able to compete equitably for the work. Restricting the list to only those manufacturers and products with which the specifier is familiar, while allowing others who may be qualified and have a substantially equivalent product to submit substitution requests, is common practice.

Using the concept of "basis of design" is a common practice to identify the one manufacturer and product from which drawing detailing was derived or that contains all the important performance aspects deemed required by the specifier. Such aspects can also include color, texture, and other appearance qualities that may be critical to the design intent. In these instances, listing other manufacturers with whom the specifier is familiar, but who may not necessarily have an identical product available, is acceptable provided that the list of other manufacturers includes the statement: "Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:"

Just as important as including materials and products in the specifications that are accurately coordinated with the drawings is the need to remove products and materials from each section that are not needed. This is a major complaint of contractors, who must sift through irrelevant specification requirements in order to determine what is exactly required for the project. Editing the project specifications down to only that which is needed for the project requires more effort, but is very important for a coordinated set of documents. The specifier's mentality is to not delete anything from early drafts of CD level specifications if they suspect they might be needed in the final issue. For that reason, early drafts may include inapplicable requirements that must be edited out for the final version.

Editing the specification to exactly what is needed for the specific project also applies to the Division 1(01) sections. Typically, a set of master specifications in an architect's office will include all of the administrative and procedural requirements of the most complicated project the office might encounter. Clearly, editing down Division 1(01) sections is important when applying master sections to, for example, a small interior renovation project, as opposed to a courthouse. Unreasonable requirements for projects of short duration or limited budget can result in needless added cost and longer project duration.

Last, methods of construction contracting can affect the means and methods of preparing specifications. For example, in a publicly funded conventional design-bid-build scenario, specifications must be as accurate, coordinated, and hardened against unqualified substitutions as possible. In contrast, specifications prepared for a design-build entity using private funds might need to include as many options as possible for diversity of manufacturers and quality of materials to allow the design-builder the ability to exercise options and adjust material quality to suit the budget. In both cases, the best quality for the least cost and construction duration is the goal.

A much more detailed discussion of specifying techniques and practices is available in the *Construction Specifications Practice Guide*, published by the Construction Specifications Institute.

LEVELS OF DETAIL IN SPECIFICATIONS

As development of the drawings progresses from schematic design to design development and ultimately to construction documents, specifications likewise need to communicate design intent to the level consistent with the drawings. Many owner entities require this as a deliverable and a condition of their owner-architect agreement. Fortunately, there are tools and formats available to suit each of these conditions.

At the schematic design level, communicating basic knowledge and design direction is important, especially as basic material and system selection develops. One method often used by architects is a narrative where the basis materials and elements of the building are communicated.

Another means, growing in popularity, is a specification tool known as UniFormat, developed by the Construction Specifications Institute (CSI). UniFormat is a method of arranging construction information as well as cost estimates based on functional elements, or parts of a facility characterized by their functions. These elements are often referred to as systems or assemblies. UniFormat breaks a facility into seven elements—substructure, shell, interiors, services, equipment and services, equipment, site work, and general—without defining the technical solutions to provide these functions. This allows the facility to be priced at the elemental level, allows design alternatives to be better evaluated, and allows facility performance to be established at the system level as the project design is being refined. At the design development level, outline specifications are often the solution to communicate materials, products, and systems. Outline specifications are prepared in three-part format, just like CD level specifications, but include very abbreviated information, focusing primarily on Part 2—Products. A typical outline specification section will be one page or less. Most commercially available master guide specification systems are available in outline format, short-form format, and full-length format. When a project's design is fairly complete and detailed at the design development level (as is sometimes in the case in site-adapted prototype work), using full three-part construction document level specifications is also an option, especially if a contractor is being pressed to do detailed pricing and guarantee pricing.

At the construction document phase, most architects agree that three-part specifications are the most appropriate means for communicating quality of materials and design intent. However, the level of detail needs to be determined relative to the size and scope of the project. As mentioned, most master specification systems come prepared into short-form and full-length versions, while others can certainly be customized to serve these purposes. Short-form specifications serve a number of purposes for projects:

- Of limited scope, such as small renovations or interior finish-outs.
- Simple in design and application, such as shell warehouse or shell strip retail.
- Prepared for a design-build entity that seeks maximum freedom in proposing final material or products to suit design criteria.
- Full-length specifications must also be customized for construction document applications, as not all projects require the level of detail that the master might contain. Submittals are a good example of where small projects may not require as extensive a list as would be required for large or fairly complicated projects. Again, the level of detail needs to be appropriate to the project.
- Last, placing specifications on the drawings is a common practice for firms involved primarily in small projects or interior finish-outs. In order to not consume scores of pages dedicated to the specifications, it is important to edit down the specifications (short-form specs can be a good starting point) to only the most critical of information, and format each page to fill as much of the page as possible before importing into the drawings. While on the surface the concept appears sound, it is quite difficult to adequately edit down a specification for this type of application.

MASTER SPECIFICATIONS

Most specifiers use some form of master specification that is modified for each project. A master specification covers an entire topic, including a range of options. The specifications editor then fills in blanks, deletes options that don't apply, and incorporates special requirements not included in the master.

Commercially available master specifications are produced by a variety of sources, including the following:

- *MasterSpec*, as developed by Arcom Master Systems under contract to the American Institute of Architects (AIA): http://www.arcomnet.com/
- *SpecLink*, as developed by Building Systems Design, a wholly owned subsidiary of the Construction Specifications Institute: http://bsdsoftlink.com/
- *Spectext*, as supported by Arcom Master Systems: http://spectext.com/
- *Unified Facilities Guide Specifications (UFGS)*, developed by the National Institute of Building Sciences and required for use on all projects funded by NASA, NAVFAC, U.S. Air Force, and the U.S. Army Corps of Engineers. UFGS is part of the Construction Criteria Base, which also includes the Whole Building Design Guide, an excellent source of material technology and research. http://www.wbdg.org/ccb
- *SpecsIntact*, as developed by the National Aeronautical and Space Administration (NASA), is the software most often used to edit UFGS-formatted specifications.
- In addition to those listed above, many product manufacturers provide guide specifications for use when specifying one of their products. The most comprehensive grouping of available guide specifications is included in the Arcat website and in the McGraw-Hill Sweets Network website.
- For some projects, the owner will provide master guide specifications for the architect to use. It is quite common for large organization owners such as federal government agencies, regional transportation or utility authorities, large hospital entities, major corporations, and some university systems to develop such guide specifications. While these are a valuable tool in shortening the learning curve time when working with new architects, it is still the architect's responsibility to edit these sections accurately, since once they are issued they will be considered as the architect's work product, and the owner and contractor will rely on them just as if they had been produced by the architect from scratch. That said, changes to such master sections need to be approved by the issuing organization.
- When using a word processing program, an important decision to be made in using master guide specifications is determining what level of pre-editing should be done to bring the raw master down to include just the products and systems that the specifier might encounter on a typical project for the firm. Editing out too much information can be a problem if the specifier regularly has to add a significant amount of information back into a specific project manual. Not removing enough extraneous information results in an excessive amount of editing on each subsequent project.

When using a word processing format, macros can significantly simplify the specifier's more mundane tasks. Macros can be written to automatically create a table of contents, edit and format headers and footers, remove editor notes, search for blanks in which information is needed, and search for bracketed text in which choices need to be made.

Another challenge is keeping the master specification sections current when manufacturers change names, go out of business, are bought out by competitors, or change the name or model numbers of their products. Likewise, changes in codes, technologies, and reference standards can outdate a master specification quickly. Most commercially available master guide specification systems are updated annually, if not quarterly. The challenge, however, is getting these changes implemented into the firm's master specifications. If using a word processing format for producing specifications, there is often only one means of incorporating these updates—manually reviewing and inserting.

The developing trend in specifications production is not in using word processing programs but in database versions of the master guide specifications. For instance, Arcom MasterSpec, in conjunction with database editing tools known as especsLinx and especsEditor (created by Interspec), allows the specifier to hide text instead of deleting it, so that text can be easily restored later if needed. Another vendor product, BSD's Speclink-e, offers a similar advantage but in a slightly different interface. Further, in an effort to assist architects in better coordinating the drawings and specifications, some software vendors have created BIM-compatible versions of their software that interface with Autodesk Revit models. These programs link common terminology and attributes between the models and the specifications, making consistency in terminology critical but allowing new possibilities for coordination and accuracy. Information about these programs can be found at http://www.e-specs.com/ and http://bsdsoftlink.com/.

COORDINATION OF DRAWINGS AND SPECIFICATIONS

Well-coordinated drawings and specifications are essential in any set of construction documents. In particular, the architect is challenged to see that materials and products shown on the drawings are described in the specifications and that the language used is consistent and unambiguous.

An excellent tool for the specifier to use in collecting project information is an initial project questionnaire. This can be developed from the master table of contents, into which questions that ultimately will need to be answered can be placed. The questionnaire should include not only questions regarding the technical sections but also those for Division 0(00) and 1(01) sections covering administrative and procedural tasks. The information may be challenging to gather, but it is nonetheless important to persevere to close loose ends.

Division 0(00) and 1(01) questions might include the following:

- Will the owner bid or negotiate the work? If bidding is selected, a bid form and instructions to bidders will need to be produced.
- What is the preferred general conditions document to be used? If AIA Document A201™–2007 (or the design-build counterpart, AIA Document A141™–2004) are not used, it is imperative for the specifier to determine what general conditions the owner may propose using, so that the specifier can look for conflicts that may exist between the owner's general conditions and what may be the standard language in the office master Division 1 sections. Using a set of general conditions in which the specifier is not familiar with the language can expose the firm to increased liability for language which the firm may not feel is prudent.
- Who has produced the soils investigation report, and how will it be shared?
- What is the preferred owner-contractor agreement form, and will it be published in the project manual?
- Will the owner require the project to be bonded, and if so, what forms are to be used?
- What are the types and limits of coverage required of the contractor for liability and property insurance?

The balance of the technical section questionnaire may include questions that the project architect is unable to answer until later in the design phase, but it is a good idea to plant the seeds early and revisit the checklist at each subsequent phase in the design process. Finishes are a good example of choices that may not be made early and may need to be revised throughout the construction document phase.

Another important goal is maintaining consistency between the language used in drawing notations and the language used in the specifications. One simple technique available to help architects achieve this consistency is numerical keynoting. Instead of attaching a descriptive note to a component of a drawing or detail, the project architect attaches a keynote number. This number is cross-referenced to a standardized keynote list, which is included on each drawing. It remains the responsibility of the project architect to coordinate the keynote list with the specifier, but this technique generally makes it easier to revise drawing notations. If a standard material notation changes, only the keynote list needs to be updated—not every plan, section, elevation, and detail sheet in which the material appears.

Keynote-based drawings lend themselves to automation. Most BIM or CAD systems can be configured to use central keynoting databases. They allow the same information to be shared between multiple drawings and models using reference files or libraries. These can be updated for all drawings simply by changing the master information. This can be especially helpful for international practices since the information can be centralized and managed in multiple languages. The firm's architects can select notes in their own language and output those notes in the language spoken where the building is being constructed.

The ConDoc drawing system that appeared in the late 1980s took the concept of keynotes further by using MasterFormat as the keynote numbering convention. Each material or product notation on a drawing is essentially tied back to the appropriate specifications section with extensions (like 04200.2.1A). Unfortunately, until more advanced CAD and BIM tools became available, such systems were almost impossible to manage unless a firm specialized in only one project type.

BIM technology now allows this drawing-specification coordination process to occur within the software, provided the terminology is consistent (refer to the preceding discussion of Master Specifications). These systems may more tightly integrate specifications attributes and permit them to be assigned to assemblies of objects in the model on the drawings. This also may allow for more complete extraction of bills of materials to assist with cost estimates.

Coordination between the drawings and specifications is a group effort that includes not only the project architect and specifier but also the other consultants on the team, to see that the specifications have no gaps or miscues. Just as challenging as finding at the completion of the project that no one provided a section on earthwork is the opposite problem of finding that the architect, structural engineer, and civil engineer each prepared a section covering the same subject, but each with a different focus and perhaps even with different directives.

This coordination effort between the drawings and the specifications, as well as between the specifications produced by the various team members, can be even more complicated as the team size grows, as on larger, more complex projects where specialty consultants, in addition to engineers, join the team. Confirming their role in producing construction documents is important to ensure effort is not duplicated. Many times specialty consultants will produce their own specifications, but just as often, they prefer to review and edit the architect's master specifications. Such specialty consultants often include: vertical transportation, building envelope, roofing, waterproofing, food service, audio/visual, parking/site vehicular, and even more specialized consultants to assist on specific project types like libraries, museums, theaters, and laboratories.

INFORMATION MANAGEMENT

Equally as important as the drawing-specification coordination effort is that of ensuring that the basis of design selections made by the project architect and interior designer are accurately saved, catalogued, and communicated to the specifier. Before the sustainability movement, project architects were encouraged to copy or print product data sheets and bind into a three-ring binder to document decisions and make information easily retrievable by the specifier. Downloading PDFs of such documents and storing them electronically in the project archives is now the default, and the more environmentally friendly method of documenting these decisions. Regardless, the importance of communicating these selections is at the core of the coordination effort. The specifier will invariably discover traits about products and materials tentatively selected that need to be further researched and perhaps reselected before the design process is complete. This store of materials and product data will remain a living document until the project is completed.

Internet search engines specifically focused on building construction materials have become increasingly important in performing product data research. These resources allow current product information, including product data sheets, guide specifications, and BIM/CAD objects, to be downloaded and used for a specific project. These resources are increasingly making the product catalog library in the architect's office obsolete, as the electronic information is available 24/7 and is virtually guaranteed to be the most accurate available from the manufacturer. Popular search engines for building construction products currently include:

- Arcat: http://arcat.com/sd/specifications.shtml
- BPM Select: http://bpmselect.com
- McGraw-Hill Sweets Network: http://products.construction.com/
- 4Specs: http://www.4specs.com/

The basic methodology for researching and evaluating products, materials, and systems could be the source of a volume by itself, but suffice to say, it is an acquired skill. Combing through the mountains of product data provided by manufacturers and saving the pertinent information by MasterFormat section number and in an easily retrievable location is a good starting point.

Comparing attributes of competing manufacturers and products becomes even more complicated, as manufacturer's information is rarely formatted identically, and performance standards and results can vary. Adding to the complexity is that two manufacturers' products are rarely manufactured with identical materials or fabrication methods. On-the job-training is the best source of knowledge, as the specifier's evaluation skills will certainly improve with each subsequent project.

IMPLEMENTING SUSTAINABLE PRODUCTS AND PROCEDURES

With the advent of the mainstream sustainable design and building movement, begun primarily in the 1990s, most architects now feel it is not only good building practice but also ethically the right path to see that greenhouse gas emissions are reduced, natural resources are not depleted, air quality is not harmed, and water resources are preserved. Sustainable strategies have been integrated into model building codes, including the International Energy Conservation Code and the International Green Construction Code. Many owner entities (especially federal and state governments, some college and university systems, major corporations, and even some cities) now require that a certain level of sustainability be incorporated into the design and construction of facilities which they fund, or that are constructed within their boundaries. With voluntary sustainability programs such as the U.S. Green Building Council's LEED certifications, the Green Building Initiative's Green Globes, and the U.S. Environmental Protection Agency's Energy Star programs, the trend to sustainable design and construction is rapidly growing.

In an effort to implement construction projects that have the least impact on the environment, specifiers routinely include into the specifications requirements such as the following:

- Low- or no-VOC paints, coatings, sealants, and adhesives
- Products with high recycled content
- Products that have been manufactured, harvested, or recovered regionally
- Roofing and paving materials with high reflectance values
- Particleboard and insulations with no added urea formaldehyde
- Flooring products that have received FloorScore certifications

- Lumber, trim, doors, casework, etc., that are certified as being harvested from sustainably managed forests
- Recycling of construction waste by the contractor
- Provision by the contractor of an indoor air quality plan during construction
- High R values for exterior building components

With the help of material manufacturers producing materials and products that support sustainable strategies, specifying and purchasing products with high insulation values, low VOCs, high recycled content, and other desirable sustainable traits continues to become easier.

Third-party certifications and services can help determine just how sustainable a product or material really is. In the past, some manufacturers have exaggerated claims about the sustainability of their products (sometimes referred to as greenwashing), including VOC content and recycled content. A third party is one that has no profit motivation in making a determination. One service is Green Format, developed and maintained by the Construction Specifications Institute (CSI) to assist in organizing sustainable data for easy comparison. Additional information is available at http://www.greenformat.com/. Also, there are a whole series of ASTM standards that now focus on sustainability. These standards can be found at http://www.astm.org/Standards/sustainability-standards.html.

Other third-party services actually investigate and perform sustainable testing and modeling to confirm the accuracy of manufacturers' statements. Such organizations include:

- Green Seal Certification: http://www.greenseal.org/
- Forest Stewardship Council: http://www.fsc.org/
- FloorScore developed by the Resilient Floor Covering Institute: http://www.rfci.com
- UL Environment: http://www.ul.com/global/eng/pages/offerings/businesses/environment

There are also numerous search engines and publications dedicated to educating the design and construction community on sustainable principles and practices, including:

- Green Source (by McGraw-Hill): http://www.construction.com/greensource
- Greenspec (by Building Green Inc.): http://greenspec.buildinggreen.com
- *Environmental Building News*: http://www.buildinggreen.com/news/

An important aspect of providing specifications that incorporate sustainable principles and requirements is to understand the owner's ultimate goal. If a project's owner is seeking LEED or other certification, it is important not only to integrate sustainable materials but also to include contractor documentation requirements in the submittals. Failure to include such requirements in the specifications may open up the owner to change orders for additional contractor administrative personnel and procedures, or may jeopardize capturing valuable LEED or other credits. An increasing number of owner-architect agreements stipulate the level of LEED certification to be achieved. Missed points may result in breach of contract and significant claims.

▶ Risks and Emerging Practices (16.3) discusses risk management related to sustainable design.

THE IN-HOUSE SPECIFIER

Specifications are often produced by a senior member of the firm who has served in the role of specifier for a number of years. Conventional firm management wisdom predicates selecting an individual who is technically oriented, understands building codes, has a significant amount of construction contract administration experience, has good writing and organizing skills, and can serve as the firm's "technical knowledge bank" in an effort to repeat firm successes, and minimize failures from a technical and compliance standpoint. While such sage individuals are often groomed for the role, it is important to groom an assistant specifier who can learn the basics and support the specifier in material research and administrative tasks. To see that the firm's designs are accurately communicated and implemented, potential candidates are usually recruited as they exhibit an understanding of materials technology and administration.

Some firms feel the need to involve all project architects in the tasks associated with specifications production and construction administration, in the hopes of "rounding out" their experience. Even firms that take great care to create in-house master specifications that are tutorial in nature, and to provide experienced personnel for guidance, typically have only marginal success with this approach.

Unfortunately, most schools of architecture place little emphasis on building materials technology, and even fewer on learning the means and methods of preparing specifications. To fill this gap, the Construction Specifications Institute has created texts that are not only used in formal education programs but also serve as core documents for educating young architects on a continuing basis. These documents, known as the *Construction Specifications Practice Guide*, the *Construction Contract Administration Practice Guide*, and the *Project Delivery Practice Guide*, are the most comprehensive sources of information on these areas of practice. These documents are available at http://www.csinet.org.

ALTERNATIVES TO PREPARING SPECIFICATIONS IN-HOUSE

Some small firms find it is not economically feasible to keep a full-time specifier or have trouble attracting one of the senior members to assume that role. Some midsize and large firms either have trouble attracting a qualified specifier or find that they are occasionally unable to meet all project schedules in-house due to the volume of work. Other firms may take on a project type that is outside of their expertise, and are not comfortable with producing the specifications in-house.

For each of these scenarios, there are usually alternatives in the form of out-of-house specifications consultants. Often congregated in metropolitan areas, these seasoned specifiers set up shop as independent specifiers who serve many architects. These specifiers are typically trained in an architect's office, and very likely have architectural degrees and licenses. Most are sole proprietors, but sometimes two or more will associate into a specialty firm. Such consultants can serve in a variety of roles, including preparing specifications, assisting in updating in-house master specifications, performing peer reviews of construction documents, providing product research, and working with cost estimators to fine-tune cost studies and alternatives.

Whether specifications are produced in-house or outsourced, the abilities and knowledge of those involved in this complex area of practice must be continually improved through product research and fine-tuning their writing and research methods.

An organization to which many independent specifiers belong is known as Specifications Consultants in Independent Practice (SCIP). A roster of SCIP members is available at http://www.scip.com.

For More Information

MasterFormat, SectionFormat, and PageFormat are available from CSI at http://www.csinet.org.

Additional information for evaluating the sustainability of construction materials is available at http://www.greenformat.com/and http://www.astm.org/Standards/sustainability-standards.html.

Information about specification editing programs can be found at http://www.e-specs.com/ and http://bsdsoftlink.com/.

Information about UniFormat can be found at http://www.csinet.org/uniformat.

Construction Specifications Practice Guide, published by the Construction Specifications Institute, is available at http://www.csinet.org.

10.8 Bidding and Negotiation

Bill Schmalz, AIA, LEED AP BD+C; RK Stewart, FAIA, LEED AP BD+C; and Bruce Toman, AIA, LEED AP

In the preceding sections, the processes, activities, and the architect's role during the design and construction document phases were presented. Before construction can begin, the owner must select a contractor. That selection usually involves some form of bidding or negotiation. This article is an overview of the bidding and negotiation processes.

DEFINITIONS

The following terms are used throughout this chapter:

- An *addendum* is a modification to the procurement documents issued for bid or negotiation. Addenda can be issued any time before the owner-contractor agreement is executed, but are typically issued until some predetermined time before the bid opening.
- An *allowance* is an amount of money or quantity of materials identified by bidders for work that is not completely defined in the procurement documents.
- A *bid alternate* is a portion of the work defined in the procurement documents for which separate pricing is to be identified in bidders' proposals.
- The *base bid* is the construction cost proposed by a contractor for the full scope of the work, without any bid alternate pricing.
- A *payment bond*, also known as a labor and materials payment bond, is an amount of money guaranteeing that the contractor will pay subcontractors, vendors, and suppliers for their work. This protects owners against potential mechanic's liens and construction delays.
- A *performance bond* is a guarantee by an entity which ensures that, should the contractor default during construction, there are sufficient funds to complete the project.
- A *privately funded project* is one for which none of the funding is provided by a public agency.
- The *project delivery method* is the manner in which the owner contracts for design and construction services.
- A *publicly funded project* has a portion of the funding provided by a public entity, such as federal, state, or local government.
- With *qualifications-based selection* (QBS), the owner selects a contractor solely on the basis of the contractor's qualifications.
- A *responsible bidder* is one who can demonstrate financial capacity to perform the contracted work.
- A *responsive bid* is one in which all bidding requirements, including all the elements of the bid form, have been satisfactorily completed.

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- With *value-based selection* (VBS), the owner selects a contractor based on the weighted values of multiple criteria, including construction cost or fee and proposed schedule, as well as qualifications-based criteria such as past experience on similar projects and proposed personnel.

PROJECT DELIVERY METHODS

► See Project Delivery Methods (9.1) for related information.

An important decision that owners need to make, often before the project starts, is the project delivery method. This is the manner of selecting and contracting for design and construction services. The choice of project delivery method will determine the nature of the owner's relationship with the architect and contractor, the timing of the bidding or negotiation process, and the documents required. AIA Contract Documents include standard forms of agreement for a variety of delivery methods.

An owner may choose to engage a *construction manager as adviser* (CMa) to provide advice and management during design and construction, or optionally, to act as the owner's representative or to supervise the work of contractors. CMa is not a project delivery method per se, but may be used for any of the delivery methods described below. AIA Document C132™–2009 is the standard form of agreement between an owner and a construction manager as adviser.

The owner's choice of delivery method will depend on several factors: legal restrictions (for publicly funded projects), schedule restrictions, budget limitations, and desired level of team integration.

In *design-bid-build* (DBB), the owner contracts with an architect to design the project and prepare contract documents. When complete, the documents are issued to interested contractors to prepare bids to construct the work. During the bidding period, the contractors use the documents to determine a cost and schedule for the work. For most projects, particularly those with public funding, the responsible bidder with the lowest responsive bid will be selected to build the project. It is often possible for an owner to prequalify contractors before the bidding process. The AIA Standard Form of Agreement most often used with DBB is Document A101™–2007. With DBB, the owner carries all the Spearin Gap risk.

Multiple prime contractors (MP) is a variation of DBB in which more than one prime contractor is selected through competitive bidding. There are three reasons why an owner would select MP. First, some states require publicly funded projects to have multiple prime contractors. Second, if schedule is an important factor for a publicly funded project that must be competitively bid, then MP may be the best option for an accelerated schedule. And third, some owners have the capacity to manage the work of multiple contractors.

As with DBB, the owner engages the architect for design and documentation. With MP, the architect prepares separate bid packages and the owner then executes separate agreements with two or more contractors. Typically, the separate prime contracts may be for general construction, structural systems, mechanical systems, plumbing systems, and electrical systems. If the construction schedule is accelerated, the architect may need to prepare separate bid packages for certain trades, such as demolition, excavation, or foundations, so that construction can begin before complete construction documents are ready for bid. With MP, as with DBB, the owner carries all Spearin Gap risks. AIA Document A101™–2007 is used for MP, with one agreement per contractor.

THE SPEARIN DOCTRINE

The "Spearin Doctrine" comes from a 1918 U.S. Supreme Court case called *United States v. Spearin*. In its ruling, the Supreme Court stated that "if the contractor is bound to build according to plans and specifications prepared by the owner, the contractor will not be responsible for the consequences of defects in the plans and specifications." Since *Spearin*, courts have ruled that, by providing plans and specifications (prepared by an architect) to a contractor, the owner is also giving an implied warranty that the documents are free of defects and are sufficient for the contractor to construct the project.

On the other hand, most owner-architect agreements, such as AIA Document B101™–2007, state that the architect "shall perform its services consistent with the professional skill and care ordinarily provided by architects practicing in the same or similar locality under the same or similar circumstances." This professional standard of care does not require defect-free documents (nor does it allow negligence). The difference between defect-free documents and the professional standard of care is often called the "Spearin Gap." The costs associated with document defects that fall within the professional standard of care are borne by the owner. Each of the delivery methods discussed in this article gives owners varying amounts of Spearin Gap risk.

Another variation on DBB is *design-negotiate-build* (DNB). Again, the architect provides design and contract documents. The owner requests proposals instead of bids to construct the work from one or more prospective contractors. Based on the contractors' proposals, the owner can choose to negotiate with one or more contractors to make a final selection. This method is usually not permitted for publicly funded projects. Owners of privately funded projects may select DNB because it gives them more opportunity to prequalify contractors and to weigh factors other than cost when making their decision. In theory, the Spearin Gap risks remained unchanged from DBB; in reality, because owners often request proposals from contractors with whom they have a past successful relationship, those risks may be mitigated.

Construction manager as constructor (CMc), also commonly known as *construction manager at risk*, is similar to DNB in that the construction cost is usually the result of negotiations instead of competitive bids. It differs by bringing the CMc onto the project team early. The owner initially engages the CMc in an advisory capacity, to provide cost, schedule, and constructability advice to the design team. At some point in the design and documentation phases—as early as the end of schematic design or as late as after the permitting process—the CMc will use the available documentation to develop a guaranteed maximum price (GMP, or GMax). The project can benefit from the early participation of the CMc, and construction schedules may be accelerated. The Spearin Gap risks are mitigated, since the CMc has an active role in the design and documentation phases. The selection of the CMc is usually qualifications-based. To select subcontractors, the owner can use qualifications-based or value-based selection (for privately funded projects), or competitive bidding (for publicly funded projects). The AIA Standard Form of Agreement most often used with CMc is Document A133™–2009.

Design-build (DB) is fundamentally different from DBB, MP, DNB, and CMc in that the owner has one contract for both design and construction services. Design-build can be contractor-led, where the architect is engaged by the contractor; architect-led, where the contractor is under contract to the architect; a project-specific joint venture between a contractor and architect; or a firm that provides design and construction services. Under the DB method, the owner sheds all the Spearin Gap risks, since no "plans and specifications," as defined in the Spearin decision, are given to the DB entity. The AIA Standard Form of Agreement for DB is Document A141™–2004.

A variation of DB is *bridging*. With this method, the owner engages an architect to prepare design documents. These "bridging documents" are used by DB teams to prepare their proposals for completing the design and constructing the project. While bridging may give owners more design control, it may also give them more Spearin liability than with "pure" DB, since bridging documents are, to a limited extent, "plans and specifications."

Design-builders can be selected based on lowest competitive bid or the selection can be value-based, with other criteria, such as schedule and design quality, being considered in addition to cost. When DB can legally be used for publicly funded projects, a value-based selection process must use objective ways of scoring all the selection criteria.

Owners generally select DB for two reasons: They have reduced risk of schedule and cost overruns, and they have only one design and construction contract to administer.

The preceding delivery methods, from DBB through DB, show a progression toward greater integration of design and construction activities. *Integrated project delivery* (IPD) is intended to promote the greatest level of team integration. The fundamental concepts of IPD are that the owner, designers, and builders share common goals focused on the project, rather than on their individual interests; that the risks and rewards are shared equally among them; and that project success is measured against predetermined, objective targets.

IPD projects typically use a form of contract that binds the major participants—owner, architect, contractor, and sometimes major consultants and subcontractors—into a single agreement. The AIA Standard Form of Agreement for IPD is Document A195™–2008. Owners see IPD as a way to break down the barriers to collaboration inherent in the other delivery methods, and to use project success, rather than individual profit, as the goal of the project team.

PROCUREMENT DOCUMENTS

The procurement documents consist of three components: the project manual, the contract drawings, and the addenda.

The *project manual* contains the procurement requirements and text-based contract documents (owner-contractor agreement, conditions of the contract, and specifications). The *instructions to bidders* (AIA Document A710™–1997) tell bidders (or proposers) what constitutes a responsive bid. The instructions usually include the date when bids are due, the date and location of a pre-bid conference, the last date when bidders can ask questions, and the process for submitting questions. The *bid bond* form (AIA Document A310™–2010) guarantees that, should the low bidder withdraw after selection but before the execution of the contract, the owner will be reimbursed by the low bidder for the difference between the low bid and the next lowest bid. The *bid form* is the format for the bidders to present their cost, schedule, unit prices, or other required information. A bid with an incomplete bid form is nonresponsive.

The *owner-contractor agreement* stipulates contract conditions—cost of construction, project schedule, and scope of the work—between the owner and the contractor. The agreement can be an AIA standard form of agreement (such as AIA Document A101™–2009, with or without modifications), or an agreement developed by the owner. The AIA standard forms of agreement are coordinated with other AIA documents, such as the general conditions, the owner-architect agreements, and the architect-consultant agreements.

The *general conditions to the contract* set forth the rights, responsibilities, and relationships of the owner, contractor, and architect. The general conditions also define procedural requirements that will apply throughout the construction period. These include provisions for payments, modifications to the contract, insurance, and correction of defective work. AIA Document A201™–2007 is often the basis of the general conditions.

The *supplementary conditions to the contract* provide project-specific modifications to the general conditions. Because supplementary conditions are customized to meet the needs of each project, there is no AIA standard form; however, AIA Document A503™–2007 provides guidelines for developing them.

The *specifications* identify, in narrative form, the qualitative, performance, and installation requirements for products, materials, and workmanship, as well as the administrative procedures that govern each trade.

The *contract drawings* are the graphic illustration of the project. They show the size, form, and representation of materials and systems, and the relationships between them. The contract drawings are bound separately from the project manual.

The documents may need to be modified during the procurement period. These modifications are issued as *addenda*. An addendum can modify the drawings, the project manual, or both. Addenda can be issued in response to questions from bidders or proposers, or to reflect architect- or owner-initiated changes.

Additional documents, such as site survey, geotechnical report, or hazardous material survey, may be included with the procurement documents for bidders' information. If the architect (or architect's consultant) did not prepare these documents, clearly indicate on the documents that the architect is not responsible for the information they contain.

The instructions to bidders, bid bond, and bid form are procurement documents that are not included in the *contract documents*. When the owner-contractor agreement is executed, only the contract documents—the owner-contractor agreement, the general and supplementary conditions, the specifications, and the contract drawings—will be used during construction. The information issued as addenda is incorporated into the contract documents.

PRICE CATEGORIES

There are four categories of prices common to all the bidding approaches described above.

Construction Costs

Often referred to as "cost of the work," these are costs incurred by the contractor to build the project. This category may include:

- Labor costs for contractor's on-site supervisory/administrative personnel, and the contractor's workers executing the work
- Subcontractor contract amounts
- Contractor-purchased products incorporated into the work, including transportation, storage, handling, and insurance costs
- Allowances identified in the procurement documents
- Mock-ups and samples that do not become part of the work
- Specialized tools or equipment required to execute specific portions of the work
- Rental charges for tools and equipment
- Vehicle fuel
- Safety and security procedures and personnel
- Special training
- Temporary facilities, utilities, and controls, such as field offices, temporary heat and light, and signage
- Waste removal, recycling, and disposal
- Administrative costs, such as document reproduction and distribution, data processing, telephone and Internet charges, postal and delivery costs, submittals, and closeout costs
- Fees for permits, inspections, and approvals by the AHJs
- Field engineering and testing procedures
- Project coordination
- Mobilization and start-up costs
- Costs resulting from site restrictions, including off-site storage and parking
- Royalties, licenses, and fees to use specific patented designs or products
- Design costs for work delegated to the contractor or subcontractors
- Insurance and bonds
- Applicable taxes
- Deductions for discounts and rebates, salvage value of waste, and shared savings with the owner from value analysis

Contingencies

When contractors submit bids, they understand they may take on risks. To manage their risks, contractors will include some factor, or construction contingency, in their bid price to ensure they will not lose money on the project. The following are examples of occurrences that contingencies are intended to protect against:

- Incomplete documents, particularly for GMP contracts, as they are frequently based on in-progress documents. GMP contracts need to include lists of specific items included and excluded from the GMP's scope to recognize the level of document completion.
- Errors made in the contractor's pricing. Construction documents contain enormous amounts of information. Errors in pricing may be made, as contractors typically

have little time to prepare bids. The contractor tries to include a sufficient amount of contingency while submitting a bid that is low enough to be awarded the project.
- Anticipated costs that may be related to dispute resolution, legal fees, and claims against the client or subcontractors.
- Default or failure of a subcontractor or supplier to perform their portion of the work. Performance bonds may provide some protection from these costs, but delays or monetary losses to the contractor remain a possibility.
- Contractor errors during construction.

Owners often budget a project contingency, separate from the contractor construction contingency, to cover the costs for changes generated by the owner, unforeseeable site conditions and other compensable contractor claims, and design professionals' errors and omissions that fall within the professional standard of care. This project contingency is under the owner's control and is released to the contractor only for agreed-upon change order items.

Contractor's Overhead

Overhead costs are those required for the contractor to maintain a viable, ongoing business but not directly attributable to constructing an individual project. Those costs often include:

- Business licensing fees required to conduct business within a jurisdiction.
- Salaries, wages, and benefits for office, general management, marketing, and estimating, and other employees at the contractor's home office. These employees are distinct from the employees assigned to project field offices.
- General office expenses not directly related to a project or a project field office.
- General accounting, tax, and legal expenses.
- Property costs, rent, and property taxes associated with maintaining the home office.
- Leased or rented equipment and furniture not used at a project site.
- Office supplies.

Profit is the financial benefit to the contractor. It is the remainder of their payments from the owner after all costs and claims for the project have been paid.

DESCRIBING PRICES

The goal of the bidding and negotiation process is to determine the price a contractor will charge a client to construct the building described by the construction documents. There are five primary forms of bid prices:

- *Stipulated sum*. This approach is often referred to as a *lump sum* or *fixed sum bid*. The bid price is offered as a single-number value that represents all the costs required to build the project. The cost of construction, construction contingencies, contractor overhead costs, profit, bonds, and similar costs, are included in the stipulated sum. In many ways, this "single-number" price is the easiest for many clients to understand. Competitively bid projects, such as publicly funded, design-bid-build, or design-build projects, typically rely on this bidding approach.
- *Guaranteed maximum price*. Also known as GMP or GMax, the guaranteed maximum price is the cost of construction that the contractor assures the client that the project will be built for. In its most typical form, the GMP is developed by the contractor before the completion of construction documents. By determining the price of the work early in the design process, the client can gain a better understanding of costs, negotiate favorable prices, and engage the contractors to control costs. At the same time, the client assumes some risk because construction documents are incomplete and all aspects of the project may not be known. Therefore, the GMP includes line item prices and allowances for the cost of the construction described in the

documents, contingency costs for construction reasonably assumed to be required based on the documents, fees, and contractor overhead and profit. An "open book" accounting process with contractors and subcontractors enables the client to be informed of material prices, overhead costs, and the status of contingencies. The GMP process is often used for projects requiring accelerated schedules. A price can be determined before the completion of construction documents to increase schedule flexibility. With a GMP, early bid packages can be issued to subcontractors, allowing procurement of materials and equipment as well as construction of certain trades while design continues on others.

- *Cost plus*. Also known as *time and material* or *T&M* pricing, this approach is based on the actual cost of the work. The contractor and subcontractors provide the client a detailed accounting of the cost of materials, equipment, and systems included in the project. The labor to construct the project is reimbursed at predetermined hourly rates for actual hours expended. Contractors often receive overhead and profit payments at a fixed rate. This approach is often used for small-scale projects, projects where existing conditions may be unknown, where the scope of construction is difficult to define, or for change orders within a stipulated sum or GMP.
- *Unit prices*. Unit prices are frequently used when a project's full scope of work is unknown. The costs for each specific unit of work, including materials, labor, fees, overhead, profit, and similar factors, are defined in the owner-contractor agreement. The contractor is compensated for the number of units of each system constructed based on unit prices. The unit prices provide an objective basis for determining prices for changes of scope.
- *Target price*. In each of the above approaches to bid a project, the owner's goal is to identify the lowest cost for a defined scope of work. The bidding process can also be used to accomplish the opposite purpose, to identify the greatest project scope that can be built for a given construction cost, or target price. Target pricing is used most often for design-build projects, where the owner identifies the construction cost as part of the procurement documents. A design-build team that can provide the most scope for that cost is then awarded the project. Target pricing is also a term used for a specific method within the lean construction process.

THE BIDDING PROCESS

Federal, state, and local procurement laws often require publicly funded projects to be competitively bid, with the lowest responsive and responsible bidder being selected to build the project. Some jurisdictions allow contractors for publicly funded projects to be selected through a value-based selection (VBS) process. Using VBS, a public client considers other, more subjective criteria—such as schedule, quality, and contractor personnel—in addition to the bid amount when selecting a contractor. For VBS to be successful, an objective way of evaluating subjective criteria needs to be established. In some jurisdictions, clients for publicly funded projects are required to solicit bids from multiple prime contractors. Management of the multiple prime contractors may be assigned to one of the prime contractors or to a construction manager–adviser (CMa). Contractors may be allowed to submit bids for more than one major category of work. Combined bids for several trades that are lower than the aggregate bid total for those trades can be awarded a combined contract.

Private sector clients rarely have the legal restrictions limiting their bidding process options that public sector clients do. Fairness and objectivity should guide private sector clients when soliciting and evaluating bids to ensure that reputable contractors prepare bids for their projects. Private sector owners can use a qualifications-based selection (QBS) process, in which the contractor is selected on the basis only of the contractor's qualifications for performing the work.

A number of major differences distinguish the bidding process for privately funded projects:

- Prospective contractors may be prequalified or preselected based on client-defined criteria.
- "Invitation only" bids may be solicited.
- Enforcement of bidding rules and deadlines may be more flexible.
- Clients are not required to award the contract to the lowest responsive and responsible bidder but may weigh other criteria in the selection.
- The bids received can remain private and not be made public.
- The client may reject any of the bids for any reason.

If the bids exceed the project budget, private sector clients may negotiate with any of the bidders to arrive at a final bid amount. This is not possible for public sector clients.

QUALIFICATIONS OF PROSPECTIVE BIDDERS

Private sector clients may use a number of criteria to prequalify contractors, including:

- Financial responsibility and capacity
- Ability to provide the required bond security during the bid process
- Ability to secure performance and payment bonds required by the contract
- Payment of taxes and other obligations to public authorities
- Ability to secure insurance required by the contract
- Demonstration that current workload allows the project to be properly staffed
- Previous experience with projects of similar scope
- Special training, licensing, or certification
- Experience of personnel
- Specialized equipment, construction processes, or techniques
- History of claims and disputes

DISTRIBUTION OF PROJECT INFORMATION

To demonstrate to bidders that the bidding environment is fair, all information regarding the process must be readily available to all prospective bidders. Complete written and graphic documents must be distributed equally, at the same time, to all bidders. All supplemental information, addenda, or additional instructions must be communicated simultaneously to all bidders.

Common ways to distribute documents and information to all bidders include:

- Providing documents and information at the client's or the architect's office
- If bidders are known through invitation or prequalification, sending documents directly to the prospective bidders
- Making documents available for purchase by prospective bidders at a printing company, builders exchange, or similar distribution point
- Allowing bidders to acquire electronic versions of documents through project websites

The cost of printing sets of bid documents may be paid directly by the client or by the architect as a reimbursable expense. The owner-architect agreement often defines how to address this cost.

The client may choose to charge bidders for the cost of printing. Charging for printing costs is common when bidding is open to all contractors, but usually not for invited or prequalified bidders.

Bid documents may be disseminated electronically. This has the following potential advantages:

- Savings in project costs, printing costs, and architect's fees.
- Information is shared more quickly with the bidders.

- This is a more environmentally sustainable process.
- Lists of bidders are easily compiled.

Regardless of the bidding process used, an information control plan established by the client and the architect should guide the bidding process. The plan should:

- Be consistent with disclosure or privacy policies.
- Clearly define the document distribution process.
- Define a quality control process to allow all bidders to receive the appropriate information.
- Provide supplemental information to bidders in a timely and fair manner.
- Maintain integrity in the secure exchange of project information.
- Provide that oral inquiries are documented and responses distributed to all bidders in a timely and fair manner.

QUESTIONS DURING THE BID PERIOD

Requests for Information (RFIs)

During the bidding period, bidding contractors may have questions about the project, the documents, or the bidding requirements. The procurement documents should define procedures for contractors to submit questions to the owner (or the owner's CM adviser) or the architect. These request for information (RFI) procedures should also be discussed in the pre-bid meeting. One person, who may be the owner, the CMa, or the architect, should be designated to receive all RFIs.

RFI responses must be distributed to all bidders, not just to the bidder requesting the information. RFI responses are not part of the contract documents unless they are issued as an addendum to all bidders.

Substitution Requests

The procurement documents will usually allow bidding contractors to propose alternatives to specified products, suppliers, or systems. Such proposals are defined as substitution requests. The instructions to bidders should define the information required to be submitted to allow the architect to properly evaluate a substitution request.

▶ Construction Phase Services (10.9) further explores the architect's services during project construction.

The proposed substitution information should include:

- A substitution request form, provided in the procurement documents, must be completed by the bidder making the substitution request.
- The bidder proposing the substitution must provide documentation that demonstrates compliance with the performance criteria and design intent of the contract documents, including:
  - A statement indicating why the specified product, fabrication, or installation cannot be provided.
  - Coordination information, including a list of all changes to other portions of the work that will be necessary to accommodate the proposed substitution.
  - A list of all modifications needed to other parts of the work, including construction performed by the owner and separate contractors.
  - Detailed comparison between the significant qualities of the proposed substitution and those of the work specified, including an annotated copy of all applicable specification sections. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and other specific features and requirements indicated.
  - Product data, including drawings and descriptions of products and of fabrication and installation procedures.
  - Samples of the proposed product, where applicable or requested.
  - Certificates and qualification data, where applicable or requested.

- A list of similar installations in completed projects with project names and addresses, along with names and addresses of the projects' architects and owners.
- Material test reports from a qualified testing agency indicating compliance with specified requirements.
- Research reports showing compliance with applicable building codes.
- A detailed comparison of the proposed and specified products, relative to their effects on the contractor's construction schedule.
- A letter from the manufacturer stating the lack of availability or delays in delivery that will not allow the specified product or method of construction to be provided within the contract time.
- The contractor's certification that the proposed substitution complies with the requirements in the contract documents, except as indicated in the substitution request; that it is compatible with related materials; and that it is appropriate for applications indicated.
- The contractor's waiver of rights to additional payment or time that may become necessary because of failure of the proposed substitution to produce indicated results.

All responses to a substitution request, either acceptance or rejection, must be distributed to all bidders and issued in an addendum to the bid documents, making it part of the contract documents.

Addenda

Responses to RFIs and substitution requests received from bidders, as well as construction document revisions generated by the owner/architect team, must be included in addenda to be considered part of the contract documents. To have a responsive bid, each bidder must acknowledge receipt of all addenda. Information in the addenda that modifies the contract documents will be incorporated into the owner-contractor agreement. The instructions to bidders should stipulate a date after which no RFIs or substitution requests will be considered. This will give bidders sufficient time to include addenda modifications in their bids.

AIA Contract Document G804™–2001, Register of Bid Documents, is available to track the distribution of addenda.

PREPARING AND SUBMITTING A BID

Contractor

Bidders are typically contractors, although in some cases vendors may be considered bidders. Contractors submit a price for the complete construction of a specific scope of work defined in the contract documents. Contractors incorporate bids from subcontractors and suppliers in their bids.

Contractors invest significant amounts of time and money in the preparation of bids; it is crucial that requirements be followed to avoid bids being disqualified. In most cases, a bid is disqualified for one of two reasons: The bid is late, or it's incomplete.

The instructions to bidders must stipulate the exact form, time, and location for the acceptance of the bids. These rules must be strictly followed. For publicly funded projects, bids not adhering to the requirements are typically disqualified and not opened. Privately funded projects do not have the legal requirement to disqualify late bids, but in the interest of fairness, it is good practice for them to be disqualified.

The instructions for completing the bid form must be clear, so they can be easily followed by all the bidders. Each contractor must submit a clear and complete bid. The required information includes, at a minimum, an acknowledgment by the contractor of all bid documents used in preparing the bid, the bid price, and the completion date for the project. Additional information is often required, including separate prices for phases and alternates, specific unit costs, proposed staffing, and lists of subcontractors and suppliers. For publicly funded projects, failure to provide all required information is often the basis to automatically disqualify the bid as incomplete.

Subcontractors

Subcontractors are companies that do a specialized portion of the overall work for a contractor.

All the pricing categories used by contractors (e.g., construction costs, contingency, overhead, and profit) are common to subcontractors. Subcontractors may also solicit bids from sub-subcontractors or suppliers.

The owner/architect team provides procurement documents only to the bidding contractors, unless the owner is also acting as the construction manager or contractor. The bidding contractors must provide construction documentation to bidding subcontractors to allow complete and thorough subcontract bids. This documentation should include all procurement documents and addenda that apply to the subcontractor's trade.

There are no requirements in the bid documents that stipulate the form for subcontractors' bids to contractors; this is the contractor's responsibility to determine.

Suppliers

Suppliers provide manufactured products or systems to subcontractors and, in some cases, the contractor. Typically, suppliers do not provide the labor required to install products or build the project; the supplier's work is limited to supplying the products.

EVALUATING THE BIDS

Opening the Bids

As bids are received, the architect or the owner's representative should stamp each bid with the date and time of receipt (using clocks synchronized with national time standards). Any bid received after the stipulated time of bid should be returned to the bidder unopened.

After the time stipulated for their receipt, all qualified bid envelopes are opened. For publicly funded projects, the bid opening is often required to be in a forum open to the public, including the bidders. The bid forms should be quickly reviewed to determine that all required information is provided. Any incomplete bid forms are disqualified as nonresponsive. All properly completed bid forms are often read aloud. Final evaluation by the owner and architect may take days or weeks following the opening, depending on their complexity. Since the bid award process is subject to public scrutiny, the final selection of the successful bidder must be objective. This objectivity especially applies to the selection of bid alternates; alternates cannot be selectively chosen to give any bidder an advantage.

Bid openings for privately funded projects are not required in a public forum. The bids may be opened privately by the owner, often with the assistance of the architect. Final selection of the successful bidder may be completely at the discretion of the owner. The architect should reveal the results of the bids only at the approval and direction of the owner.

Tabulation and Evaluation of the Bids

Once the responsive and responsible bids have been opened and read, the bid administrator (owner, construction management consultant, or architect) will tabulate all the pricing information for a comparison of pricing information. The bid tabulation form should identify each bidder's name, address, and phone number; the contract being bid; the form of bid security provided; the base bid; unit prices; and alternates. For complex bids, all line items and attachments must be carefully scrutinized to see that there are no errors. Determination of the low bidder may require detailed evaluation of alternate pricing, proposals, and attachments. Systematic evaluation will foster accuracy and reduce the likelihood of challenge by unsuccessful bidders.

If the bid amount of one bid is significantly lower than the others, this may be an indication of errors in the low bid. For a publicly funded project, the owner must have strong justification that the bid is erroneous before rejecting it. Even then, there is a risk of a legal challenge by the unsuccessful bidders. The owner of a privately funded project is not required to accept the low bid, and may choose to reject a significantly low bid rather than risk having to deal with the consequences of a contractor who cannot meet the bid commitment.

The time and effort required to evaluate bids depends on the number of bidders, the number of required supplements, and the complexity of the information required on the bid form.

Award the Contract for Construction

Following the evaluation of bids or the conclusion of negotiations, the owner will award a contract to a contractor. The owner-contractor agreement can be one of the standard AIA contracts, modified to meet the conditions of the project, or a custom contract prepared by the owner's legal counsel may be used. It is important that the architect be involved in the development of the owner-contractor agreement to determine if it is consistent with the provisions of the contract documents, general conditions, and the owner-architect agreement. Clauses and conditions that prevent the architect from performing its contracted duties must be brought to the owner's attention.

Before executing the agreement with the owner, the successful bidder or negotiated contractor will have to submit proof of compliance with builder's risk, workers' compensation and related insurance requirements, a performance and payment bond (if required), and evidence of compliance with licensing laws and incorporation in the state of the project. For publicly funded projects, evidence of compliance with equal employment opportunity laws in the project's jurisdiction is often needed.

Upon completion of these negotiations, an agreement is executed and the contractor is given the authorization to proceed with construction of the project.

CONCLUSION

In this section, we've discussed how each delivery method affects the bidding process; what constitutes the procurement documents; the various methods for categorizing and describing construction pricing; and the processes to follow during bidding or negotiation. We've considered some of the benefits and risks associated with bidding or negotiation, and why owners would choose one process instead of the other. And we have reviewed the procedures for evaluating bids, for negotiating with potential contractors, and for selecting the contractor to build the project.

For More Information

Project Delivery Practice Guide (McGraw-Hill, 2011) by The Construction Specifications Institute.

The Project Resource Manual, 5th edition (McGraw-Hill, 2005) by The Construction Specifications Institute.

The Design-Build Library, Volume I: Design-Build Essentials (Delmar Cengage Learning, 2011) by Barbara J. Jackson, Ph.D, DBIA.

Official Guide to the 2007 AIA Contract Documents (Wiley, 2009) by The American Institute of Architects.

Project Delivery Systems for Construction (AGC, 2004) by The Associated General Contractors of America.

The Architect's Guide to Design-Build Services (Wiley, 2003) by The American Institute of Architects.

10.9 Construction Phase Services

James B. Atkins, FAIA

Construction phase services involve the architect's evaluation and reporting of the progress and quality of the work and its conformance to the design intent expressed in the contract documents. Delivery of these services requires knowledge and control of the project scope and access to the work in progress.

The construction phase is the physical realization of the architect's design. At this point the project scope has been fixed with the publication of the contract documents, the contractor has been selected and placed under contract, and any further design ideas or scope changes will likely cost additional money. The primary objective from this time forward is to deliver contract administration (CA) services and work with the contractor toward providing the owner with a successful project that substantially conforms to the design concept.

Architecture starts when you carefully put two bricks together. There it begins.

—Ludwig Mies van der Rohe

The need for CA services has evolved during the past half century from a passive "Call me if you need me," to a more interactive monitoring, review, and decision-making process. With routine bombardment of value analysis, also known as value engineering (VE), substitutions, product availability challenges, increased variations in workmanship quality, and more new untested products, the architect's need to monitor the design is greater than ever. Moreover, at least 17 states currently require registered architect involvement during construction for projects that require a professional seal. Another compelling reason to stay involved through project completion is because almost all claims against design professionals arise during the construction phase. If AIA parameters are followed and architects actively participate in CA, there is a greater chance of lowering risks while achieving design goals.

If AIA parameters are followed and architects actively participate in CA, there is a greater chance of lowering risks while achieving design goals.

PROACTIVE CONTRACT ADMINISTRATION

Architects control the degree of their involvement during construction based on assessment of project needs. Since the AIA documents require the architect to visit the site at intervals appropriate to the stage of construction, the architect must determine the number and frequency of site visits, unless the services contract requires otherwise. This is consistent with the standard of care, the measure by which design professionals are judged under the law.

If the project is small, if the owner has its own administrative staff, or if the contractor is aggressive and largely controls the administrative processes and documents, it is easy to rationalize that the project requires less interaction and thus a more passive administrative effort may be appropriate. This approach may be successful when the team members are good friends or if the project is a prototype and is being constructed repeatedly, but under most circumstances the project and the architect will be better served with proactive involvement.

BENEFITS OF PROACTIVE CA

Proactive CA can produce greater value for the owner and contractor as well as the architect, and it can include the following benefits:

- Promotes a "trusted advisor" relationship with the owner
- Increased influence on work acceptability through active participation in problem and conflict resolution
- Increased design control through input on owner- or contractor-proposed scope changes
- Opportunities to correct errors or omissions in the contract documents before the work is completed, reducing risk
- Fewer chances for owner-accepted nonconforming work

James B. Atkins provides project management and litigation support services. As a senior principal in an international design firm for over 30 years, he was responsible for construction phase services supporting the delivery of over $20 billion of construction.

Accomplishing Proactive CA

Proactive contract administration begins when the project commission is received, and it is more easily achieved through the following:

- Prior to executing the services agreement, help the owner understand the importance and benefits of having the architect-of-record perform construction phase services.
- Include full construction phase services in the owner-architect agreement.
- Take an active role in the administrative processes.
- Attend all owner project meetings.
- Update the owner appropriately.
- Be responsive.
- Maintain good relationships.

The need for a registered architect providing construction phase services has been acknowledged and is currently required by law in 17 states, and other states are considering adoption. Therefore, it is likely that another architect will be providing CA services on a project if the design architect does not. Proactive contract administration involvement in a project provides many benefits and makes it easier for the architect to fulfill key contractual responsibilities during the construction phase.

Seventeen states currently require that a registered architect provide CA services on projects with a registered professional's seal.

Even the most complex and difficult projects run more smoothly when a good relationship exists among project team members. When all team members work to the benefit of each other, disputes are reduced and problems are solved more easily and quickly. The architect should approach the construction phase with this in mind.

PREPARING FOR THE CONSTRUCTION PHASE

The architect's CA services are typically determined before the owner-architect agreement is executed, and the agreement reflects the specific services agreed upon. However, at this point in the project the owner may not yet have decided on the type of project delivery, and before construction begins it is advisable to confirm that the contracted CA services are appropriate.

If the owner does not understand the services required and does not have retained or in-house experienced owner representation, it may be beneficial to meet and review contracted services and any related construction phase services the owner may need.

Project Delivery Determines CA Services

Project delivery options such as design-build, construction manager as adviser (CMa), and integrated project delivery (IPD) require construction phase services that differ from the traditional model. For example, in contractor-led design-build, the architect works for the contractor and does not determine substantial completion.

AIA Document G704DB™–2004, Acknowledgment of Substantial Completion of a Design-Build Project, is a form of owner's certificate of substantial completion because, according to the document's instructions, "the project owner assumes many of the CA duties performed by the architect in a traditional project." In the AIA CMa documents, the construction manager–adviser shares position with the architect on the project, and AIA Document G732™–2009, Application and Certificate for Payment, Construction Manager as Adviser Edition, anticipates that the architect and the construction manager-adviser may certify a different amount than that applied for, with each initializing the figures that have been changed and providing explanation(s) accordingly.

CA services required for a particular project delivery method can be determined by reviewing the AIA documents provided for that purpose.

Consequently, when administering a project under a delivery option that departs from the traditional design-bid-build, one must follow the AIA documents to determine the construction administration services required for that particular delivery model.

It is an exciting time for architects as the bright line of traditional CA progressively blurs into integrated project delivery. Activities such as submittal review that have already diminished with design-build will disappear altogether as specific products are selected before the documents are completed and manufacturer-provided detail files are integrated into the building model. Other activities, such as determination of work conformance, will likely continue as long as registered architects design projects, but this may ultimately be accomplished without going to the site as technology continues to enable.

Although this article addresses contract administration from the traditional design-bid-build application, developing changes in emerging project delivery practices will be addressed along the way. Please be aware that since all projects vary, actual contracted project conditions may not be specifically addressed.

AIA DOCUMENTS FOR PLANNING PROJECT DELIVERY

The AIA provides documents that can assist in gathering information and organizing project delivery.

AIA Document G612™–2001 Owner's Instructions to the Architect Regarding the Construction Contract, Insurance and Bonds, and Bidding Procedures is a questionnaire used to obtain information from the owner necessary to arrive at a construction contract through the bidding process. It is a three-part document, and Parts A, which relates to contracts, and B, which relates to bonds, should be completed with the owner as early as possible in the project. Part C, which relates to bidding procedures, should be completed with the owner prior to the completion of the construction documents. If the contractor is to be selected through negotiation only, Part C need not be completed.

Provided that this document has been completed, essential information related to the construction phase can be found: type of construction contract, general conditions to be used, requirements for payment retainage, and construction start and completion dates. This document will greatly aid in planning and scheduling construction phase services.

AIA Document D200™–1995, Project Checklist is a checklist that identifies tasks and data necessary to fulfill assigned project responsibilities. It can also serve as a permanent record of owner, contractor, and architect decisions. Parts 1 through 5 relate to the architect's services through completion of the construction documents. Part 6 of the document relates to bidding or negotiation, Part 7 relates to construction contract administration, and Part 8 relates to post-construction services. Part 7 can be used initially to plan construction phase duties and activities, and later as a checklist as the actions and events are completed.

Confirm CA Services

The contract administration services described in this article are based on a design-bid-build (DBB) project delivery. While basic contract administration services can be applied in some way to all projects, specific services and applications will vary depending on the delivery model. In preparation for the construction phase, it is good to review contracted CA services with the owner to be sure that expectations align.

The architect's construction phase services are typically described in these documents:

- Owner-Architect Agreement
- General Conditions
- Supplementary General Conditions
- Specifications Division 1

If the owner has a different understanding of the contracted CA services, or if an owner's representative is involved with conflicting tasks, resolve the issue through discussion. This is a good opportunity to help the owner understand the purpose and benefits of the architect's CA services. Should the meeting result in a change to contracted services, an amendment to the agreement will be required.

A few issues worthy of discussion that may affect the services fee are:

- Number of shop drawing reviews per submittal
- Submittal schedule (check to be sure it is included)
- Extensive punch list requirements
- Extensive site visits

▶ Owner-Generated Agreements (17.3) discusses a systematic approach to evaluating terms in agreements provided by owners.

Confirm Construction Agreement

Architects must have a copy of the owner-contractor agreement and its general conditions in order to provide CA services, since they cannot administer a contract unless they know what it requires. Best practice is to obtain an executed copy of the agreement and its general conditions and check for conflicting requirements that could prohibit provision of the architect's contracted services.

▶ See Construction Contracts (17.4) for further discussion of the construction agreement, general conditions, and other parts of the construction contract.

When the architect is retained on a project, the current edition of AIA Document A201™–2007 is typically referenced in the owner-architect agreement. However, when the contractor is retained, differing general conditions may be negotiated. This is more likely to occur if the contractor is retained first or if the architect is not involved with construction procurement. If AIA documents are used, services are more likely to be consistent throughout.

If the contractor's negotiated general conditions differ from AIA Document A201™–2007, determine if the differences will affect the architect's contracted services or if there are conditions that are detrimental to the owner and/or not in accordance with good construction practice. If conflicting or prohibitive differences are found, meet and resolve the differences with an appropriate amendment to the agreements as required.

Examples of significant variations from the AIA General Conditions that could affect the architect's ability to provide CA services include:

- Unreasonably short submittal review time
- Change order execution without the architect's approval
- Excessive site visit requirements
- Deletion of submittal review

Some owners are reluctant to provide the architect with a copy of the owner-architect agreement because they do not understand that the specific duties of an architect when administering a construction contract are determined by how the construction is contracted. Should attempts to help the owner understand this fail, and a copy of the contract cannot be obtained, inform the owner that the most relevant AIA agreement documents will govern the architect's services until the executed agreement is provided. This will assist in protecting the architect from errors or omissions in CA services.

An executed copy of the owner-contractor agreement is required for the architect to determine which CA services are appropriate for the project.

Information Management

The exchange of information is the administrative vehicle for project delivery. The owner, architect, and contractor engage in an elaborate and complex exchange of information that involves a building program, design illustrations, construction documents, planning information, technical interpretations, financial supporting data, and ultimately acceptance and approval notices, to name only a few of the documents exchanged. The speed and efficiency of the exchange directly affects the efficiency of project delivery.

Since construction is the physical manifestation of the project, information required by the contractor often takes precedence. However, the information required by the owner and architect is no less critical or important. If the architect does not receive sufficient information from the contractor on the work completed, sufficient information on payment certification cannot be given to the owner, and sufficient information by the owner for the transfer of money to the contractor cannot be provided.

The exchange of information is the administrative vehicle for project delivery.

Project Requests for Information

Perceived delays or failures in the transfer of information in the past has generated a tracking document descriptively called the request for information (RFI), designated as AIA Document G716™–2004. It originated in the 1970s to document the architect's answers and response time to questions from the contractor.

The RFI is also useful for tracking the information provided by the contractor, such as the submittal schedule, the construction schedule, the list of subcontractors, and contractor change pricing, to name a few. Since information is required from all parties during construction, the owner, architect, and contractor can all use AIA Document G716™–2004 to document the exchange of information.

Since the exchange of RFI information is often time-sensitive and can carry a higher risk, documentation of processing time and activities is advised. A variety of data management software is available for this purpose.

▶ Information Management and Services (5.12) addresses information management practices and technology-based services.

Team Assignments

In a larger office, some team members may be reassigned after document preparation has been completed. An in-house meeting is appropriate to review construction phase roles and responsibilities, as well as such other relevant issues as:

- Construction phase team assignments
- Atypical (non-AIA) contract conditions
- Unique project design features
- Delivery challenges such as fast-track and CM involvement
- Designated in-house submittal reviewers
- RFI routing and responses
- VE substitution processing
- Special labor requirements for document changes and project reviews
- In-house filing and document storage

Consultants

It is important that architects and consultants understand and agree on construction phase responsibilities. This should have been resolved at the time the consultants were retained, but it is a good idea to confirm required services before the start of construction.

Issues such as site visits, site observation reporting and report format, meetings and meeting reports, project communication protocols, submittal procedures, and payment certification requirements are among topics to discuss. If consultants are contracted directly with the owner, services and processes may vary significantly. It is important to meet and work out all of the details prior to start of construction.

Should the consultant be contracted under a non-AIA agreement form, it may be necessary to amend the agreement to accommodate appropriate CA services.

Preconstruction Conference

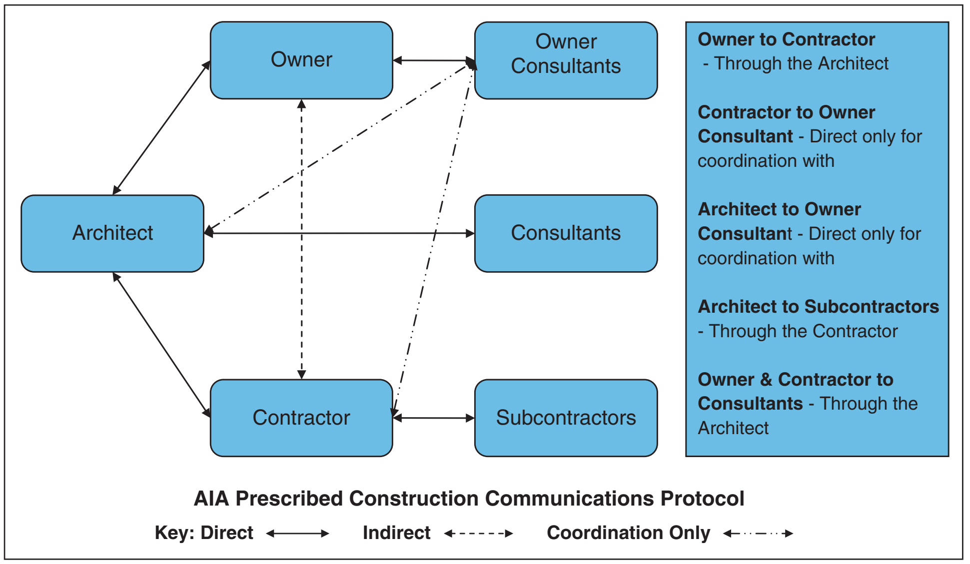
The preconstruction conference is perhaps the most important meeting during the construction phase, and preparing for the meeting is as important as the meeting itself. Since the essential administrative processes during construction—change order preparation and processing, submittal approval, determination of work conformance, and payment certifications—are controlled by the architect, it is advantageous that the architect conduct the meeting.

Preparation for the meeting should include advance distribution of the proposed meeting agenda to allow participants to have input on discussion topics. (See sidebar for a sample preconstruction conference agenda.) It is also a good time to confirm that the contractor will be providing up front required information such as the name of the superintendent with work qualifications, list of subcontractors, the construction schedule with coordinated submittal schedule, schedule of values for payment applications, insurance bonds and permits as required, and any other information requiring review prior to the start of construction.

The communications protocols are established in the preconstruction conference. See Figure 10.27 for the communications protocol during construction. Proper communications are essential in order to avoid miscommunications and unauthorized directives.

PRECONSTRUCTION CONFERENCE AGENDA

I. Introductions
  A. Communications/contact information
II. Project start-up requirements
  A. List of subcontractors and material suppliers
  B. Schedule of values
  C. Construction schedule
  D. Submittal schedule
  E. Site usage/access
  F. Quality control
III. Bonds and insurance
  A. Bonding
  B. Insurance
IV. Project procedures
  A. Shop drawings, product data, and samples
  B. Payment applications
  C. Changes in the work
  D. Requests for information
  E. Time extensions
  F. Closeout requirements
V. Site observations
  A. Scheduled visits
  B. Reporting
  C. Nonconforming work
VI. Miscellaneous items
  A. Separate contracts by owners
  B. Partial occupancy
  C. Field office
  D. Project sign or banner
  E. Owner requirement for certifications
  F. Other



James B. Atkins

FIGURE 10.27 Construction Communications Protocol

It is important that all project team members understand the lines of authority for administering the construction phase processes and contract requirements. This can be facilitated by a *project authority matrix*, as shown in Table 10.13.

Notice to Proceed

The Notice to Proceed letter can be sent by the architect on behalf of the owner and at the owner's directive.

Construction typically starts with the notice to proceed, which is an owner's authorization typically given in letter format. It can be sent by the architect on behalf of the owner at the owner's directive, and it should include the requirements for completion as stated in the owner-contractor agreement. See sidebar for a sample Notice to Proceed letter. The architect does not have the authority to direct the work to proceed.

TABLE 10.13 Project Authority Matrix (per AIA Document A201™–2007)

Items to Be Approved	Owner	Architect	Contractor
Construction change directives	✓	✓	
Change orders	✓	✓	✓
Work conformance	✓	✓	✓
Nonconforming work	✓		
Project completion schedule	✓		✓
Project submittal schedule		✓	✓
Submittals		✓	✓
Applications for payment			✓
Certificates for payment		✓	
Special testing	✓		
Minor no-cost changes		✓	
Substitutions	✓	✓*	
Substantial completion		✓	
Final completion		✓	

Note: ✓ Owner may accept substitutions that architect rejects.*

SAMPLE NOTICE TO PROCEED LETTER ABLE ARCHITECTS

Mr. Max Velocity

Broadway Builders

7139 Corinth Street

Surfside, Colorado 80956

Project name: Vesey Village

Project number: 97006

RE: OWNER'S NOTICE TO PROCEED

Dear Mr. Velocity:

The owners, Swansong Developers, have directed me to send this NOTICE TO PROCEED on the referenced project. You are hereby authorized by the owner to proceed with the work of your contract for the construction of Vesey Village. In accordance with your contract with Swansong Developers dated April 15, 2013, you have agreed to complete the contract as stated below.

Contract amount:	$24,556,811
Construction time:	385 calendar days
Commencement date:	(insert date)
Substantial completion date:	(insert date)

Please confirm in writing the date you have commenced construction.

Best Regards,

Chris Wren

Chris Wren, AIA

Principal

cc: John Sawyer, Swansong Developers

ADMINISTRATION OF THE CONSTRUCTION CONTRACT

The architect's services during construction are prescribed in the owner-architect agreement. The architect should perform all of the construction phase services required in the agreement unless the owner waives specific services. If owner-waived services are necessary to meet the architect's standard of care, advise the owner in writing and provide the services. If the services are not required to meet the standard of care, the owner directive should be documented in writing, indicating the date given and the specific services waived.

A review of the architect's contract administration (CA) contracted services is required in order to determine which specific services are necessary. If doubts arise, consult your professional liability insurance agent for assistance.

Project documentation should support that all the CA services required by the contract have been provided unless otherwise waived. File all reports and respond to all administrative communications so that the full delivery of services cannot be questioned. See Table 10.14 for the architect's tasks required by each project activity, along with the documents that are produced.

Site Visits and Observations

The purpose of site visits is to observe the progress and quality of the work, determine its conformance to the design, and report findings to the owner. AIA Document A201™–2007, General Conditions of the Contract for Construction, is clear on this charge, and agreeing to more stringent requirements in the services agreement can increase risks and affect insurability. Use caution and seek appropriate counsel when agreeing to wording other than that prescribed in the AIA documents.

The number of visits provided is typically up to the architect in his or her determination of the "intervals appropriate to the stage of construction." If the contractor is not adequately managing the work, they often request the architect be on site more often to address unanticipated "discoveries." Also, owners may feel that more frequent observations by the architect will be more beneficial. Explain to the owner that increased site visits will not assure the detection of all nonconforming work.

A suggested approach in controlling site visits is to establish a specific number of site visits in the services agreement, with any additional visits provided at a unit price. Many of the AIA owner-architect agreements and related scope documents contain a

TABLE 10.14 Architect's Contract Administration Tasks/Documentation

Activities	Tasks	Documentation
Preconstruction conference	Review administrative procedures Review contractor's construction schedule Review contractor's submittal schedule Review contractor's required submittals Review schedule of values Review quality control/testing procedures Review allowances/contingencies Review bond requirements	Preconstruction conference report Administrative procedures manual (optional)
Construction	Conduct scheduled site visits Monitor progress and quality of work Determine work conformance Participate in project meetings Issue site observation reports Send/answer RFIs Review contractor submittals Review value analysis substitutions Prepare change orders Review applications for payment Issue work change proposals Monitor allowances Monitor contingencies Monitor progress and quality of work Approve minor changes Review quality control reports Cooperate with owner's consultants Review change order pricing	Site observation reports Project meeting reports Work changes proposal requests Change order recommendations Change orders Construction change directives Supplemental instructions Requests for information Certificates for payment Action item lists Document logs
Substantial completion	Inspect project for substantial completion Review contractor's punch lists Prepare certificate(s) of substantial completion Document owner-accepted nonconforming work Monitor building start-up and commissioning	Amended punch lists Certificate(s) of substantial completion
Closeout conference	Review contractor closeout documents Review record documents Receive contractor written notice of final completion	Closeout lists Transmit record drawings to copy owner
Final completion	Inspect project for final completion Review final closeout documents Review final application for payment Reconcile allowances and contingencies Prepare final change order	Final change order and final application and certificate for payment to owner
Contractor's warranty	Review compliance completion items (if requested by owner)	Letter to general contractor citing warranty corrections required
One-year follow-up review	Review warranty items to be completed or corrected prior to end of warranty (if requested by owner)	List of outstanding warranty items to owner

fill-in space for the number of site visits; however, a specific number can be specified in any owner-architect agreement.

It is helpful to have a reduced set of drawings when walking the site, and the iPad and tablet PC allow the observer to not only have a full set of project documents at the fingertips but also take digital images for records. Just be sure that any nonconforming work discernible in the image is appropriately noted.

Site observation reports reflect the status of construction at the time of the site visit, and the wording should accurately reflect the construction. For example, the architect may observe roofing work that appears to be complete. If the report states, "The roofing has been completed," and there is uncompleted roofing elsewhere on the project, the reader could reach an erroneous conclusion. It is more prudent to state, "The roofing on the building appears to be completed" to avoid a misunderstanding.

Observed nonconforming work should be noted in the report and tracked until it has been resolved. The architect is authorized to reject any observed nonconforming work.

Site observation reports should be dated, sequentially numbered, and distributed to designated parties. It is advisable to use the same reporting format, even if multiple observers submit reports. AIA Document G711™–1972, Architect's Field Report, is available to document and report site visits. The form can also be used as a daily log for a full-time project representative.

Firm size can affect the amount of documentation during the CA phase. While larger firms often have the resources for more elaborate site observation reports and an extensive administrative infrastructure for extensive documentation and filing, the sole proprietor and the small office must administer projects with a more austere support system.

While each project is different in its requirements, the basic documentation required for many projects could include:

- Meeting reports (or response to report) on all meetings
- Site observation reports with all site visits (one page minimum)
- Copies: submittals, RFIs, key correspondence, change orders, architect's supplemental instructions (ASIs), contracts, consultant-issued documents, owner directives, payment certifications, certificates of substantial completion, etc.

The Architect's Project Representative

The traditional role of the architect's on-site project representative has evolved over the years, and because of the variations in services the AIA has discontinued the publication of AIA Document B352™–2000, Duties, Responsibilities and Limitations of Authority of the Architect's Project Representative.

If additional on-site representation is a part of the architect's services, specific responsibilities can be included in the owner-architect agreement. AIA Document B101™–2007, Standard Form of Agreement Between Owner and Architect, in Article 4, Additional Services, lists "On-site project representation" in the additional services table under §4.1.12. A similar listing can be found in AIA Document B103™–2007, Standard Form of Agreement Between Owner and Architect for a Large or Complex Project. Otherwise, additional on-site representation can be described in "other services."

The on-site project representative typically provides a greater on-site presence for the architect; however, the additional time on the project does not increase the standard of care for the architect relative to its contracted responsibilities. If the owner wishes to have an on-site representative solely for its purposes, it is better for the owner to provide the representative rather than the architect.

The architect's on-site project representative usually represents the architect in activities that include site meetings, construction progress reviews, and the review of constructed conditions for information responses, but the representative's decision-making authority is typically limited and defers to the architect's construction contract administrator.

Owner-Accepted Nonconforming Work

The owner has the right to accept nonconforming work instead of requiring its removal and replacement, and the contract sum should be reduced by change order as appropriate and equitable. Should the nonconforming condition conflict with code requirements or endanger life safety, the architect must object to the acceptance and insist on completion or correction. Owner-accepted nonconforming work should be noted as an exclusion to the architect's certificates of substantial completion.

Clarifications and Problem-Solving

Since the drawings usually contain some errors and omissions, and they are not a complete set of instructions on how to build the building, the process of the architect providing clarifications and solving detail conflicts and problems is an important part of the delivery process. In order for this process to be effective, it is necessary that the contractor prepare an effective work plan that includes performing adequate initial document reviews, coordination drawings, conflicts checks, and timely submittal preparation. It is hoped that this will flesh out most of the naturally occurring conflicts and discrepancies before they are discovered while doing the work.

When a problem in the details is discovered while the work is being installed, the contractor's request for assistance usually arrives at the architect's office in the form of an e-mail RFI with an urgent status. As a team player, the architect should respond as quickly as possible after due research. This requires having knowledgeable respondents available with the authority to make decisions.

Project Meetings

Scheduled project meetings, often called owner-architect-contractor (OAC) meetings, are typically conducted on regular intervals during the construction phase to report the project status to the owner and to discuss and resolve key project issues. A popular agenda format that facilitates issue resolution is the action item report (see Table 10.15). The action item report lists numbered topics that are carried over from meeting to meeting until resolution is achieved. If published in timely fashion, the report can serve as a work list for the next scheduled meeting.

The meeting can be conducted by the contractor, the architect, or a third-party construction manager–adviser, program manager, or other owner representative consultant. Since the minutes are a permanent record of the attendee's discussions and decisions on the project, the architect is advised to read, correct, and clarify the published minutes in writing before the next OAC meeting.

Initial Decision Maker

The initial decision maker (IDM) for claims between the owner and the contractor is the architect, unless a third-party IDM is named in the owner-contractor agreement. The IDM will render a decision or take other appropriate action as indicated in §15.2.2 of the General Conditions of the Contract for Construction.

An architect that is designated to render the initial decision on a claim that involves the architect's services may have a conflict of interest, and it may be necessary for the issue to be resolved by another method.

Assisting a third-party IDM, or administering an extensive number of claims as the IDM, is listed as an additional service to the contract in AIA Document B101™–2007, Standard Form of Agreement Between Owner and Architect.

Contractor Progress Payments

The orderly progression of work is dependent on timely payments to the contractor, who subsequently pays its subcontractors, sub-subcontractors, and suppliers. Payment delays and nonpayment can threaten the economic balance of this contractor payment sequence and cause great disruption or a possible work stoppage. Therefore, payment application reviews and payment schedules should be administered as a priority.

Payment Application Processing

AIA Document 702™–1992, Application and Certificate for Payment, is a dual form that also includes the architect's certification for payment. AIA Document G703™–1992, Continuation Sheet, is typically used to list the scheduled values for the various parts of the work. The contractor's application includes a signed and notarized certification by the contractor that the work is in conformance with the contract documents, all contractors have been paid for previous amounts received, and the current requested amount is correct and due. The architect and its consultants review the application, and if they find the requested amounts to be a reasonable representation of the work in place, will issue the certificate for payment portion of the document to the owner.

TABLE 10.15 Action Item Meeting Report

Able architects
Meeting report

Date of meeting:	July 5, 2012
Date of issue:	July 6, 2012
Project:	**Vesey Village**
Project no.	13521
Present:	Representing **Swansong Developers (SD)** John Sawyer Representing **Able Architects (AA)** Chris Wren, AIA Representing **Broadway Builders (BB)** Max Velocity Representing **Dubious Mechanical (DM)** Stan Downs Representing **Miracle Electrical** Flash Finley
Location:	Vesey Village job site
Purpose:	Project Meeting No. 48

Discussion:

Item No.	Discussion	Action By	Date
48/1	**Flagpole Illumination** The owner has requested additional lighting on the flagpoles at the building entrance. Able Architects will select a lighting fixture, and Miracle Electrical will provide pricing for the change.	ME, AA	7/13/12
48/2	**Additional Thermostat** The owner has requested an additional thermostat at the security guard station. Dubious Mechanical will provide pricing for the change.	DM BB	7/21/12 7/13/12
48/3	**Building Directory—North Building** BB will replace the building directory wood frame in the North Building with stainless steel as requested by the owner. AA and SD are to select the finish color.	SD,AA	7/8/12
45/2	**Kitchen Makeup Air Diffusers** At the owner's request (JS), the general contractor has replaced the egg crate diffusers in the kitchen areas with a perforated type diffuser.	Closed	

End of Meeting
This report is assumed to be a true and accurate account of this meeting, unless written notification to the contrary is received within ten (10) working days of the date of issue of this report.
Respectfully Submitted,
Chris Wren, AIA
Principal
cc: All present

Payment application reviews by the architect and its consultants are typically coordinated with a scheduled site visit, and a "pencil copy review" can be conducted with the contractor. This allows the contractor to discuss the work status and finalize the application based on the mutually agreed review, and the subsequent preapproved application avoids a time-consuming resubmission.

Stored Materials

Applications for payment typically include a list of stored materials, which may be maintained either on or off site until incorporated into the work. Off-site storage locations are typically approved by the owner, and require storage in a bonded warehouse or secured by other acceptable means. Therefore, it may be necessary for the architect and consultants to visit off-site storage facilities to review stored materials and quantities.

Work Status Representations

The contractor's application for payment is a notarized certification of the work status that is further supported by the contractor's express warranty to the owner and architect that the materials and equipment furnished under the contract are new, that the work is free from defects, and that it conforms to the requirements of the contract documents. The architect's payment certification is based on this warranted representation, and it is made to the best of the architect's knowledge, information, and belief. The AIA General Conditions require that payment cannot be made without the architect's signed certification, and the owner must pay the amount certified.

Other Payment Conditions

The AIA application and certificate for payment form also includes a change order summary, the amount of current retainage for work in place and stored materials, and a "balance-to-complete" amount remaining. The architect's review of the payment application includes a review of this balance to determine whether sufficient funds remain to complete the work. For example, if the project has been delayed or the contractor has underbid the work, the remaining funds may not be sufficient to complete the work. The determining factor is if there are sufficient funds remaining for an outside contractor to be brought in to complete the work for the balance remaining. If not, the architect will not be able to certify payment on this application, and if the deficiency is great enough, previous certifications for payment may require nullifying to cover the cost of completion.

Should it be determined that the balance-to-complete is not sufficient, a meeting should be called with the owner and contractor to discuss the actions required to complete the work. Payment certification is a serious matter, and care must be taken to be fair and reasonable, with the overriding goal of protecting the owner.

When a contractor is providing work under more than one contract with an owner, multiple contract payment applications could be reflected in a single application for payment. Should this happen, care should be taken to not certify work that is not included in the architect's contract so as not to incur increased risk. This can be resolved by the contractor preparing separate applications for payment or by having the contractor break out the application into separate contract amounts so that the architect's certification can be specifically designated.

The architect must not certify payments on work that is provided by consultants who are contracted directly with the owner. The architect is not contracted for this work, and certifying payment will incur additional risk. If this condition exists, have the contractor either apply on a separate payment application or reorganize the application for payment to allow for a separate certification signature and amount by each contracted design professional.

Contractor Submittals

The contract documents prepared by the architect illustrate the completed project, but they are not a complete set of instructions on how to build the building. Instead, the documents express the design intent for the contractor to use in preparing its work plan. A primary part of the contractor's work plan is contractor submittals. These include detailed drawings (referred to as "shop drawings") prepared and approved by the contractor, detailed information or data from the product manufacturers, and physical product samples.

Submittals are a part of the contractor's work plan documents that illustrate in detail how the contractor plans to construct the work, and they must be submitted to the architect for review and approval. The architect determines which parts of the work require submittals, and the contractor is prohibited from performing those portions of the work without approved submittals.

When reviewing submittals, the architect does not verify or determine detailed information such as dimensions, fasteners or fastening methods, or material gages. Instead, the architect reviews and provides its approval only for the purpose of checking the submittal for conformance to the design intent as expressed in the contract documents.

Submittal Review Schedule

The contractor's submittal preparation and review, and the architect's submittal review are very time-consuming, and sufficient time must be allocated for the entire process. This is accomplished by the preparation of a contractor's submittal schedule that is coordinated with the project construction schedule. The reason for coordinating it with the construction schedule is to allow enough time for submittal preparation, review, and fabrication of products and systems sufficiently in advance of product installation.

Since many products in construction must be sequenced and coordinated with other products, the submittal schedule must be carefully prepared in coordination with the project construction schedule. The absence of a submittal schedule indicates that the project has not been completely planned and sequenced by the contractor. Preparation should be a cooperative effort by the contractor with the architect.

MasterSpec Full Length Section 013300, Submittal Procedures, identifies "action submittals," which require the architect's review and approval action, and "informational submittals," which are not reviewed but are submitted only to inform the architect that the contractor has met its contracted submittal obligations. Informational submittals include coordination drawings and performance-based engineering calculations, which are the contractor's responsibility.

Submittal schedules must be carefully prepared in coordination with the project construction schedule.

Submittal Review Time

It is important to take sufficient time to review submittals, and some submittals take longer than others. Owners sometimes attempt to contractually limit review time, in the belief that it will accelerate project completion. If a prescribed review time is included in the services agreement, it is recommended that it be agreed upon as *average review time*. This will allow a more reasonable allotment of time for more and less lengthy or complicated submittals while still maintaining the average time. It is helpful to discuss submittals on items that require a long lead time and large, complex submittals to determine if the allotted review time and submittal sequencing are reasonable.

Submittal Review Process

AIA documents require the contractor to review each submittal *prior to submission to the architect* to determine if the submittal has been properly prepared and to coordinate it with other portions of the work in accordance with the contractor's work plan. Any deviations or omissions in the submittal from the contract documents are to be noted, advising the reviewer of the scope change.

The architect should take the following actions upon receipt of the submittal:

- Determine if the submittal is required.
- Return without review submittals not required.
- Mark the required submittals received with date.
- Determine if a control number is affixed.
- Enter the submittal into the tracking log or database.
- Determine appropriate routing for review.
- Forward the submittal for appropriate review.

Review the submittal in accordance with the approved submittal schedule. Mark "revise and resubmit" and return any submittals when a review cannot be completed. Remember that resubmissions take time, and added notations with "approved as noted" will allow the contractor to begin the work without resubmitting.

Do not review submittals that are the responsibility of other design professionals, and return submittals without review when they are not required by the contract documents. If a portion of a submittal contains the work of another contractor or work included in a separate contract, highlight the area and note, "not reviewed."

Submittal Tracking

Since submittal reviews are time-sensitive, the process must be well documented. Include complete transmittal information with all routing; PDFs attached to descriptive e-mails; and a complete description of the documents sent, to whom, with date and control number included. These issues should be resolved in the preconstruction conference, if not earlier.

When reviewing submittals in electronic media, be sure that markups and notations by the design professionals cannot be manipulated.

Track all submittals in a submittal log or database. Report all participant activity times, including the contractor's. Manual tracking can be done with AIA Document G712™–1972, Shop Drawing and Sample Record.

Each submittal should have a unique control number. Incorporating the specification number into the control number is useful for cross-reference. For example, the first submittal for fire extinguisher cabinets, specifications section 104413, would be 104413-01A. If a resubmission is required for a second review, the number for that submittal would be 104413-01B. If a subsequent submittal is made for fire extinguisher cabinets for a different part of the project, the submittal control number would be 104413-02A. This versatile numbering system differentiates each individual submittal while cross-referencing it to the appropriate specification section.

When you receive the submittal schedule, check to be sure that all specified submittals, and only specified submittals, have been included. Do not review submittals such as crane support details, temporary safety designs, or earth retention designs because those involve construction means and methods and safety procedures, for which the contractor is solely responsible.

Much time can be saved in transmittal and distribution through digital documents and electronic routing. An architect who holds the prime contract with the owner and works with other design disciplines as subconsultants can allow direct distribution to the consultants. However, the reviewed copy should be routed back through the architect to allow coordination of the architecture to the consultant's work. Any notations added by the architect should be noted as "architectural coordination" in a separate markup color. It is not appropriate for the architect's review stamp to be affixed to the consultant's submittal because the architect is not licensed to perform the work of that discipline.

AIA CHANGE DOCUMENTS

AIA Document G701™–2001, Change Order. A change order (CO) requires the signatures of the owner, the architect, and the contractor. The architect signs the CO because it changes the architect's signed and sealed documents, for which he or she is held legally responsible. Therefore, it is advisable that the architect prepare the CO to facilitate acceptance. If COs are executed without the architect's involvement, it can prohibit the determination of substantial and final completion.

AIA Document G714™–2007, Construction Change Directive. A construction change directive (CCD) is signed by the owner and the architect, and it may or may not need to be agreed to and signed by the contractor to be valid. If the contractor does not agree with the change described in the document, it is referred to the architect as a claim. When the scope, cost, and time for the CCD has been agreed to by the owner and the contractor, the architect is to issue a corresponding change order.

AIA Document G710™–1992, Architect's Supplemental Instruction. Architect's supplemental instruction (ASI) is an order by the architect for a minor change in the work that does not affect the contract sum or time and is consistent with the design intent expressed in the contract documents. It is signed only by the architect and will stand as a change in the work unless contested, in which case a CCD or CO will be required as is deemed appropriate.

Changes in the Work

Changes in the scope of the work are a normal part of the construction phase, and every project typically includes at least one change order. Even if there is no change in the original project scope during construction, a final change order is usually required to reconcile contract variables such as contingencies, allowances, and unit prices. Construction is expensive, and owners should be able to make changes in their project to get it just as they want. The more agile and efficient design professionals are at performing with changes, the more they will endear themselves to the owner and the contractor as a team player.

Change Causation

Changes in the scope of the work can be caused by a number of sources or conditions, and the way the change is managed can affect the efficiency of the administrative efforts, as well as the level of risk.

Owner Scope Changes

The owner can change the scope of the project at will, and the cost of the change increases (or decreases) with the completion of the work. Thus it is important to assist the owner in understanding the completed project as much as possible. Renderings, computer animations, and mock-ups help owners visualize and understand in advance what the project will be. Should a significant scope change be made during construction, a quick response and efficient actions are paramount in minimizing project delay and controlling premium costs.

Contractor Substitution Changes

The architect controls the quality of the project through the specifications. Firms spend years developing specifications based on product performance and availability. In-house detail libraries are built around the use of specific products and sometimes specific manufacturers. But the contractors are responsible for making the parts of the building fit together, and they are allowed to substitute nonspecified products and brands if it is justified and approved. Factors such as product availability, volume purchasing, and LEED certification can make a proposed substitution for cause worthwhile.

AIA's MasterSpec Full Length, Section 012500, Substitution Procedures, provides a good approach to administering substitutions. It defines substitutions as Substitutions for Cause and Substitutions for Convenience. The contractor is allowed to substitute for cause due to unavailability of product, regulatory changes, or prohibitive warranty conditions.

The specifications writer is given the option of either not allowing substitutions for convenience altogether, or allowing them for a limited time after the notice to proceed or the actual start of work. Sixty days is suggested. Substitutions for cause can be requested using CSI Form 13.1A, since the AIA does not have a form for this purpose, or a firm can prepare its own form to accommodate individual project needs.

CSI Form 13.1A, Substitution Request, if fully utilized and enforced, can be helpful in vetting substitutions in that it requires the submitter to provide supporting information, including the number of years the product has been available, similar installations to review, differences between the two products, savings to the owner, and changes in contract time.

The form also contains a certification by the submitter that the product is equal to or better than the product to be replaced, it has the same warranty and maintenance requirements, it will work in size and function, and any additional costs will be accommodated. The architect's review and action on the request is the same as on other contractor submittals.

Product substitutions should be managed with a substitution request form that requires sufficient manufacturer's information to conduct a reasonable product comparison.

Contractor Value Analysis Changes

Another source for scope changes is value analysis, also known as value engineering (VE). By definition, value analysis proposals are intended to increase the value of the project. Ideally, this can be accomplished by finding a product or system of higher quality at the same cost, or a product or system of equal quality at a lower cost. The reality is that products and systems are competitive, and purchasers get what they pay for—that is, a product of lesser cost is often of lesser quality. Architects are often pressured to accept VE changes to reduce project costs, and the changes, which are actually substitutions, are not always well vetted in a review/approval process.

Risks can arise when the product adversely affects the project design or adjacent products, or when it fails to perform either functionally or as expected. The architect is frequently blamed for the product's disappointments since the architect is responsible for specifying the original quality of the project and allowed the VE change to be accepted.

Therefore, a good approach to administering VE changes is to manage them as substitutions, using MasterSpec and an effective substitution request form such as CSI Form 13.1A. A cryptic list of line-item VE changes attached to the owner-contractor agreement is a red flag, and the list should be considered nonconforming work until each product has been properly researched and vetted.

Architects are often pressured on short notice to accept VE changes to reduce project costs when the time allowed for a reasonable review is limited. In general, don't succumb.

In the value analysis process, the risk increases when the owner expects the substituted product or system to have the same quality as that which was originally specified, especially with no accompanying reduction in the project cost. And when the project cost is reduced by a substituted product or system, it may have a shorter life cycle or a higher maintenance cost. It is important to assist owners in understanding this reality so that expectations can better align.

Changes Caused by Accepted Nonconforming Work

There is a degree of latitude in construction, in that there is more than one way to construct a building and sometimes more than one way to conform to the "design intent expressed in the documents." The architect is under contract to determine whether the completed work conforms to that intent. There are occasions when the work does not precisely conform to the design intent but the difference is acceptable relative to scope and functionality, and it is accepted by the architect. There are other occasions when the work does not conform to the design and is not acceptable to the architect but is acceptable to the owner, who has the final say. When the owner accepts nonconforming work, it still does not conform to the contract documents, and the architect is obligated by its services agreement to report it as such. Such work should be noted as a nonconforming exception on the certificate of substantial completion, and the contractor is typically required to document the deviation on the contractor's as-built drawings.

There are occasions when the work does not conform to the design and is not acceptable to the architect but is acceptable to the owner, who has the final say.

BASIC CONSTRUCTION PHASE SERVICES FOR SMALL FIRMS AND SMALL PROJECTS

The level of sophistication and intensity in contract administration (CA) can vary with the size project and the size firm. Small firms do not always have the administrative infrastructure to produce extensive supporting documents and keep elaborate records. For small firms and small projects, some basic CA that usually covers the project is listed below. Remember that the requirements of the services contract must be the final determination of the services provided.

A helpful rule to remember is that undocumented services, if questioned later, will be difficult to substantiate. Therefore, a good approach is to document as briefly and efficiently as possible. This could include a one-page site observation report filled in with all repeating information, such as project, client, location, etc., with a space for a short paragraph of work status observations. The same can be accomplished with meeting reports, memoranda, ASIs, etc.

The "action item" meeting report addressed in this article lends itself to minimal preparation and maintenance. An RFI can be formatted to include a space for a written response to avoid re-creating the form. A tablet PC will allow memoranda to be filed in the project files from any remote location.

If CA services have been contracted, basic CA may include:

- Meeting notes from all meetings
- Documentation of all important discussions and decisions
- Preconstruction conference
- Site visits in accordance with the services contract
- A site observation report with every site visit
- Review of specified submittals
- Certifications of payments based on site visits
- Preparation and issuance of change documents
- Determination of substantial and final completion
- Issuance of certificate(s) of substantial completion

When CA is not included in the services contract, architects often wish to visit the site anyway to make general observations. Be aware that architects are required by law to "perform without negligence" any provided services whether or not compensated. Therefore, an increased level of risk will be incurred with the uncompensated site visit in the event that a claim arises. However, a timely visit could prevent a claim in the first place.

Meetings can be abbreviated, some conducted by telephone conference if the purpose can be accomplished. Any architect-generated documents required by the contract must be administered.

CONCLUSION

Proactive construction phase services provide many benefits to the project team. It promotes a team synergy with the contractor that can greatly improve and benefit administration and execution of project procedures, allowing the built construction to align with the design intent with more accuracy and efficiency. It allows the architect a chance to be interactively involved with any changes or construction challenges that may arise, while allowing an opportunity to resolve discrepancies before the cost goes up. For the owner, it leaves a memory of good service when it mattered most and proficient administering of the project construction when time was money—a lasting impression on the owner that can result in satisfaction, good recommendations, and possibly future work.

For More Information

Construction Administration for Architects (McGraw-Hill, 2009) by Greg Winkler and Gary C. Chiumento.

A Guide to Successful Construction: Effective Contract Administration, 3rd edition (BNi Building News, 1996) by Arthur O'Leary.

Contractor's Guide to Change Orders: How to Resolve Disputes and Get Paid (Prentice Hall, 2002) by Andrew M. Civitello Jr. and William D. Locher.

AIA Emerging Professional's Companion (Construction Phase—Office and Construction Phase—Observation): www.epcompanion.org.

Project Resource Manual: CSI Manual of Practice, 5th edition (McGraw-Hill, 2005) by The Construction Specifications Institute.

The AIA Official Guide to the 2007 AIA Contract Documents (Wiley, 2009) by The American Institute of Architects.

Building Construction: Principles, Materials, and Systems (Pearson Prentice Hall, 2008) by Madan Mehta, Walter Scarborough, and Diane Armpriest.

10.10 Project Completion and Post-Construction

James B. Atkins, FAIA

Project Completion is the stage of construction contract administration where owner-contractor contract documentation and the architect's services are finalized. Post-construction provides the architect an opportunity for a continuing relationship with the owner through assistance during the contractor's one-year warranty period and additional services beyond the architect's basic services contract.

INTRODUCTION

Project completion begins with the architect's determination of substantial completion when the owner can occupy the project for the purpose intended. AIA Document A201™–2007, General Conditions of the Contract for Construction, states that the construction phase ends when the owner makes final payment to the contractor, with the exception of a follow-up meeting with the owner to review the facility operations

In the end, you're measured not by how much you undertake but by what you finally accomplish.

—Donald Trump

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and performance, if requested. Final payment is due only after the architect has performed an inspection to determine whether the contractor has completed the work and submitted all required closeout documents and materials, including the final application for payment and final change order if it has not already been processed.

Post-construction provides an opportunity for the architect to continue the owner relationship through assistance with the new building, which could include additional services to the base contract. While all additional services beyond this point are intended to be fee-producing, the architect may choose to provide some services without fee to foster the owner relationship.

Although the contractor's punch list might have been found to be complete, there are almost always items and conditions that arise later. Follow-up by the architect on these latent issues can also provide an opportunity for the resolution of any design issues that may be subsequently discovered.

PROJECT COMPLETION

Substantial Completion

When the work, or a designated portion of it, is sufficiently complete for the owner to occupy or use for its intended purpose, the project is considered substantially complete. This may not involve final occupancy, as in the case of shell construction with a separate contract for interior finish out. Building utilization requirements are to be considered when determining substantial completion.

Substantial completion is a milestone on which many cost-related issues may depend. In addition to building use, utility expenses, insurance coverage, legal statutes, and completion penalties or bonuses could be affected. Warranties typically begin on this date unless otherwise agreed upon. Therefore, it is important that everyone understand the conditions that establish substantial completion under the contract.

The Punch List

The punch list, required from the contractor in the AIA owner-contractor agreements, is a list of items remaining for completion or correction at the time of substantial completion. It is required in order for the architect to determine and certify substantial completion, and it should be attached to the certificate of substantial completion or referenced therein. Although many architects choose to provide the punch list, it can be time-consuming and expensive to prepare, and the architect may choose to offer preparation of the list as an additional service to the owner-architect agreement.

Preparation and Planning

Advance preparation allows substantial completion to be administered more efficiently. It can be helpful to walk the project with the owner and contractor prior to completion to discuss the expected level of finish and quality. This can save time by reducing the number of discrepancies, and it can avoid disagreements over the acceptable level of finish and completion.

Larger projects may require increased personnel and coordination in order to complete the project completion review, and advanced planning and budgeting is recommended. If punch list preparation involves the architect, on larger projects it should be included in the contractor's construction schedule for planning purposes.

Substantial completion review can be difficult to manage, especially if the contractor notifies the architect that the work is substantially complete when it is not. Such events usually involve a wasted trip to the site by the architect, the cost of which may be disputed. This can be avoided if the architect specifies the number of inspections that are included in basic services in the owner-architect agreement. See sidebar for a list of the AIA owner-architect agreements and related sections that include a space to fill in the number of inspections for both substantial and final completion.

If the number of inspections is not specified in the owner-architect agreement, it may be necessary for the architect to negotiate additional fees for inspections beyond the number anticipated.

It is important that the owner understand the significance of observations versus inspections. Observations are made of the work by the architect during the course of the construction phase to review the work and report its progress and conformance to the owner. Two inspections are made on the project, one to determine substantial completion and one to determine final completion. Only substantial completion is certified by the architect, and final completion is documented only by the architect's issuance of the final certificate for payment. The certification of the final contractor's application for payment is not a certification of final completion because the architect is not responsible for the completion or conformance of the work.

ESTABLISHING CONTRACTED LIMITS ON PROJECT INSPECTIONS

Contract obligations and corresponding owner expectations can be established in *AIA Document B101™–2007, Standard Form of Agreement Between Owner and Architect*, as stipulated in § 4.3.3 for the number of inspections for any portion of the work to determine if such portion is substantially or finally complete. Simply fill in the blanks with the number of inspections included in basic services, and any inspections required in excess of that number will be provided as additional services. Quantities for the number of submittal reviews and site visits as well as the total number of months included as basic services can also be established in this section of the agreement.

Among other AIA documents that include this provision are the following:

- *B103™–2007, Standard Form of Agreement Between Owner and Architect for a Large or Complex Project*, Article 4, Additional Services, § 4.3.3
- *B143™–2004, Standard Form of Agreement Between Design-Builder and Architect*, Exhibit B, Architect's Services, § B6.8.1
- *B152™–2007, Standard Form of Agreement Between Owner and Architect for Architectural Interior Design Services*, Article 4, Additional Services, § 4.3.3
- *B201™–2007, Standard Form of Architect's Services: Design and Construction Contract Administration*, Article 3, Additional Services, § 3.3.3
- *B209™–2007, Standard Form of Architect's Services: Construction Contract Administration, for Use Where the Owner Has Retained Another Architect for Design Services*, Article 3, Additional Services, § 3.3.3
- *B252™–2007, Standard Form of Architect's Services: Architectural Interior Design*, Article 3, Additional Services, § 3.3.3

AIA documents that do not include this provision can be modified to include a maximum number of inspections for substantial completion and final completion by noting the number of inspections in the document. Examples of documents and locations for adding the number of inspections are listed as follows:

- *B104™–2007, Standard Form of Agreement Between Owner and Architect for a Project of Limited Scope*, Article 4, Additional Services, § 4.1 (insert description of services)
- *B105™–2007, Standard Form of Agreement Between Owner and Architect for a Residential or Small Commercial Project*, Article 7, Other Provisions (insert description of services)
- *B141CMa™–1992, Standard Form of Agreement Between Owner and Architect Where the Construction Manager is NOT a Constructor*, § 11.3.2 (insert description of services)
- *B142™–2004, Standard Form of Agreement Between Owner and Consultant Where the Owner contemplates using the design-build method of project delivery*, Exhibit B, Consultant's Services,
- *B161™–2002, Standard Form of Agreement Between Client and Consultant for use where the Project is located outside the United States*, Exhibit E, Consultant's Services Matrix, Construction Contract Administration (insert notes below matrix)
- *B181™, Standard Form of Agreement Between Owner and Architect for Housing Services*, Article 12, Other Conditions or Services

The owner's expectation can be better managed if you explain why the number of inspections is limited, the additional costs incurred by additional inspections, and the contractor's responsibility for those costs.

Substantial Completion Certification

AIA Document G704™–2000, Certificate of Substantial Completion, is provided to document certification. The document contains a date of issuance which is also the date of substantial completion. If the dates are not the same, it will be necessary to add the date of substantial completion to the form.

It is good practice for an architect to require its subconsultants to issue a certificate of substantial completion for their respective portions of the work. AIA Document G704™–2000 can be modified for this purpose and attached to the architect's certificate. If consultants are contracted directly with the owner, it is imperative that they issue independent certificates of substantial completion for their work since the architect is responsible only for the work included in its services contract.

A list of uncompleted punch list items is attached to the certificate as well as a list of any owner-accepted nonconforming work. The owner and contractor each sign the certificate to indicate acceptance of individually agreed-upon responsibilities. A project can have many certificates of substantial completion for different portions of the work, but the last certificate issued should be marked "final" to document all remaining portions of the project.

All projects typically contain nonconforming work. This could result from alternative "means and methods" that change the design of the project but still render it acceptable, or it could result from an owner accepting work that the architect rejects as nonconforming. The certificate of substantial completion does not recognize or acknowledge these nonconforming conditions, and therefore they should be listed as exceptions to the certificate. It is advisable to keep a list of accepted nonconforming work during the course of construction, and attach an itemized list as an exhibit to the certificate at the time of issuance.

AIA documents do not require an authority having jurisdiction (AHJ)-issued certificate of occupancy (CO) as a condition for issuing a certificate of substantial completion; however, the owner may include such a condition in the contract. Some projects, such as "shell and core" building scopes, will not be occupied upon completion since the "use intended" is to build out the space.

If the architect's consultants are contracted directly with the owner, they must issue separate certificates of substantial completion from the architect since their work is "of record."

Substantial completion typically includes a release of retainage, with a balance of funds retained only for completion of punch list items. It is common to withhold double the amount of the value of remaining work in the event an outside contractor is required to complete the work. The objective of withholding funds is to protect the owner from all costs related to project completion. If AIA Document G612™–2001, Owner's Instructions to the Architect, is used, management of retainage is listed in Part A, item 13.

Final Change Order and Final Application for Payment

The final change order is intended to reconcile outstanding changes, allowances, contingencies, unit prices, owner rebates or credits, outstanding architect additional services, completion bonus or penalty assessments, and any other outstanding money-related item that affects the final construction cost. It is highly unusual for a project to not have a final change order with the final application for payment. If not processed prior to the final application for payment, it should be submitted concurrently.

It is highly unusual for a project to not have a final change order.

The final application for payment is prepared and sent by the contractor to the architect with written notice that the work is ready for final inspection and final acceptance. The AIA General Conditions prohibit final payment to the contractor until the contractor closeout documents listed in § 9.10.2 have been submitted to the architect.

Final Completion and Final Payment

Upon receipt of the contractor's written notice that the work is ready for final inspection and acceptance and upon receipt of the final application for payment, the architect will promptly make the inspection; and if the architect concurs, the final certificate for payment is issued to the owner.

The issuance of the final certificate for payment is the architect's only documented representation that the project has been completed. No certificate of final completion, final inspection report, or any other written representation of completion is created or issued. The architect's certification of final payment is not a certification of work completion because the contractor is solely responsible for the work and its final completion, and the architect is entitled to rely on the contractor's representation. Accordingly, the AIA does not provide a form or suggest wording for a certificate of final completion.

The issuance of the final certificate for payment is the architect's only documented representation that the project has been completed.

Construction Contract Closeout

Construction contract closeout is considered by many owners to be one of the most important steps in project completion in that it essentially provides the "owner's manual" for occupying and operating the project. There are typically many documents and activities associated with project closeout, and a final check of each requirement is advised.

Should key activities and documents not be fully administered, such as the issuance of a certificate of substantial completion or the preparation and execution of the final change order, a systematic closeout can reveal these outstanding contractual requirements.

The following documents and activities should be checked for resolution to determine if the architect has completed its construction phase services:

- Site observation reports issued and on file
- Certificate(s) of substantial completion issued and on file, with all owner-accepted nonconforming work listed issued and on file
- Punch list copies on file
- Contractor's required closeout documents received, reviewed for conformance to submittal requirements, and forwarded to owner
- Outstanding owner questions and issues answered and resolved
- Final change order prepared, issued, executed, and on file
- Final application for payment certified, issued, and on file
- Contractor warranty contact information on file
- All basic and additional services invoiced
- All invoices paid
- One-year follow-up meeting scheduled
- All other completion-related documents finalized

When the architect has confirmed that the contractor's obligations under the construction contract agreement have been fulfilled, if there are no pending additional services to the architect's services contract, then the architect can begin its internal closeout.

Architect's Project Closeout

The objectives for the architect's project closeout are to retain and suitably store valuable project information while clearing out the documents and files to make room for the next project. The value, quality, and accessibility of the information gained during the project are dependent upon how effectively the architect completes its internal project closeout. Activities for the architect's closeout include the following.

Retention of Project-Related Documents

Project-related documents should be suitably identified and properly stored in accordance with the firm's documents retention policy. Unless required for a longer period by the services contract, documents are typically retained for a period approximately the same as the state statutes governing claims, unless the services contract requires a longer period of time. Although some states have no statute of limitation on claims, a popular period for maintaining project files in storage is 15 years. Documents on projects for repeat clients are often kept longer, especially if the project has future phases yet to be constructed.

Another purpose for retaining documents is for owners' future needs. Owners often request copies of drawings and specifications from the architect for building operations, future phases, and marketing. This provides yet another opportunity for the architect to continue its relationship with the owner.

The architect's internal project closeout involves the retention of valuable documents and information useful for the owner's future needs as well as for the architect's marketing and risk management.

Regardless of office size, a retention protocol should be established. The fundamental element of project filing is the assignment of a unique project number to each project. The segregated storage of project information under its project number should be considered the minimum storage requirement.

Internal Dissemination of Project Information

Each project provides valuable information on lessons learned. It is important that this information be evaluated for its impact on the firm's project delivery process and communicated to the appropriate groups. Marketing, design, documents preparation, specifications, project procurement, and construction phase services may be affected by and can benefit from this information. If a company maintains a central project database, there may be other categories of information, such as project delivery models, which could include design-build, bridging, CM, MP, and IPD.

Perhaps the most important data to retain is for risk management. It is a simple task to establish a risk management database that contains historical information on projects. Use caution, however, to make generic entries that do not refer or relate to actual projects, as this may create a liability. For example, a file on "exterior walls" could include details on various flashing conditions without reference to specific projects, and it could also include problematic details that did not perform as expected.

Another way to avoid project-specific references is to combine the information with issues and experiences from outside project or product information completed by others, such as manufacturer's details and recommendations. If there are questions concerning how project information should be retained, the architect should consult its professional liability insurance agent or provider.

The drawings and specifications should be stored in an appropriate medium and location with suitable and safe backup copies. Renderings and images can be beneficial to marketing and should also have backup copies.

Maintenance of a Client/Project Contact File

▶ The One-Year Walk-Through backgrounder (12.4) discusses how to perform a facility walk-through prior to the one-year mark following substantial completion to review the facility's operations and performance.

During the contractor's warranty period there will likely be requests from the owner for warranty follow-up issues and other types of assistance. On larger, complex projects such communications can be frequent. It is important that all services be documented, including communications, even if they are not fee-producing.

AIA Documents B101™–2007, B103™–2007, and B201™–2007 require the architect to meet with the owner, if requested and without compensation, prior to the expiration of the contractor's one-year warranty. The meeting should include a walk-through to review warranty issues and to gather information on how the building design is performing. A small investment in time by the architect can yield benefits for both the owner relationship and knowledge of the design.

The client/project contact file should contain instructions on project information storage and retrieval in the event records are needed for follow-up.

The need for additional services by the architect may arise after the completion of construction. Continuing services can be beneficial to the architect both economically and as a means of continuing the relationship with the owner.

POST-CONSTRUCTION

It is easy to assume that design services have ended simply because construction has been completed and all fees have been paid. That is why it is important to think in terms of owner needs rather than services after construction has completed. Post-construction offers opportunities to gain important information for the future relative to design functionality, services performance, owner satisfaction, and the possibility of future work.

Your most unhappy customers are your greatest source of learning.

—Michael Graves, FAIA

Additional Services

AIA Document B101™–2007, Standard Form of Agreement Between Owner and Architect

AIA Document B101™–2007, Standard Form of Agreement Between Owner and Architect; AIA Document B103™–2007, Standard Form of Agreement Between Owner and Architect for a Large or Complex Project; and AIA Document B201™–2007, Standard Form of Architect's Services: Design and Construction Contract Administration, list the following services that an owner may request after construction is completed.

- Architectural Interior Design (AIA Document B252™–2007)
- Conformed construction documents
- As-designed record drawings
- As-constructed record drawings (based on GC-provided info)
- Postoccupancy evaluation
- Facility Support Services (AIA Document B210™–2007)
- Tenant-related services
- Security Evaluation and Planning (AIA Document B206™–2007)
- Commissioning (AIA Document B211™–2007)
- LEED Certification (AIA Document B214™–2007)
- Furniture, Finishing, and Equipment Design (AIA Document B253™–2007)

A postoccupancy evaluation, also known as a facility performance evaluation, can provide benefits to both the owner and the architect.

A postoccupancy evaluation, also known as a facility performance evaluation, is an assessment of how the new facility is being received and used. It can address areas such as facility management, worker adaptation and satisfaction, and other owner program issues. It can also benefit the design team through a better understanding of how the facility is performing and affecting the building occupants, yielding valuable information for evidence-based design.

EVIDENCED-BASED DESIGN

Building evaluations can yield information for evidenced-based design, a field of study that emphasizes the use of credible data to influence the design process. Its terminology and ideas are derived from architecture, neuroscience, environmental psychology, and behavioral economics.

AIA Document D200™–1995, Project Checklist

Another AIA document that references post-construction services is AIA Document D200™–1995, Project Checklist. Under Post-Construction Services, on page 23 of the document, is listed the following:

- Maintenance and operational programming
- Start-up assistance
- Record drawing
- Warranty review
- Post-contract evaluation

▶ Evidence-Based Design (14.4) discusses how to take advantage of current knowledge, data, and well-informed clients to arrive at better design solutions.

If a warranty review is requested that is more comprehensive than the owner's follow-up meeting required in the AIA documents, it could be provided as an additional service as listed in document AIA Document D200™–1995. Other potential additional services include the following:

- Move-in assistance
- Disaster planning
- Energy analysis and monitoring
- Forensic analysis

When additional services are requested by the owner, the next step is to execute an agreement for the work.

Contracting for Post-Construction Additional Services

Should an owner request services in addition to those included in the owner-architect agreement, they can be contracted using AIA documents in one of two ways. AIA documents allow for additional services to the architect's services agreement after the project has been completed, and if this approach is taken, AIA Document G802™–2007, Amendment to the Professional Services Agreement, can be used. The scope for the work can be defined by attaching an appropriate AIA scope document, such as B201™–2007, Facility Support Services, or if no scope-specific document applies, a description of the work can be included with the agreed-upon fee and time required. The document also provides for the agreement and approval of anticipated reimbursable expenses.

It is advisable that additional services performed after construction is completed be contracted for using AIA Document G802™–2007, described above, because this document adds the services to the original agreement. Under the original services agreement, the state statutes of limitation and repose for making claims against the architect typically have already begun on the date of substantial completion. Otherwise, if the additional services are contracted separately from the original services agreement, the statutes will not begin to toll until the additional services have ended.

If the services are contracted separately, AIA Document B102™–2007, Standard Form of Agreement Between Owner and Architect without a Predefined scope of Architect's Services, is available for this purpose. Like AIA Document G802™–2007, an appropriate AIA scope document can be attached, and if no scope-specific document applies, a description of the work can be included in Article 1.1.

CONCLUSION

The architect's services required for project completion are as important as those required for construction contract administration. Moreover, these services are provided at a time when the owner is occupying the new building and attempting to understand and gain control of occupancy and maintenance responsibilities. Supportive and complete services during this time can leave the owner with good memories and a high regard for the services provided.

Post-construction services provide continued support for the owner during the first year of occupancy, often resulting in additional fee-producing services and chances for a continuing owner-architect relationship. It can also provide the design team with an opportunity to correct discrepancies that may have surfaced. If the one-year walk-through is made, it can provide valuable information for all involved. For the design team it can reveal important performance information on both the design and the construction, and for the owner it can offer a chance to improve functionality and usage after the first year of occupancy.

Project completion and post-construction should be discussed with the owner at the beginning of the project to allow for adequate planning and to emphasize this important part of the architect's services.

For More Information

Project Resource Manual: CSI Manual of Practice, 5th edition (McGraw-Hill, 2005) by The Construction Specification Institute: see Chapter 7.12, Project Closeout.

AIA Document D200, Project Checklist, Section 7, Construction Contract Administration, and Section 8, Post-Construction Services.

Construction Administration for Architects (McGraw-Hill, 2009), by Greg Winkler and Gary C. Chiumento.

AIA *Emerging Professional's Companion*, Construction Phase—Office and Construction Phase—Observation: www.epcompanion.org.

MASTERSPEC, the AIA's master guide building and construction specification system, Section 017700, Closeout Procedures, and Section 017839, Project Record Documents.
"Planning for Effective Project Closeout" (AIA Best Practices, chapter 13, 2007) by Douglas C. Hartman: www.aia.org/aiaucmp/groups/ek_members/documents/pdf/aiap016634.pdf.
AIA KnowledgeNet, Construction Contract Administration: www.aia.org/cca.

BACKGROUNDER

WHAT ARCHITECTS NEED TO KNOW ABOUT BUILDING COMMISSIONING

William Donald, CBCP

The following information is intended to be a brief introduction to the field of building commissioning. The overview presented below describes many of the tasks involved in the process but is not meant to be all-inclusive.

William Donald has been with van Zelm Engineers in Farmington, Connecticut, since 1998 and currently holds the position of manager of commissioning services. He is a Certified Building Commissioning Professional (CBCP) through the Association of Energy Engineers (AEE) and has taught classes in commissioning and retro commissioning at the University of Hartford.

WHAT IS BUILDING COMMISSIONING?

While building commissioning has been in existence since the 1980s, it is still considered a relatively new addition to the construction industry. As such, commissioning is still not fully understood by many in the construction industry.

The term "commissioning" originated from the ship building industry. After a ship was built, it was subjected to a variety of quality assurance measures. It was thoroughly tested, and the crew was trained in its operation. A ship that was commissioned was considered seaworthy and ready for service.

As with ships, modern buildings have thousands of individual components that need to be assembled and tested as part of the construction process. Once the Mechanical, Electrical, Plumbing, and Fire Protection (MEP/FP) systems are installed, they need to be functionally tested to see that they provide safe, reliable, long-term operation. Building commissioning provides this quality assurance process and oversight to provide for a successful turnover of a new building.

TYPICAL COMMISSIONING PROCESS

For most projects, the commissioning agent (sometimes referred to as the commissioning authority) works directly for the building owner with the sole objective of confirming that the project is delivered as designed and meets the owner's objectives. The typical commissioning process is meant to be a team approach made up of four phases of work: design, construction, acceptance, and post-acceptance. The commissioning team comprises the owner (or owner's representative), design team, contractors, and commissioning agent.

While a typical commissioning agent's scope of work is dictated by the specific project, the tasks listed below constitute a scope for most new construction projects. Typical tasks for each phase include the following.

Design Phase

1. Assist with development of specific owner's project requirements.
2. Perform independent design review of plans and specifications to help meet owner's goals. Discuss and evaluate energy saving opportunities.
3. Create commissioning specifications for inclusion in bid documents.
4. Assist design team with developing comprehensive training program.

Construction Phase

1. Create construction phase commissioning plan.
2. Review submittals for commissioned systems.
3. Conduct commissioning meetings to coordinate with contractors and discuss schedule, open items, etc.
4. Perform site visits to review systems installation conformance to drawings and specifications.
5. Attend equipment start-ups for major MEP/FP systems.
6. Monitor all issues and deficiencies and assist with resolution.

Acceptance Phase

1. Functionally test systems and document compliance with drawings and specifications.
2. Review operations and maintenance manuals.

Post-Acceptance Phase

1. Assist with and help coordinate owner training.
2. Provide owner with all commissioning-related documentation and disposition of all issues and deficiencies.
3. Conduct seasonal testing with the assistance of installing contractors and provide end-of-warranty review of new building.

(continued)

BENEFITS OF COMMISSIONING

Buildings systems have become more complex, and there has been increasing attention paid to the energy efficiency components. The accelerated building schedules and competitive environment that exist in today's construction industry offer greater challenges than ever for the project team.

Based on experience as well as recent studies conducted by Lawrence Berkeley National Laboratory, a building that is not commissioned will cost more to operate than a commissioned building. In many cases, the cost of performing commissioning will be paid back in a short period of time from the energy savings alone. Other significant but less obvious benefits can include reduced change orders, longer equipment lifetimes, improved indoor environment for occupants, and a well-trained staff that is prepared to operate the building.

Some owners may not be fully aware of what they need and may benefit from the interaction that the commissioning agent can provide if they are involved early enough (pre-design or design phase). Having the commissioning agent on the project team at this stage provides opportunity to uncover installation, performance, and training-related issues long before the project is put out to bid.

The complexity of the various system designs, in particular the mechanical systems, requires special attention. The various equipment components must be integrated together to operate as one system. With technologies changing and advancing at a rapid rate, not all installing contractors are familiar with the newer systems. Too often, the system is installed and then, during functional testing, it is found that it will not perform to the intended sequence of operations. An experienced and qualified commissioning agent will be familiar with new systems technology and can bring added experience to the project. The same is true for the design and construction phases.

During the construction phase of the project, the commissioning agent also has a good opportunity to confirm that the equipment and systems are properly installed and future access is given for service and maintenance reasons. This will benefit the facility staff for the life of the building.

During the acceptance phase, functional testing helps reveal issues that may otherwise go undetected. Problems such as simultaneous heating and cooling can persist for years without being discovered because the room temperatures can look normal and there may be no complaints. However, by thoroughly testing and monitoring the system as part of the overall commissioning process, the problem can be identified and resolved. This is one of many examples of how independent testing can help avoid future costs.

During the post-acceptance phase, the commissioning agent can assist with delivering the owner a more effective and informative training program.

The commissioning agent is also able to provide valuable input once the building has been in operation for a period of time, but prior to the end of the warranty period. By visiting the site and interviewing staff, it is possible to identify issues that have not been reported or have gone undetected. This provides the owner with their last opportunity to have a problem corrected as part of the project.

SELECTING A COMMISSIONING PROVIDER

There are many firms providing commissioning, and the selection of a commissioning agent can be daunting for many owners. The importance of fully understanding the commissioning process and the benefits that commissioning provides owners and project teams cannot be overstated. The owner needs to be able to understand the value of what they are investing in when they select the commissioning provider.

There are a number of organizations that provide credentials for commissioning firms and commissioning agents, and the criteria to become certified can vary considerably by organization. While certification is a good starting point, the commissioning provider should also demonstrate significant hands-on commissioning experience, including technical expertise on similar projects. Owners should consider the following before retaining the services of a commissioning provider:

- Create a comprehensive request for proposal outlining all responsibilities of the commissioning provider.
- Consult with the design team to decide which systems are to be included in the commissioning scope of work.
- Request qualifications and references for similar type projects.
- Request resumes of the proposed commissioning team.
- Request a detailed fee breakdown, not just one lump sum fee.

If the commissioning agent is engaged early in the design or pre-design phase, there will initially be many unknowns in terms of the type of systems that ultimately will be included in the design documents. Based on this, it is recommended that the owner consider obtaining a fee proposal for the design phase commissioning work and negotiate the fee for the remaining work once the entire scope of the project is known.

The commissioning provider should be chosen primarily based on qualifications and not solely based on price. Many regretful owners have unfortunately "gotten what they paid for." References also speak volumes about a commissioning provider. Some of the best references can be from clients who did not understand the commissioning process but were involved in the project and identified the value that a capable commissioning agent brought to the table.

Commissioning can be all-encompassing. There are very few individuals who possess the technical knowledge that is critical in understanding all of the building systems. A well-qualified commissioning provider will be composed of individuals with varied areas of expertise such as design, installation and service, control systems, testing and balancing and facilities, as well as a fundamental understanding of the commissioning process.

COMMISSIONING AS IT RELATES TO LEED

The U.S. Green Building Council (USGBC) recognizes the value commissioning brings to a project by mandating commissioning for all projects seeking LEED certification. LEED projects require fundamental commissioning as a prerequisite and offer an additional credit for enhanced commissioning. In the true spirit of LEED, commissioning should be viewed for the value and positive impact it will have on the project.

For More Information

American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE): www.ashrae.org/.

Building Commissioning Association (BCA): www.bcxa.org.

Association of Energy Engineers (AEE): www.aeecenter.org.

Portland Energy Conservation Inc. (PECI): www.peci.org.

U.S. Green Building Council (USGBC): www.usgbc.org.

AABC Commissioning Group (ACG): www.commissioning.org.

California Commissioning Collaborative (CCC): www.cacx.org.

CHAPTER 11

Technology in Practice

11.1 Technology in Practice Overview

Calvin Kam, Ph.D., AIA, PE, LEED AP

When navigating technology, architects encounter an array of applications that make it difficult to objectively analyze the potential value and impact of adoption decisions. This article reviews common tools in practice, and categorizes them to support an objective evaluation of their capabilities and value to a project or a firm.

INTRODUCTION

Technology plays an integral part in our daily life. Computers, mobile Internet access, smartphones, and a host of applications and software are familiar tools in our daily experience, and are transforming the efficiency and quality of our communication and entertainment. Mirroring the rise and proliferation of technology in daily life, technology has brought sweeping changes to architectural practice. These include not only software and hardware innovations but also the way owners define requirements and deliverables; the methods through which designers, engineers, and builders collaborate; the processes through which governments validate and approve permit submissions; and, gradually, the expectations from building occupants and the public at large.

Dr. Calvin Kam is the founder of bimSCORE.com, the director of industry programs and a consulting faculty member at Stanford University's Center for Integrated Facility Engineering, a co-founder of GSA's National BIM Program, an active AIA volunteer, and an expert advisor to a number of international public and private owners. The author would like to acknowledge the contributions of colleagues and coworkers in developing this article, particularly Justin Oldfield, Claire Matthews, Tony Rinella, and Martin Fischer.

With the rapid evolution of technology and the concurrent improvements in design and delivery processes, designers are increasingly finding themselves at a crossroads of technology adoption. Many are choosing to invest in incremental improvements to traditional processes by simply pairing conventional practice with new technology and tools; visionary innovators, however, are challenging the status quo by investing in an entirely new integration of organization, process, and technology to realize transformative benefits and revolutionize their existing business practices. This is illustrated in the integrated enterprise example presented in Figure 11.1, where sustainable design was empowered by multidisciplinary building information modeling and analyses, through collaboration among owner, architect, and construction manager as an integrated enterprise. Whether or not a firm or professional is a technology visionary or a mainstream adopter, informed decisions must be made about the degree and maturity of technology adoption, balancing potential values and the risks of change.

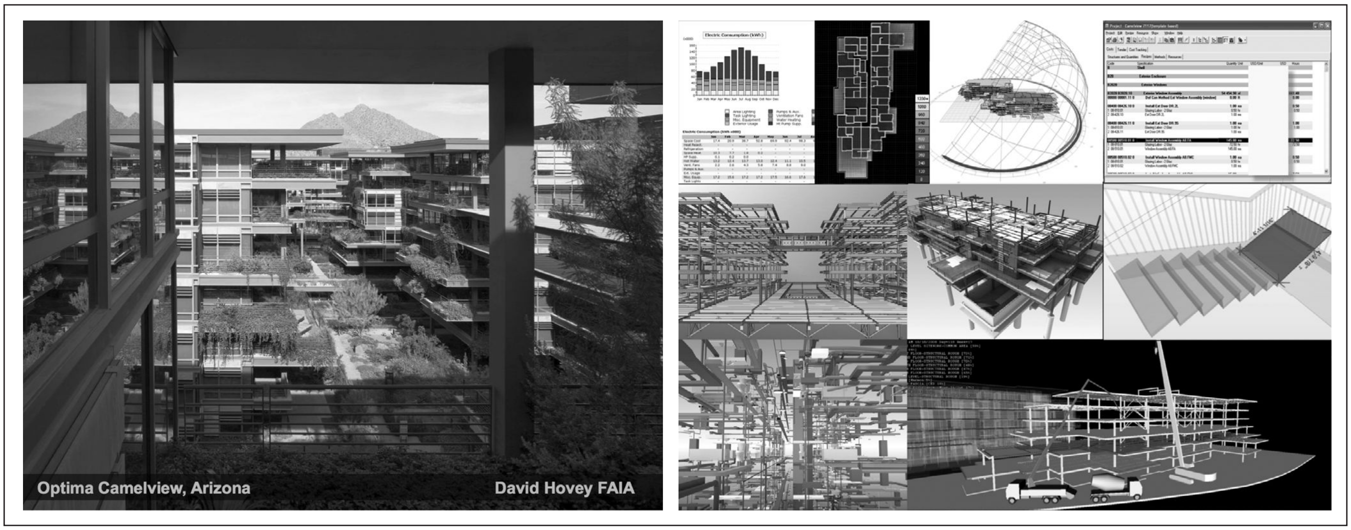
This article explores an array of value propositions and technological applications for architects to consider, using seven categories of technology's contribution to enterprise and project performance:

1. Communication
2. Design Exploration & Facility Performance
3. Cost
4. Schedule
5. Safety
6. Project Delivery
7. Knowledge Management

Subsequent sections describe proven applications relevant to each of these categories, including key functions and their value to practice, with the goal of assisting readers in their navigation of adoption and management decisions.

These categories were formulated at Stanford University's Center for Integrated Facility Engineering (CIFE) as part of the BIM and Virtual Design and Construction (VDC) Scorecard Research led by the author. The Scorecard will be introduced later in this article (see sidebar), but its genesis lies in the fostering of objective decision making in technology management in the AEC industry. These seven categories are part of a larger evaluation framework and vocabulary for assessing BIM and VDC maturity in practice, established to inform and improve business decision making, and help identify

▶ Technology Management (11.5) discusses planning, adoption, and management of technology to enhance a firm's performance.



Optima

FIGURE 11.1 ***(left)*** **Sustainable design supported by building information modeling;** ***(right)*** **an array of models and model-based analyses employed in practice today: multidisciplinary models, energy simulations, daylighting and solar analyses, cost estimation, automated model checking, and 4D simulations.**

specific areas for potential improvement within a firm or project. Outside of BIM and VDC, this same framework can also be applied more generally to technology management, which will be more thoroughly treated in a later article in this chapter.

Definitions

Throughout this article, the discussion of technology applications and tools will focus on their value to practice. Short definitions are provided below to supplement this value-oriented discussion by describing the basic functions and characteristics of common tools and processes.

3D Modeling

3D modeling refers to the creation of a three-dimensional, virtual representation of an object's surfaces or forms. 3D surfaces are composed of a collection of 3D points that are usually connected by triangles or lines to create a polygonal mesh, or otherwise connected via curved surfaces such as non-uniform rational Bézier splines (NURBS). NURBS are defined by weighted control points, which can be modified by changing their location or weight in order to alter a surface's shape. 3D objects can be solid, representing the volume of the object, or a surface or shell, representing the outer surface or boundary of an object.

4D Modeling

By incorporating the fourth physical dimension of "time" into 3D building information models, 4D simulations of facility phasing and construction sequencing can be generated. These animations or simulations can be used to identify spatial and temporal conflicts in the construction process and analyze different sequencing scenarios.

Technology vendors may have used analogous terms such as "5D" and "6D" to describe adding cost and facility management information to a model, respectively. But unlike 4D, these misnomers are not grounded in actual physical dimensions, and are instead creating labels which are merely "information" that is embodied in the "i" of building information modeling. Thus, readers are recommended to use terms like "BIM for cost estimating" or "BIM for Facility Management," rather than ungrounded terms such as 5D, 6D, or nD.

Building Information Modeling (BIM)

Building information modeling (BIM) has been defined by several industry and academic organizations, but generally each of these definitions incorporates several key ideas and components. BIM is the generation of a digital representation of design intent and construction specification, including a facility's physical and functional characteristics. The resulting building information model can be used by designers, builders, and facility operators as a shared knowledge resource, condensing the information needs of many users into one central and integrated source for easy extraction and analysis throughout a facility's life cycle.

By linking attributes to model objects, BIM can incorporate a vast array of geometric and nongeometric information into a 3D model. This provides access to a wealth of information for model-based analyses and design and construction support. Model attributes include parametric information that allows object form and behavior to be controlled through modifying object parameters, both of the object itself and the parameters of adjoining or related objects. Parametric behavior effectively embeds design intent into objects and the relationships between objects, facilitating efficient design exploration and revisions by propagating changes to all related objects. This is further enabled by parametric modeling tools, which will be described in a later section.

Computer-Aided Design (CAD)

Computer-aided design (CAD) refers to the many computer systems and software applications that assist the design and drawing process. Traditionally, CAD refers to 2D drawing systems used for design and construction documentation, as well as for assisting with facilities management operations. Yet as technology has developed, CAD has come to refer to 3D drawing tools as well, described in the 3D definition above.

Clash Detection

Frequently led by BIM managers or coordinators, clash detection is the use of BIM applications to integrate discipline-specific models into an aggregated model (also known as a federated model) in order to detect undesirable geometric or spatial conflicts among various building systems and assemblies. This includes not only direct spatial conflicts but also objects that violate acceptable clearances required for construction or proper installation.

Computer Numerical Controlled (CNC)

The term CNC (computer numerical controlled) machine refers to fabrication equipment that accepts and reads precise geometric information, and aids in or automates the creation of fabrication and sequencing instructions to cut, drill, mill, grind, or otherwise alter a block of material to produce an object. CNC machining involves a carefully planned fabrication process, since the CNC machine may need to perform cutting, routing, or other procedures in a certain sequence, possibly with manual work in-between. Geometric information defining an object's shape can be in many formats, including CAD files and, more recently, 3D fabrication models generated from BIMs.

Integrated Concurrent Engineering (ICE)

"Integrated Concurrent Engineering (ICE) uses: a singularly rapid combination of expert designers; advanced modeling, visualization, and analysis tools; social processes, and a specialized design facility; to create preliminary designs for a complex system" (Chachere et al., 2004). As the name implies, ICE relies on concurrent design tasks to reduce design duration, and integrates many project stakeholders to reduce decision and response latency and properly account for the needs and performance of a product during all phases of its life cycle.

Virtual Design and Construction (VDC)

Virtual design and construction (VDC) is the use of integrated multidisciplinary performance models of design-construction projects, including the product, organization, and processes of the design-construction-operation team, in order to support business objectives (cife.stanford.edu).

BIM and VDC Maturity

Generally speaking, most practitioners have a subjective basis upon which to rest their claim to knowledge, accomplishment, or experiences with BIM. In reality, technology and BIM come in many forms, maturity, and purposes; and it is necessary to be more precise in defining, differentiating, and relating the levels of technology maturity. Without a systematic method of evaluation it can be difficult to effectively navigate technology adoption decisions, making practitioners susceptible to short-sighted technology investments and advancements. Lacking explicit definitions, the stages of BIM maturity have become vague as users have different expectations and assessments of BIM adoption. The architecture industry could greatly benefit from a holistic and objective BIM evaluation framework that outlines the many purposes and business needs of BIM, their gaps, their interrelationships, and their levels of maturity.

As part of the BIM and VDC Scorecard research, technology and BIM applications have been categorized into five groups, separating their key functions and maturity. As listed, they generally progress from least mature—(1) Visualization—to most mature, (5) Automation and Optimization. These classifications are only part of the larger framework of the BIM and VDC Scorecard, which aims to provide a common vocabulary and structure for assessing BIM and VDC maturity within a firm or project.

Subsequent sections will focus more on the contributions of specific tools, but the categories defined below provide a broad overview of the varying levels of technology's value to practice. Using these categories, professionals are more likely to see BIM adoption as including clash-detection or model-based simulation, and less likely to assess their level of BIM adoption as solely based on the creation or existence of 3D models.

Visualization

Tools for visualization enhance our ability to quickly view and understand a design, component, or process. These include 3D models and BIMs, which in their basest forms are mediums for design visualization, and other technologies such as Cave Automatic Virtual Environments (CAVE) that provide 3D, immersive environments for design review. Visualization tools are considered less mature applications of technology because although they may expedite and enhance design and review, they don't have a direct or significant impact on optimizing design performance or increasing design productivity.

Documentation

Documentation tools aid in generating, organizing, and presenting many forms of project documentation. This includes creating design, construction, and as-built documents from models or drawings, incorporating product or system specifications into models for facility management, and using 3D laser scanning to verify as-built or existing facility conditions. This level of technology maturity extends beyond visualization, as the model assists directly with typical documentation tasks while maintaining tolerances and precision adequate for design and construction requirements.

Model-Based Analyses

Model-based analyses refer to a wide range of simulations and studies that leverage building information models (BIMs) to predict facility behaviors and simulate design and construction impacts on building performance, structural integrity, project cost, energy consumption, and other facility life cycle issues. While the term "BIM" may equally refer to virtual artifact (building information modeling), this article uses the acronym to refer to the latter. For the former, "virtual model" or "building information model" is used. Such analyses include spatial validations for program compliance, structural analyses, daylighting and energy analyses, and model-based estimation. The primary shared characteristic of these and other similar tools is the use of model geometry and attributes to drive a performance analysis.

Integrated Analyses

Integrated analyses combine multiple analyses and discipline-specific interests into a single analysis process, thereby increasing efficiency, consolidating data, and reducing redundant information exchanges. Such integration is achieved in clash detection, which resolves conflicts between different systems and trades, and integrated scope-cost-schedule applications, which combine multiple construction management tasks into one platform. These integrated platforms use 3D model geometry to drive model-based estimation and scheduling, facilitating nearly automated revisions to estimates and schedules as model quantities change throughout design and construction.

Collaborative, integrated forms of project delivery provide environments conducive to optimizing the value of these tools, as designers and builders can more effectively interact and integrate shared information during early project stages. Builders can analyze cost and schedule impacts to aid in design decisions, and designers can assist in resolving many questions and issues before construction begins. This results in fewer changes and delays, and ultimately more value and quality for the project owner.

Automation and Optimization

Software and hardware tools in this category automate typical design and construction tasks, increasing the productivity of designers, builders, and regulatory agencies.

Automation and optimization tools include those that enable off-site prefabrication and CNC machining, facilitate design optimization, and check building code and circulation requirements. Parametric modeling tools and optimization software give designers the ability to quickly generate and analyze many design options, and accurately compare their performance and other attributes. This provides owners with more, higher-performing design options for their consideration, and also assists in reducing the overall design review duration.

VALUES AND APPLICATIONS

This section presents seven categories for classifying the value of technology in practice, based on the author's research on BIM and VDC at Stanford University's CIFE. This categorization offers professionals a guide to evaluate their needs, while setting up a rational basis to meet their enterprise and/or project goals. The following sections will highlight proven application examples for each of the eight categories, and explore the value and impact of these applications.

Communications

A common challenge in conventional practice is that architects do not have reliable or efficient methods to integrate information from 2D drawings, renderings, specifications, Gantt charts, and shop drawings to communicate design intent. Not only does this create errors and introduce risk, it also increases decision and response delays with time wasted in gathering and disseminating relevant design information. Visualization and communication technologies empower architects to more accurately and reliably integrate such design-related information, and share it efficiently with other project stakeholders in order to make informed design decisions. A brief overview of these and other communication tools and applications is provided below, with an emphasis on their value to practice.

Building Information Models

Architects often rely on 3D renderings as a means of communicating design concepts and intent to clients and project team members. BIMs, though, are becoming a preferred basis for client and project communication. They are valuable tools in conveying design intent, and provide a much more intuitive exploration and review of design features when compared to renderings or 2D drawings alone. Even though 3D massing models, renderings, or animations may suffice in early design phases, as the design progresses BIMs become increasingly valuable for storing and sharing information such as cost, schedule, and performance specifications that will guide client and project teams to more informed design and construction decisions. Furthermore, as BIMs become more detailed, progressing from conceptual massing in early design to fabrication ready at construction, they can serve as reliable records of project change. By fully coordinating a fabrication-ready model, project teams can limit and manage change, holding builders accountable for deviations and recording changes to reflect as-built conditions.

Virtual Meetings

A growing number of free or low-cost software applications and services can link multiple meeting attendees in Internet-connected locations for audio and visual participation in meetings with coworkers, clients, and project teams. These tools promote more frequent and even impromptu collaboration, while reducing travel-related expenses and lost productivity. Screen sharing focuses all participants on the same pertinent information from any presenter's computer screen, and high-definition video lets users talk face-to-face when desired. With the right tools and Internet bandwidth, architects can engage with geographically distributed business partners and stakeholders, while exchanging data, models, and drawings, and holding meetings and work sessions all online.

Smartphones and Tablets

Smartphones and tablets have expanded the mobility, fluidity, and ease of access of several communication mediums—combining voice, messaging, e-mail, photos, and video conferencing into a single "smart" device. Beyond enhancing our connectivity, smartphones and tablets are also becoming useful as display platforms; with the use of increasingly specialized applications, architects can share drawings and models on their portable devices and even annotate these materials to quickly communicate with their clients and teams. Many AEC-specific apps are available for smartphones and tablets, featuring capabilities such as model navigation, geospatial positioning, commenting and markups, file sharing, and field reporting and documentation. Hardware built into phones and tablets is a useful tool as well, with cameras being used to document and share field conditions, materials, and building components, and even hold impromptu video conferences.

Meeting Coordination

Calendar schedule planner and management systems connected to e-mail and smartphones are important tools for helping professionals access their schedules in order to set up meeting times and places. Some programs even allow users to share and automatically cross-check their calendars for available times, or survey users on their open time slots to quickly isolate a time that works for all participants.

Big Rooms

"Big Rooms," "i-Rooms," or "interactive workspaces" provide a technology-enabled physical meeting space for the many members of a project team. Typical features of these rooms include large, and often multiple, multimedia screens or interactive displays to share BIMs and implement changes or markups, web and teleconferencing equipment to engage remote stakeholders, and enough seating to physically co-locate designers, contractors, and owner representatives or end users.

By incorporating these technological tools, Big Rooms provide many advantages over more 2D- and paper-based meeting processes. A variety of information, including Gantt charts, estimates, and models, can be displayed simultaneously and shared in an easily accessible and intuitive manner, reducing decision latency and improving a team's ability to make critical project decisions (Liston 2000). This is in contrast to paper-based meetings, where attendees often rely on their own markups, materials, and organization systems to access and relate data, which means much time is spent simply explaining and understanding the thoughts and concepts of others (Liston 2000). Big Rooms leverage communications technology, BIM, and software tools to intuitively present concepts and focus meetings on key information, reducing the need for explanation and providing more time for meaningful tasks and critical decision making. The collaboration and quick communication enabled by Big Rooms makes them ideal locations for ICE sessions and supporting integrated design processes.

Information Exchanges

Although e-mail is still the mainstay for many information exchanges, project management systems and information linked to the model are increasingly becoming important tools in project communication. Semiautomated exchanges enabled by these tools improve efficiency by linking comments, questions, and other documents to the model, which can be referenced by other parties as part of a more informed decision-making process. This enhances collaboration between builders and designers by consolidating and standardizing exchanges, and reducing the latency of information exchanges while increasing their clarity and ease of transmission.

Design Exploration and Facility Performance

Technology contributes to better building and facility performance through quicker and more accurate design analyses, tighter conformance to design intent, higher predictability of building performance and operations, and better control over occupant responses, building functions, and utility usage. These benefits to facility performance are enabled by a number of tools, including software applications and physical sensors and devices.

Energy Analysis

Efficient and high-performing designs are achieved through a number of model-based analyses, chief among them energy analyses, which incorporate a number of simulations to predict a building's energy performance. These simulations consider factors such as building orientation, location, daylighting, user habits, materials, and model geometry to predict overall energy performance, which directly informs operating cost estimates. These simulations are often conducted early in the design process using less detailed massing or spatial models to provide preliminary feedback on the optimal building location, shape, and orientations. With massing model studies, designers can compare multiple alternatives and make simple design changes to provide significant energy savings and improved end user comfort over the life cycle of the building, all before committing major resources for design development and construction.

Parametric Modeling

Parametric design uses programming and algorithms to help automate the design and documentation process. In contrast to 2D or 3D modeling, BIM embeds the design intent and relationships more formally within digital models, enabling more effective design explorations based on modifiable parameters. Using software products or custom programming scripts, designers can establish parameters for geometry, relationships between components, site information, and other factors. These scripts help define the base form, beyond which designers can iterate, subdivide, or otherwise modify parameters to complete the geometry and achieve specific goals for program or design. Of course, this approach requires a significant time commitment in programming and modeling, so often its most valuable use is in producing curving and non-uniform designs that cannot be readily achieved by other design methods. However, once parametric relationships are established, architects can quickly generate and explore design concepts, especially in conceptual design phases.

Facility Management

BIMs are not only useful tools for increasing design and construction productivity but also are increasingly becoming owner-required deliverables for improved facility management (FM). With the ability to link information to model objects, BIMs can offer useful FM information, including materials, specifications, user manuals, quantities, costs, and maintenance schedules. Even without FM information included, as-built models themselves can help operations and maintenance (O&M) personnel more efficiently locate components for maintenance, increase the effectiveness of O&M training, and help populate existing facility management databases. Leveraging BIM for FM requires only incremental additions to BIM deliverables, and can provide significant value throughout a building's lifetime through reduced operating costs and more efficient maintenance tasks.

Cost

Technology's impact on cost performance is not necessarily due to a particular application or process, but to the benefits achieved through a combination of many different tools in different project phases. Most of the tools in this chapter are direct or indirect contributors to lowering costs throughout design, construction, and operation of a facility. However, certain tools are more direct contributors to cost performance and in particular cost management, including a variety of estimating tools and especially those that are model-based.

Model-Based Estimation

Model-based cost estimation links model quantities and geometry to cost line items to quickly and accurately generate a cost estimate. BIMs provide an easily accessible and accurate source of geometric and quantity information, and once model objects are linked to cost information, estimation can be almost fully automated. This requires a sometimes lengthy process of mapping model objects to the desired cost assemblies, but once the links are created, the impact of design and quantity changes can be quickly reflected in the cost estimate. This facilitates an accurate and informed comparison of the cost of design alternatives, better equipping architects to make design decisions during early project phases. As the design matures and the level of model development increases, model-based estimation can facilitate continuous projections of cost, and even be used to validate progress payments and make cash-flow forecasts. Maintaining accurate, ongoing control of the construction budget is beneficial for all project stakeholders, helping to reduce risk and uncertainty.

Schedule

Technology and BIM-based design provide a variety of tools and methods to shorten project durations, tighten production control, and increase schedule conformance. Although scheduling considerations have traditionally been left to the contractors and owner, the advent of integrated forms of project delivery have more thoroughly embedded designers into the construction and scheduling process.

4D Simulations

Long established in the construction industry, 4D simulations, or more broadly model-based scheduling, have been proven particularly valuable in projects with complex site logistics and competing site uses, such as renovation projects. 4D simulations can help maintain access requirements and a functioning work environment for current occupants, and optimize site use with limited storage and lay-down space. 4D simulations allow for site phasing schemes to be tested, analyzing impacts on current users and construction operations.

Location-Based Scheduling

Assigning locations to a model, such as floors, zones, or distinct area boundaries, enables location-based scheduling, in which sequencing is based on both model object and construction zone. Because each area has finite material quantities, production rates can be used to calculate the durations of tasks. This method of scheduling reduces the time spent on revising schedules to reflect design changes and grounds the simulated durations in quantity-based calculations, as opposed to best-guess or experienced-based estimates. Furthermore, by tracking as-built quantities and comparing them to model quantities, production rates for various trades can be validated, modified, and optimized to increase the accuracy of forecasts and avoid future delays, resulting in tighter production control.

Safety

Technology's benefit to safety is realized during both the construction and operations phases of a project life cycle, and is primarily achieved through more detailed modeling practices and model-based analyses.

Construction Safety

By modeling safety hazards (e.g., fall hazards or high vehicle traffic areas) and safety equipment (e.g., temporary lighting or fire extinguishers), a model can serve as a detailed safety guide for the project, helping to ensure a proper distribution of on-site safety features and improving safety planning and training for field personnel. Model checkers can help automate this analysis, using programmed rules to check the adequacy of the distribution of safety equipment and access clearances. 4D simulations can also serve as safety tools, helping teams identify hazards due to sequencing or site logistics.

Operations Safety

Model-based analyses, including fire and smoke simulations, egress analyses, and circulation checkers, can validate or help improve a design with respect to occupant safety during the operations and maintenance phase. These tools can be used to improve a building's performance during emergency situations, ensuring occupants have nearby access to exits and enough time to reach them safely. In addition, as-built models or FM databases with emergency equipment and alarm locations linked to operating manuals and building controls can improve the preparedness and response of operators, and can be valuable in assisting and directing emergency responders.

Project Delivery

Technology's contribution to project delivery has largely been to increase the efficiency of the design and construction process and improve the quality of the final deliverables, whether these are drawings, a model, or the facility itself. These benefits are realized through less rework, defects, and design changes, during both design and construction phases. Software tools have played an important role in improving project delivery, but just as important are the processes that support their implementation. Perhaps the most important process innovation enabled by technology is integrated project delivery (IPD), which along with more traditional forms of project delivery has benefited from a number of the tools described below.

▶ See Technology in Project Delivery Phases (11.2) for more detail on technology use in practice.

Integrated Project Delivery

The full value of technology, and BIM in particular, is most often realized in a collaborative environment where designers, builders, and operators can cooperate and openly communicate. IPD and other forms of collaborative project delivery provide this level of knowledge integration, bringing together multiple stakeholders throughout the design and construction phases. In this environment information can be shared and trusted, reducing both design and construction changes and rework. IPD is most effective when the right tools are being employed among the team. These tools include:

- BIM for modeling, analysis, and documentation of designs (in both 2D and 3D), enabling improved evaluation of design alternatives and solutions for issue resolution
- Clash detection and BIM-enabled coordination for aggregating multiple models, identifying and solving conflicts, and ultimately reducing changes, RFIs, and rework
- Project or knowledge management that leverages cloud computing for sharing models and simplifying information exchanges
- Big Rooms and interactive displays for facilitating project-wide meetings and co-location
- Audio and video web conferencing for quick and efficient communications with remote or off-site project team members

▶ Collaborative Technologies (11.4) includes a more detailed discussion of cloud computing.

The ability of these technologies to integrate the efforts of multiple stakeholders and facilitate information exchanges has been integral to the advent and value of IPD. This development shows how technology can not only improve traditional methods of delivery but can also generate more efficient arrangements with new methods of interaction. This transformation may have far-reaching effects as IPD adoption increases throughout the design and construction industry, improving productivity, increasing quality, and ultimately reducing costs in an overall optimization of the design-build-operate life cycle.

Documentation

BIM and other tools have improved the accuracy, consistency, and quality of design and construction documents, while concurrently improving the efficiency of the documentation process. BIM-enabled design documentation nearly automates the production of floor plans, elevations, sections, and other drawings, and helps ensure that each contains the desired level of detail from the model on which it is based. This means

▶ Project Management with Building Information Modeling Processes (10.4) discusses the use of BIM in practice.

that at any point during the design process 2D drawings of the model can be readily referenced and shared, expediting design review and permitting. By increasing the accuracy and efficiency of the documentation process, designers can improve their turnaround for making submissions or changes, and help reduce the costs of errors and omissions. Outside of BIM, technology for documentation also includes physical tools, such as laser scanning and 3D printing, which will be more thoroughly treated in the next article. These tools, among others, are essentially extensions of 2D and 3D documentation, as they either use the model or enhance the model through representing or extracting physical components of the design.

BIM-Enabled Coordination

Architects are now able to share BIMs and combine them with models from structural engineers, building system engineers (e.g., mechanical, electrical, and plumbing), and specialty consultants (e.g., acoustics, façade, security, and data) throughout the design process. With clash-detection applications, designers can use these aggregated models to mitigate conflicts with other design disciplines, and the resulting revisions can be shared with all relevant coordination parties. This allows design teams to resolve conflicts early and avoid costly construction change orders and rework, while keeping individual models (often broken down by disciplines or by location) small in file size for model management and hardware performance reasons. Clash detection is a reactive approach to improving design coordination, but when combined with processes such as integrated concurrent engineering (ICE), project teams can complete the design and decision-making process in a highly collaborative environment, avoiding many clashes before they arise.

ICE

ICE sessions take advantage of easy access to a broad collection of project stakeholders to facilitate thorough coordination and constructability reviews and concurrent design. This decreases response and decision latency, reduces overall design duration, and lowers field-generated conflicts and design changes during the construction phase. This is in contrast to more traditional coordination processes, where disciplines are not co-located, forcing design tasks to be more sequential and therefore longer in duration. ICE sessions are best supported by Big Room or i-room environments, where communication technologies facilitate enhanced collaboration and coordination.

Knowledge Management

▶ See Knowledge Management (5.11) for more on this topic.

Knowledge management is the effort to retain the collective expertise and learning experiences of a group, and can exist at several levels: within a project, within a firm, and across the entire design industry. At the firm and project scales, research and software for knowledge management are enabling architects to effectively manage their collective wisdom by integrating data collection and documentation into existing management practices. A description of knowledge management in project and firm follows, outlining their general objectives and the combination of software tools, meetings, and organized documentation that supports their implementation in practice.

Knowledge Management in a Project

Within a project, knowledge management practices help coordinate between different teams, and maintain consistent processes and standards. A number of tools can be used for project-wide knowledge management, with their applicability varying depending on the size of the project team and the type of information being shared. Shared servers and intranets help manage designs and data, and assist with collaboration between disciplines. There are also many software solutions available for project management, whose functions can assist with contract management, document and drawing storage, submittals and RFI processing, and accounting. In projects with BIMs, the models themselves become a large component of the project knowledge base, in terms of both exchanging design information between project teams and storing component details for use by builders and operators. The tools briefly described here are among many available for project-wide knowledge management.

Knowledge Management in a Firm

Within a firm, knowledge management can help align employees with the company mission and protocol, keep them up to speed with the latest information, and help exchange lessons and experience between parts of the organization that may not frequently interact. Knowledge management also extends to data and resource sharing, which increases efficiency throughout the office. These tools allow companies to quickly access and leverage best practices, lessons learned, and the appropriate contacts for seeking more information. Formal documentation of overall procedures and specific tasks, established in advance, can help projects run more smoothly, especially as staff come and go. Depending on the nature of the information, lessons can be shared in meetings, in written manuals or guides, displayed throughout the firm, or cataloged in shared databases or management software.

Best practices and lessons learned incorporate many types of information, including work flows for modeling and analysis, protocols for information exchanges, and model progression standards for the design process. An example of a valuable shared knowledge is a firm-wide model component library. These libraries may include BIM objects, CAD construction details, and specifications for frequently used products. The firm can store both its own unique components and objects from vendors and manufacturers, who often model their products for use by designers. A firm with such a library can complete design and documentation tasks faster and with more reliability.

CONCLUSION

The optimal integration of technology in practice, when properly evaluated and managed, can support myriad values to improving communications, design exploration and facility performance, cost, schedule, safety, project delivery, and knowledge management. Technology affects our profession by redefining our deliverables, collaboration, work flows, and standard of practice. Navigating this new environment requires not only knowledge of common tools but also the weighting of value propositions against potential risks in a systematic and objective manner.

▶ For more information the influence of technology adoption on the profession, see Emerging Technology in Practice (11.6).

The rest of the articles in this chapter build upon the foundation laid down in this overview article, exploring technology in practice through the lens of project delivery phases, small projects, collaboration, and technology management. Closing the chapter is an article that summarizes the driving forces behind innovation in practice, compiles innovative ideas and emerging trends, and introduces the Stanford BIM and VDC Scorecard to support decision making in technology planning and performance measures.

For More Information

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BACKGROUNDER

DRAWING AND MODELING

David R. Scheer, AIA, AICP, and LEED AP

Drawing is being replaced by digital simulation models in architectural practice. This will have profound effects on how architects work and think.

David R. Scheer is a practicing architect who has taught design and theory at several schools of architecture. His firm pioneered the use of building information modeling in the 1990s, and he writes and speaks widely about technology's impacts on architecture. He was the 2012 chair of the AIA Technology in Architectural Practice Knowledge Community.

AN APPRECIATION OF DRAWING

For centuries, drawing has been the lifeblood of architecture. In fact, the architecture profession owes its existence to the establishment of drawing as the chief medium of building design in the fifteenth century. There is a crucial difference, almost too obvious to mention, between a drawing and the building it represents. Drawing is abstract—it is a mental construction. None of the views typically shown in construction drawings (plans, elevations, etc.) can be seen in reality. A single drawing shows very little of what is present in a building. Architectural drawing is a symbol system that must be learned. Understanding a building from a set of drawings requires the ability—gained through long training—to synthesize a three-dimensional image of a building from a set of interrelated two-dimensional images. The qualities of the building's form and spaces must be imagined by the architect from this synthesized image. Since it is the primary support for our design processes, drawing, to a great extent, conditions how we think. Architects think by drawing.

Drawing is also a physical skill. In learning to draw, architecture students absorb many of the values essential to architecture, such as attention to detail and craftsmanship. As architects they transfer these values from drawing to building. Learning to draw in specific ways embodying these values is a key part of becoming an architect, inducting students into the culture of architecture. Drawing provides architects with their first encounter with materials (paper, pencil, ink, etc.) that, while different from construction materials, teach them how intentions and materials work together to form a final product. Most important, by involving the hand, eye, and mind, drawing joins mental processes with bodily (haptic) experience to create the unique way of thinking needed to designing buildings that are themselves experienced in all these ways.

Thus, drawing has provided architects with the scaffolding on which their design thinking is erected and their professional identity is established. CAD changed this only partially. While it diminished the physical skill and material experience drawing entails, it left the ideational role of drawing intact. With the rise of building information modeling (BIM) and computational design, the last remnants of the influence of drawing on architecture are disappearing.

REPRESENTATION AND SIMULATION

Drawing is a form of representation. In this context, "representation" has the specific meaning of a set of signs that refer to reality. These signs have utterly different properties than the object to which they refer, just as the spoken or written word "cow" is nothing like the animal. The sign system associates an object with a set of ideas and provides a means of manipulating these ideas and, by extension, thinking about the object. We create representations in order to think about our experience. Our languages are the most common and probably most important representational systems. For over 500 years, architectural drawing has been the primary representational system used to think about the design of buildings.

Simulation denotes a different relationship to reality than representation. Whereas representation works by means of sign systems distinct from the reality to which they refer, simulation works by duplicating reality to some extent. Instead of viewing reality through the filter of signs, simulation gives us the experience of reality itself. Although computation is used to create a simulation, all the user perceives is the final result of an experience of reality. How this result is obtained is completely hidden from the typical user. Since only the final result matters from the user's point of view, what an architectural simulation is effectively doing is predicting the performance of a building. Performance in this context can refer to any aspect of a building, technical or visual. The processes behind the simulated performance are entirely different than in the real building. In the simulation, the processes are computational; in the building they are physical.

In order to use simulation in design, architect-users must overlook the obvious fact that they are looking at a computer display and not at a building. This sounds unlikely, but the logic of simulation drives the architect to do precisely that. The entire point of a simulation is to reproduce the experience of the eventual reality of the building. Architects must accept what they see in a simulation as an anticipation of reality in order to use it. Insisting upon the difference between simulation and reality amounts to a refusal to accept the simulation and negates its use as a design tool.

The seductiveness of simulations also pushes the architect to forget the separation between simulation and reality. This is not simply a pitfall to be avoided. The almost irresistible tendency to be drawn into a simulation is a well-documented phenomenon among users in the scientific research community, where it causes considerable anxiety (see S. Turkle, *Simulation and Its Discontents*, 2009).

SIMULATION IN ARCHITECTURE

The technology behind architectural simulations has made enormous strides since its inception in the 1970s. With the widespread adoption of BIM and computational design, simulation has begun to replace representation (drawing) as the architect's medium. Although these tools are currently being used chiefly to produce drawings, the process behind the extraction of these "drawings" from a computer model is radically different from creating drawings by traditional means, including CAD. Furthermore, the day is approaching when models themselves will replace drawings as architects' deliverables. There are many obstacles to be overcome before this happens, but for reasons of efficiency and owners' demands, it will happen eventually. Answering the question of what will happen as simulation displaces drawing is of the utmost importance. Simulation has effects on both practice and design thinking. These effects stem from two aspects of simulation: information management and computational design.

Information management has always been a significant aspect of architectural practice. With drawing, information management presents challenges due to the difficulty of coordinating drawings that are separate from one another and come from many sources. Architects act as the gatekeepers of project information, enabling them to control the design process by deciding what information is made available, when, to whom, and in what form. Also, because most people cannot read construction drawings, the architect has additional control over information given out to clients and the public. The centralized control of information in the hands of architects is largely responsible for their special position in the project. As the only member of the project team with a comprehensive view of the project, the architect is naturally considered its author.

The situation is much different with simulation. Now project information can be stored in a data model on a server, and accessed and augmented by a number of people, reducing the architect's control over the information. Contractors can be included from the beginning of design, providing constant feedback on constructability and costs. Furthermore, the information can be displayed by the model so that anyone can understand the form and organization of the building, allowing nonprofessionals to participate in its design. These capabilities allow design to be intensely collaborative in real time, breaking down traditional barriers among ownership, design, and construction. This process provides great advantages to the owner, and these advantages are greatest when a maximum amount of information is available and collaboration is as free and open as possible. The owner's interests counter the architect's tendency to want to control information. This implies a complete rethinking of the legal structure of the project.

Design thinking is affected by these changes in project structure. The criteria for a "good" design can now be based on its performance under various quantitative analyses. Since there is so much information available even early in the project's development—and it is in computable form—technical performance can be evaluated early and often for a large number of alternative designs. Because simulation allows every aspect of a design to be viewed through the performative lens, those that are most easily quantified tend to receive the most attention. Therefore, quantitative measures of project performance, be they technical or financial, tend to have greater influence on design decisions.

Computational design can yield forms that are impossible to draw yet can be fabricated using computer numerically controlled (CNC) machine tools. These forms may not be directly designed but can be generated by a computer algorithm. The architect designs the algorithm rather than directly designing a form. The architect often cannot foresee the results of the algorithm, but evaluates its results displayed by the computer, selecting among the forms it generates in an iterative process. While this can produce visually exciting results, it demands profound changes our concepts of design thinking and intent.

The automated fabrication of building components directly from the architect's computer files not only expands the possibilities of buildable forms, it also blurs the separation of design and construction. While architects can become builders in the sense that their computer files drive CNC tools, fabricators can become designers insofar as architects need their input and expertise to create economical, constructible designs that respect the properties of the materials and machinery.

PROSPECT

The building industry in the United States is in the midst of a transition from a drawing-based system to one based on simulation. However, the bridge has already been crossed. Many students emerging from architecture schools today are not skilled at drawing and unquestioningly accept simulation as the means of design without understanding its implications. More owners are requiring their architects to use simulation tools. New technologies and project delivery processes are being created under pressure from owners who are demanding greater efficiency and certainty. Simulation is pervasive in our culture. Architecture will inevitably follow suit.

For More Information

Simulacra and Simulation (University of Michigan Press, 1994) by Jean Baudrillard.

Drawing: The Motive Force of Architecture (Wiley, 2008) by Peter Cook.

The Alphabet and the Algorithm (MIT Press, 2011) by Mario Carpo.

The Thinking Hand (Wiley, 2009) by Juhani Pallasmaa.

The Death of Drawing: Architecture in the Age of Simulation (Routledge, forthcoming) by David Ross Scheer.

11.2 Technology in Project Delivery Phases

Stewart Carroll

Technology is transforming every aspect of professional practice, including how we communicate, conceptualize, design, engineer, evaluate, and deliver our projects. This article will explore how technology is affecting the phases of project delivery.

INTRODUCTION

A convergence is near inside the AEC [Architecture Engineering Construction] space and that point is quickly approaching. The concept of a singular database for all is not all too unrealistic and tools exist now that are beginning to realize just that. Designers of the future will be wholly different than they are today having their work, process, and output scrutinized by all parties at all times for the betterment of the project. They, conversely, will have access to other data for their scrutiny as well. The days of working in siloes are over.

—Clayton Starr, Associate, RTKL

Technology is changing how projects are delivered, what is delivered, who is responsible for delivery, and how our industry is rewarded for the value that is delivered. In essence, the very fabric of architectural professional practice is undergoing change.

In his book *The Innovators Dilemma* (HarperBusiness, 2011), Clayton Christensen compares disruptive and sustaining innovations. A disruptive innovation helps create new markets and value networks, and eventually goes on to disturb existing markets and value networks, over a few years or decades, displacing an earlier technology. In contrast to disruptive innovations, sustaining innovations do not create new markets or value networks but rather evolve existing ones with better value, allowing competition between the firms in implementing sustaining improvements.

The technological changes occurring in project delivery are based on disruptive innovations. The consequences of these innovations were likely unseen by their creators and it's highly likely that the full ramifications of these changes have not yet been completely revealed.

TECHNOLOGY IN TEAM FORMATION

The need to manage a team and the data a team produces is very important, irrespective of the number of project team members and number of documents created on a project. Many project management solutions exist in the market, ranging from home-cooked company-shared network drives and FTP sites to specialized web-based collaboration portals, and integrated project information management (PIM) systems.

The simplest forms of management systems simply focus on archiving project data and don't really provide a mechanism to manage the work flows associated with the team. Many of the web-based collaboration and PIM solutions such as NewForma™ define the team members, the subgroups within the team, and the subgroups each team member is on. They also will manage permissions of each team member; track workflow within subgroups and among overall team members, provide a complete history of project documentation with change set management, and even integrate with building information modeling (BIM) applications. Many of the upper-end solutions even have the ability to mine data across projects, so that the team can see where they are relative to other projects of a similar building type, size, etc. This does require standardization at the firm level as opposed

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to the project level, which makes it difficult for project team members whose company standard does not line up with the solution being required by the owner or architect.

To see that the entire project team is aware and aligned with the projects intent and the steps necessary to execute the project is very important. Microsoft Office™ products such as Microsoft Word™ and Excel™ are in wide use for capturing and communicating project intent and project execution. Many in our industry are visual by nature and tools such as Microsoft Visio™ and most recently Mind Map™ are becoming common. Mind Map in particular is popular because many "mind map" applications run on mobile devices, so they can readily be created and viewed when out of the office. They are also easy to learn and to use, as well as serving very well to map the way our minds work. Unlike written communication, which has a predetermined structure (in English, for instance, we go from left to right and top to bottom), mind maps are not linear. They visually capture ideas and show connections between ideas, with no real fixed start or end.

Interaction between team members is vitally important. Teams from all over the country and across the world are using technologies like GoToMeeting™ and WebEx™ as a means of communicating. When it comes to collaborating on the work product, distributed teams can now work on the same virtual model at the same time. Many of the BIM offerings provide a way for multiple team members to work on the same project at the same time. Backend BIM servers coordinate the changes being made by project participants. Unfortunately not all of the BIM applications are interoperable; as such, make sure that all project participants are working on the same platform and version of the BIM software. Historically CAD allowed users to save drawings back to an older format. Many of the BIM applications do not permit users on newer versions to save their models to older file formats. Therefore, all users need to agree upfront which versions of the software will be used on the project developed. This can pose a problem when projects span multiple years, with all project participants needing to remain on the same version of the software. In some cases this can mean having multiple versions of BIM, for different projects, on one user's machine.

TECHNOLOGY IN PRE-DESIGN AND CONCEPTUAL DESIGN

One of the major changes in professional practice has been the adoption of 3D modeling early in the design process. Traditional hand rendering of concepts has almost entirely been replaced with 3D computer modeling. In this area, Google's SketchUp™ is ubiquitous. Its simple user interface, coupled with its low cost, make it a very easy transition to computer modeling for firms of any size and users of any experience level. The ability to rapidly mass ideas, render, and use the model and technology live with the client during presentations make this style of modeling a very common starting point for the modern design process. The major advantage is the speed with which ideas can be explored during conceptual design, combined with the fact that the learning curve to proficiency is relatively short. Owing to the advantages of this technology, a number of firms struggle to leave this technology behind in the later stages of the design process; it is not uncommon to see the transition to production-oriented technologies and the use of SketchUp running in parallel. Over time the SketchUp teams have started adding drawing production–oriented functionality to this highly popular technology.

Another starting point, often associated with more complex nonlinear forms of geometry, are NURB and Spline-based modeling tools. These tools are typically harder to learn than SketchUp, but when conquered they enable designers to push the envelope on complex geometric forms. An interesting extension to these technologies being used by a number of design firms, such as Pickard Chiltern and Skidmore, Owings & Merrill (SOM), is parametrically constrained smart geometries. In these extensions, the designer parametrically constrains the geometrical model, then uses the computer to rapidly generate derivative geometric forms.

The use of BIM tools is growing as a starting point in the early design phase. Many of the major vendors have incorporated massing functionality into their offerings. The obvious advantage of using the same tool for design and production is that the transition from design to production is seamless. The challenge with this starting point is the often rigid nature of the massing tools within the BIM offerings. However, many of the vendors have put significant development effort into making the massing tools easier to use.

The use of physical scale models is still common; however, even in this area, a number of technological changes are assisting practitioners. Three-dimensional printing directly from computer models is becoming a more common technology. There are many vendors offering a variety of cellulose- and plastic-based printing solutions that translate the 3D computer model into a physical model. This enables both the designer and the client to experience a tactile form of the concept and assists in design decision making. Both monochrome and color 3D printers exist. The cost of this technology continues to drop, making it more accessible. However, the challenge at the time of this writing is the level of detail being put into the virtual model. High levels of detail can make printing difficult or even impossible, causing the designer to have to modify the virtual model for the purpose of converting it into a physical model.

Another interesting development during the conceptual design phase is the increasing number and diversity of analyses being carried out on the designer's concepts. Decision making during this phase is becoming much broader than aesthetics. This trend is being driven by the move to sustainable design, with most commercial projects being designed to meet the standards of the LEED rating system. Analysis at the conceptual phase is extending beyond sustainability to include more in-depth analysis of projects' financial and schedule viability.

PICKARD CHILTON

Pickard Chilton is a New Haven, Connecticut–based architectural design firm. In summer 2009 the firm was invited to participate in a limited international design competition for a significant new corporate campus in Texas on a wooded and ecologically diverse site. Intended to serve and consolidate employees currently working in a variety of locations, the project comprised multiple low-rise office buildings, a laboratory, conference and training centers, child care facility, wellness center, and other amenities.

Pickard Chilton worked closely with the client to clearly define its desired project outcomes and understand their project concerns and aspirations. To best respond to the client's objectives, Pickard Chilton developed a unique measurement criterion that enabled them to compare their design ideas against their client's desired outcomes. The measurement criterion consisted of 10 individual metrics against which each concept was evaluated. Certain measures, such as design quality, were qualitative; others, such as building energy, lighting, financial and schedule, were quantitative. Pickard Chilton then developed a weighting system that, when applied to a particular design, could be used to easily compare concepts.

During the conceptual design phase of the project, Pickard Chilton used a variety of 3D modeling and analysis technologies to develop and evaluate each concept. In their presentation to the client, Pickard Chilton demonstrated four comprehensive master plan concepts and then, within each concept, detailed its work for each program element in developing a plethora of options, such as a basement, numbers of floors, form, gross building areas, exterior building envelope options, and MEP systems. Each concept was evaluated against its respective measurement criterion.

In the interview with the client, Pickard Chilton deployed a number of presentation materials, including traditional storyboards, physical and virtual models, and stereolithography (SLA) physical models. Data derived from their numerous computer models and analyses demonstrated that the team clearly understood not only the client's desired outcomes but also the specific implications of a number of potential design decisions.

In adopting this system of measurement criterion, Pickard Chilton was able to communicate to the client their deep understanding of the project in a way that they would not have been able to without this approach. The firm was subsequently awarded the project and it is now under construction.

TECHNOLOGY IN SCHEMATIC DESIGN

Geographic information systems (GIS) have been around since the 1980s and are designed to virtually create, manipulate, analyze, and visually represent geographical data. The overlap with the AEC industry is clear; we focus on the built environment, which is built in the geographic environment. Groups such as the Open Geospatial Consortium have sponsored collaboration between GIS and BIM vendors to close the gaps between software. Google Earth™ was the first widespread GIS solution to pique the interest of many industry professionals in connecting GIS and BIM. With its integration with many of the 3D and BIM applications on the market and its very low cost to firms, many projects start with Google Earth™. In lieu of a CAD file showing site boundaries, many start the schematic design phase by typing the project address into Google Earth and using it as a method of identifying the existing conditions. Unlike a CAD file, Google Earth enables the context of the site to be explored. The ability to show local points of interest, proximity to local amenities, and local highways and interstates replaces the need for a site visit until later in the project.

Many of the same tools described in the previous section are still being used in this phase. During this phase it is typical to provide the owner with walk-through, renderings, and animations of the project. Low-end graphical walk-through of models can be done in all 3D tools and BIM offerings, and involves navigating the 3D model in front of the owner in lieu of a 2D PowerPoint presentation. This can either be done face-to-face with the client or delivered over the web with tools such as GoToMeeting or WebEx. It is not uncommon to export the 3D model from the authoring tool back to Google Earth in order to show the design in the context of its surroundings. More visually realistic renderings can be created by using the rendering functionality built directly into the 3D or BIM authoring tool. More typically, the 3D model is exported into specialized rendering tools such as Autodesk® 3ds Max®. Autodesk 3ds Max has a variety of rendering plug-ins available to its users, each aimed at maximizing a particular rendering effect or style. Depending on the client and the project, computer animations are used as a method of communicating design intent, and, similar to renderings, different levels of photo-realism can be introduced into the animation.

In many renovation projects, existing conditions drawings don't exist or don't reflect the state of the current facility. Laser scanning is being used as a method of capturing a detailed 3D representation of the existing conditions.

A laser scanner is an optical device that can shoot and catch beams of light, and use the time between outgoing and incoming beams to measure very accurate distances. By shooting thousands or even millions of beams of light from a fixed control point in 360-degree azimuth, the device builds a 3D point cloud that graphically represents the environment. By moving the laser scanner to additional control points and repeating the process, a set of point clouds can then be combined to create a single point cloud representing the existing conditions. Processing of the point cloud involves using technology to convert points into surfaces, and in many cases from surfaces to objects in BIM. The post-processing of the point cloud can be time-consuming and labor-intensive.

Photogrammetry is another technology used to rapidly create a point cloud representing existing project conditions. Photogrammetry takes a series of photographs from a fixed control point and measures the distance between points that lie on a plane parallel to the photographic image plane. By measuring multiple points, a point cloud of the elements in the model is constructed. A number of 3D modeling tools such as Rhino™ are in use today that support photogrammetry as a means of defining a 3D model. Typically, photogrammetry produces lower resolution models than laser scanning; however, the cost of producing the model is also significantly lower.

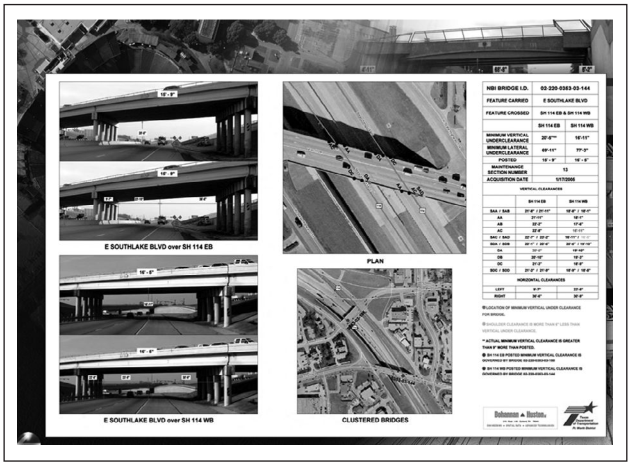
TxDOT

The Texas Department of Transportation (TxDOT) had 1,100 bridges that needed to be surveyed to obtain clearance data for approximately 3,300 spans. The project involved scanning of up to 1,000 bridges. By working closely with the Ft. Worth District of TxDOT, the Woolpert team developed a comprehensive plan to deliver clearance information on approximately 3,000 spans within one year. (See Figure 11.2.) Established in 1911, Woolpert is a design, geospatial, and infrastructure management firm with its home office in Dayton, Ohio.

The Woolpert team captured and processed complete bridge clearance inventory across all seven counties of the TxDOT Ft. Worth District using a Leica Geosystems HDS 2500 and HDS 3000 terrestrial LiDAR systems.

Woolpert deployed high-definition survey crews to each bridge site to set up and operate the laser scanning equipment. All work complied with all TxDOT survey work zone safety requirements. Once the data was collected for each bridge, the point clouds were processed to provide the critical vertical clearances of the structure above each lane line and the lateral clearances of obstructions perpendicular to the travel lanes. These clearances were determined based on National Bridge Inspection Standards (NBIS) and TxDOT requirements. High-resolution digital photography was collected simultaneously with data acquisition to facilitate the creation of hard-copy recordings of all pertinent PONTIS data defined by the Ft. Worth District's bridge maintenance division. The Woolpert team developed specific computer software applications and programmed scripts to interface with PolyWorks® for the automated extraction of key bridge measurements from the terrestrial LiDAR scanner point cloud data. Hard-copy deliverables were produced through this process to show the clearance measurements on digital photographs and database population for GIS, PONTIS, or NBIS applications. Reducing the need for human interface enabled the team to reduce or eliminate associated errors. Since the measurement data was collected remotely, Woolpert could safely acquire high-accuracy bridge structure surveys in heavily trafficked roadway corridors. No survey personnel were required to perform the dangerous and difficult steps needed to acquire clearance information in traffic, and no lane closures were required, thus reducing the impact to the traveling public. A comprehensive and unique digital bridge inventory package, consisting of PDF, GIS database, and CADD deliverables, was provided to the TxDOT bridge inspection group. Data sheets for each highway bridge structure depicted the plan view and front elevation view and were complete with elevation heights of minimum vertical under-clearance, minimum lateral under-clearance, and posted clearance.

Woolpert's approach to this project provided all the high-definition survey data that TxDOT needed regarding its on-system bridges in an efficient, cost-effective manner. Using laser scanning techniques enabled the team to record all relevant clearance data at the same time and without disrupting traffic. In several locations, this data could have otherwise been difficult, dangerous, or impossible to obtain by other methods. Once the data was acquired, the automated process generated existing vertical and horizontal clearance information with hard-copy visual reference, along with other crucial maintenance data, to provide the bridge inspection group with data never before available. Automated procedures rapidly cut processing time for extraction of bridge clearance information, critical maintenance data, and hard-copy reference plots, as evidenced by the project's completion well ahead of the anticipated schedule.



Bohannon Huston, Inc.

FIGURE 11.2 Minimum Vertical Clearances

TECHNOLOGY IN DESIGN DEVELOPMENT

The design development phase involves both design and production processes. 3D design technologies such as SketchUp, Rhino, and form•Z, used during the pre-design and schematic design phases, are still being utilized; and if BIM is used on a project this is typically the latest it would be started. Production processes, employed at the end of the schematic phase to produce SD deliverables, are ramping up, and in larger firms the number of employees on the team may increase during this phase. Input from consultants typically increases during design development, with involvement from civil, structural, mechanical, envelope, and specialty consultants.

During this phase structural engineers are calculating detailed load information (live and dead loads, wind loads, seismic loads, etc.), along with deflections. They are using finite element analysis software to try to conform their solutions to the constraints required by the architect.

Typically, structural engineering tools fall into three types: structural steel, structural concrete, and foundation analysis. A number of products, such as Autodesk ROBOT™, Concrete in Structures ETABS™, and Bentley's RAM™, are commonly used during this phase of the project. Similarly, mechanical and electrical engineers are calculating the building, zonal, and equipment loads associated with the project and are using these calculations to size and layout equipment. Typical mechanical design technologies used during this phase are EQuest™, Energy^{+}™, Trace™, and HAP™.

Also during this phase, the general contractor is often getting involved and providing feedback to the client. In lieu of a BIM model, the contractor can use the PDF versions of drawings from the architect with some sort of on-screen take-off technology coupled with a cost-estimating system such as Timberline™ or MC2™. More commonly, BIM models either provided by the AE or re-created by the general contractor are used to extract quantities for cost estimating with technologies such as Autodesk QTO™ or Innovaya™, and the quantities are linked to cost assemblies with cost-estimating systems such as Timberline or MC2. Besides cost estimating, the project team is starting to look at construction schedules based on the proposed design. Primavera™ and Microsoft Project™ are sometimes used, but visually linking the BIM with the schedule using tools like Autodesk Navisworks Timeliner™, Synchro™ and Vico™ is more common. The advantage of these technologies over traditional scheduling technologies is that the schedule is tied to the model and can be visually simulated. Simulating the schedule enables the team to scheduling issues, identify logistics issues, and address safety concerns long before the construction phase of the project.

TECHNOLOGY IN CONSTRUCTION DOCUMENTS

Ensuring that a project meets a jurisdiction's specific building codes and accessibility requirements has historically been a long and laborious process involving many markups, rework loops, and heated discussions with code officials. With the introduction of BIM, both 3D spatial data and object metadata can be used to ensure compliance with both building code and accessibility requirements. FIATECH, Target Corporation, Solibri, the International Code Council, and Avolve software are working together on a new platform called AutoCodes. This platform should reduce review time and speed up the approval process.

Throughout the design and construction process, CAD- or BIM-based deliverables are provided to a variety of project participants. Printed drawings are still in use, but are becoming more limited due to environmental awareness in the industry and the cost associated with printing. Many in the industry have taken to electronic exchange of both 2D and 3D data. The most common form of electronic exchange is through PDFs, although DWFs are also in use. A number of technologies for managing PDFs are in practice, the most common being Revu™ by BlueBeam, which provides tools to manage, mark up, store, and link other data to the PDFs.

Autodesk Navisworks is most commonly used in the construction phase of a project by the general contractor and subcontractor to coordinate the sub-trades as they are coordinating shop drawings. However, it is increasingly being used by architects as a way of ensuring that cross-disciplinary data is coordinated during the construction document phase. In some cases AE firms who have adopted this technology, such Iron Horse Architects in Denver, are now providing a new service line and revenue stream by using Navisworks on behalf of general contractors who don't have the ability to use this technology.

TECHNOLOGY IN CONSTRUCTION ADMINISTRATION

Once upon a time the job site was a relatively low-tech, people-intensive place. Those days are gone. Today the modern job site often has many of the same technologies being used as those in the office during the design phase. Many forms of communication, project management, quality control, and just-in-time delivery are affecting modern construction.

One of the most important parts of the construction administration phase is to ensure that design intent is carried into construction and translated from idea to built environment. One of the early steps is transferring the locations of major project elements from drawings to the physical space. Surveyors are using Total Station, which are electronic theodolites (or a transit, which is generally less accurate) with integrated electronic distance meters that measure slope and distance from the device to a point of interest, to lay out major construction elements. Recent developments in Total Station technology have seen the creation of Robotic Total Stations integrated with BIMs from earlier project phases. The automation of converting points in the model to physical points in the world has dramatically reduced the time and accuracy associated with laying out the project.

Both laser scanning and photogrammetry, as described earlier in this article, are also in use during the construction administration phase of the project. These technologies are being used as a method for field verification of construction. Point clouds are captured and, after the construction of a particular section of the project is complete, can then be combined with the BIM to determine if actual construction matches planned construction. If there are construction issues, corrections can be made before moving on. This type of quality control ensures that problems are caught when they are introduced, not weeks or months later when it is too costly or time-consuming to fix the issues.

Paper drawings, whether CAD-generated or BIM-generated, are still in common use on the job site; however, it's not uncommon for construction-hardened laptop computers and, more recently, mobile devices to be used to review, mark up, and capture job-site notes associated with drawings. With the proliferation of 3G and 4G wireless networks, direct connections between the field and back office are common. Many of the modern project management technologies enable markup, redlines, and notes to be automatically synced with the project management application, enabling personnel in the field to communicate in real time with the office. Laptops and mobile devices with integrated high-resolution cameras enable photographs, videos, and even real-time web conferencing between the field and the office. Project management software has also enabled the creation and management of formalized requests for information (RFIs), RFI tracking, and RFI history.

CONSTRUCTION PROCUREMENT

A number of construction elements, such as curtain wall and precast façades and structural steel members, have typically been prefabricated off site. Off-site prefabrication offers a number of benefits to traditional on-site construction methods, including improved quality, reduced waste, and a predictable delivery schedule. The downside is that once the off-site construction begins, the project is locked into the size and shape of what is being fabricated. In the traditional drawings-based method, errors were common and prefabrication often required redrawing the architectural drawings to ensure that the element could be fabricated. With the adoption of BIM, digital fabrication directly from the model has become possible. Because the model can contain fabrication-level detail, the costly step of shop drawings for off-site prefabrication can be eliminated. In essence, the architectural model can be the fabrication model.

HINMAN RESEARCH BUILDING

The Hinman Research Building at the Georgia Institute of Technology is a renovation and historic preservation project completed in 2010. It is now the studio space for students of Georgia Tech's College of Architecture. The project was designed by Office dA, with Lord, Aeck & Sargent as architect of record and the Beck Group as builder.

As design documents became further developed through the budgeting and early construction phases, the prices being received from the millwork subcontractor market began to escalate beyond the initially set project budget. Part of the issue was trying to communicate design intent for millwork installations that were complicated at best. The scope involved mostly computer numerical control (CNC)-routed 18mm Baltic birch plywood installations of stairwell paneling, computer lab desks, plywood storefront, custom plywood doors, some large interior windows, and wall paneling, as well as the desks, tables, and lockers for the building. (See Figure 11.3.) Most of the scope involved millwork details that follow the topology of existing and irregularly shaped building elements.

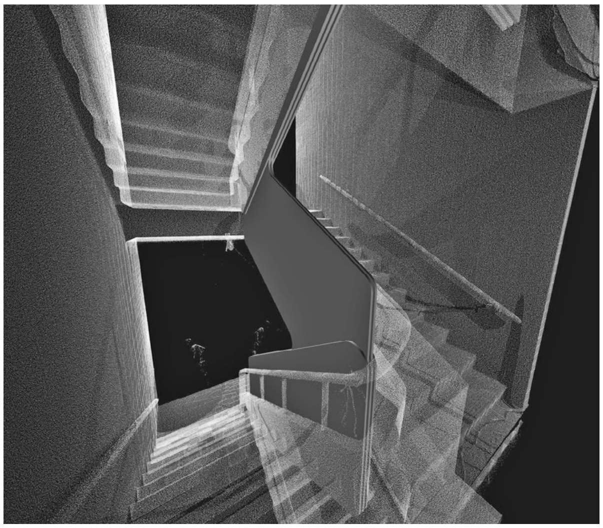
Uncertainty around communicating the scope of work in the limited avenue of two-dimensional design documents was partly to blame. Despite working with the market, the reality of a fixed budget began to mean that the scope of the work would begin to be "value engineered," which in most cases is code for scope deletion. In an effort to truly engineer a process to provide value to the university, and also, importantly, to help realize the design definition of project success, the team started looking at what processes, people, and technology were really required to do this work as designed and within the construction budget.

The team found a residential cabinetmaker who owned the type of machine needed to cut the plywood, rather than a traditional finish millwork company that would typically be contracted to do this kind of work. The team was able to reduce the cabinetmaker's risk and keep the price low by taking on the production of digital prototypes. The modeling and detailing resulted in the production of digital information from which the CNC machine's code was generated. By automating the production of the millwork, the pricing of the work started to become fairly commoditized: Rather than receiving lump sum pricing to do a certain amount of work, a rate was negotiated per sheet regardless of what was being cut, as well as a rate per square foot to sand and finish the pieces. Digital labeling of each cut piece contained information about what part of the building the piece belonged to, and what treatment each side and edge needed to receive. All of this labeling information, fabrication information, and installation instructions were generated out of Autodesk Inventor™.

There was also a particular need to gather information about the geometry of the building to be able to model pieces that met the design intent. One example was stair railing and paneling that had a ¾″ reveal at the bottom that was to be maintained all the way up the stairwell. (See Figure 11.4.) With the stair being poured concrete, there was a large amount of variation in the tread dimensions that made

Stewart Carroll

FIGURE 11.3 Plywood Stairwell Paneling



Stewart Carroll

FIGURE 11.4 Plywood Stairwell Paneling Model

(continued)

PART 3: PROJECT DELIVERY

achieving the design intent a considerable challenge. To help address this and similar challenges, the building was laser scanned. At the time it was not possible to import point clouds into Inventor, but the project team desired to modify the model in Inventor with the scan data present. To do this, Leica's Cyclone™, a point cloud management platform, and Meshlab™, a free tool for generating surfaces from point clouds, were used in combination to create meshes that could be brought into Inventor to adjust the model to meet existing conditions. After initial panels were produced and successfully tested for fit-up, the rest of these panels could be produced off-site without any need for field cutting or rework.

The installation of the millwork scope was performed by the contractor, which again minimized costs and allowed for better control and coordination with the broader project schedule. Installation drawings were produced from the digital prototypes. This type of information is much more intuitive than having to work with many 2D documents to communicate the same amount of information.

In the end, the project was delivered to Georgia Tech for the originally set budget, on time for the spring semester opening, and without compromise to the designer's original vision for the space.

Other technologies frequently seen during procurement and delivery to the job site are bar-coded or RFID (Remote-Frequency Identified) tagged building materials or prefabricated building elements. Bar code or RFID readers can be used to check off elements and materials as they are delivered to the job site, along with a means of tracking quality control items. A number of technologies exist that integrate bar code and RFID tracking, the most popular being the integration between Tekla Structures™ and Vela Systems Material Tracker™ for structural steel elements. These applications enable a visual representation in the BIM of elements yet to be delivered to the job site, elements delivered but not installed, elements delivered and installed, and elements delivered but of poor quality that need to be refabricated.

OCCUPANCY AND OPERATION

Many forms of technology are used within owners' organizations during the occupancy and operation phase. In particular it is common to see building management systems (BMS) monitoring the MEP performance of the building, and also some sort of computerized maintenance management system (CMMS). During the final weeks or months of the construction phase, the project is usually commissioned. During commissioning all major building systems are tested, and performance within design parameters is confirmed. The MEP equipment is typically installed with sensors that enable ongoing monitoring of the performance of the equipment.

Once the construction phase of the project is complete, "as-built" drawings are delivered to the owner. These as-builts are then typically uploaded electronically, in the form of 2D PDFs or 2D CAD files, into the owner's CMMS system. Then operation and maintenance (O&M) schedules and data can be linked in the CMMS to items on the drawings. Typically this process is fraught with error and is very laborious. To solve some of these problems, a number of construction firms are delivering as-built models with objects in the model hyperlinked to O&M information.

Many in the industry have recognized the potential value of connecting the information created during the design and construction phase with the operational phase of the facility. Dr. Bill East and others at the National Institute of Building Sciences have been pioneering the Construction Operations Building Information Exchange (COBie). The intent of COBie is to provide a common data exchange format that enables data from different sources created throughout the design and construction process to be aggregated and carried into the operations phase. Many of the BIM technologies in use today support COBie.

FEDERAL AVIATION ADMINISTRATION

The Federal Aviation Administration saw the potential value of BIM in its existing facilities program. This pilot project in Brunswick, Maine, was used to demonstrate how BIM can be used to rapidly capture existing conditions and a tie to their BMS and CMMS systems. The project team consisted of the owner, FAA; the prime contractor, Lockheed/NISC; Ecodomus; and the Beck Group as subcontractors.

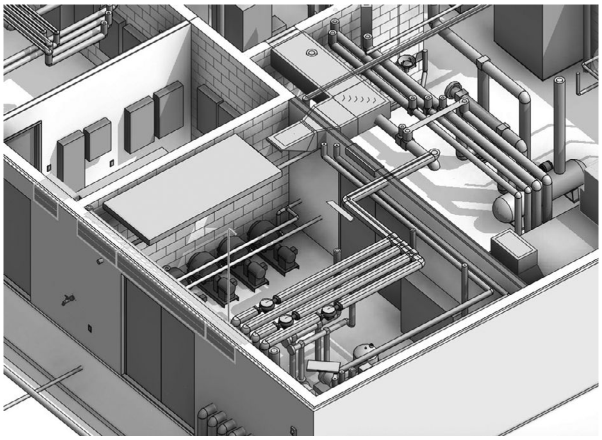
As is the case with many older facilities, existing drawings didn't always match the conditions of the physical project. Existing conditions drawings for structure and equipment were combined with laser scanned point cloud data and used to rapidly create an existing conditions BIM. Where design data was available, the preliminary modeling could be done using the intended dimensions of the structure and equipment. The laser scan, however, identified myriad differences between the drawings and the actual conditions: equipment in different locations and specifications, metal panels having expanded and shifted from heat, HVAC systems with alternative routing methods as-fabricated versus as-designed. As the model was developed, critical information was input into each asset in the model, using the COBie format. This data formed the structure for interacting with the model downstream. Each object was identified with a specific Asset Tag, with information tying that asset tag to manufacturer's data, maintenance manuals, parts lists, and instructions and notes for operating and maintenance, such as, "A ladder is required to access the equipment."

Once the model was completed, the team began formatting the BIM into a usable interface for the O&M crew: BIM authoring software is purposely suited for design and construction, but not currently ideal for use downstream in operations, due to the fact that models are typically resource-intensive and hardware-demanding, and in most cases not very portable.

For the interface between BIM and the FAA's BMS and CMMS, the team used Ecodomus's Facilities Management product. Ecodomus FM™ utilizes a BIM export that provides a lightweight viewer and navigator so that it can run on less demanding hardware while still providing all of the asset data and visualization from the BIM. In addition, Ecodomus FM allows several additional connections to be made to the asset identification, including the BMS and the CMMS. This allows immediate visualization and streamlined troubleshooting when off-site facilities managers receive alerts from the BMS indicating that a problem has occurred. For instance, if an alert is triggered indicating that the national server room is too hot, and the issue is isolated to four devices—sensor #1, sensor #2, Air Handling Unit #3, and Fan #4—the Ecodomus FM solution will illustrate where the room and devices are in the BIM. (See Figure 11.5.)

The FAA is not endorsing any specific tool as a part of this proof of concept. The tools selected were merely chosen to demonstrate the capabilities of life cycle BIM.

This case study demonstrates how design and construction models can be used downstream by building operators through the connection between BIM and BMS and CMMS systems. The potential to replace static 2D documents that often become outdated very quickly with intelligent data-rich 3D models has tremendous value. It can reduce the cost associated with the transition from design and construction to operations.



Stewart Carroll

FIGURE 11.5 BIM and Facilities Management

CONCLUSION

Although the pace of technology adoption in the AEC industry has been historically slow, its impact since the 1990s has been profound. Technology will continue to act as the catalyst that will enable changes to the industry, which will, in turn, result in the delivery of higher-quality, lower-cost, and more predictable facilities.

11.3 Small Firms, Small Projects, and Building Information Modeling

François Lévy, AIA, AIAA

This article discusses the benefits, challenges, and best practices of building information modeling in smaller architecture practices, defined as those of fewer than 10 people.

INTRODUCTION

This article discusses the benefits, challenges, and best practices of using building information modeling (BIM) in architecture firms with fewer than 10 people. The use of BIM has the potential to greatly expand the capacity of small firms to efficiently and accurately deliver projects of all sizes. Although the adoption of BIM takes time, capital investment, and training, it enables small-firm practitioners to use tools and processes that promote collaboration, effectiveness, and, in the right hands, design innovation.

While the term "BIM" may equally refer to a virtual artifact (building information model) rather than a process (building information modeling), this article uses the acronym to refer to the latter. For the former, "virtual model" or "building information model" is used.

BENEFITS AND OPPORTUNITIES

BIM is an inescapable topic of professional interest among architects. Those who advocate its use promise greater production efficiencies, fewer errors, and a more collaborative design process among stakeholders. While much of the BIM conversation has focused on large architecture firms and by extension large projects, most architects in the United States work in firms of six or fewer. Furthermore, anecdotal evidence suggests that smaller firms are able to execute larger projects than in decades past due to technological efficiencies including BIM.

Efficiencies

▶ Other articles in in this chapter present further discussions of building information modeling.

BIM's most obvious benefit lies in production efficiency of design documents, from the early phases of conceptual design through design development and construction documents. Such efficiency is gained by extracting multiple graphical views—i.e., drawings—from a virtual model. While the initial investment of design time on a building information model might seem prohibitive, as more views are derived from the model its value increases. While BIM tends to increase the workload in earlier phases of design (a so-called left shift or frontloading), for most projects the development of the virtual model as the basis of a drawing set is more efficient than the CAD production of a corresponding set of 2D drawings (Giel and Issa, "BIM Return on Investment," 2011). This is generally the case even though a portion of the BIM set, such as details, might consist of 2D embellishment of lower-fidelity model views such as LOD 200 models (see Figure 11.6). When the virtual model is maintained throughout the design

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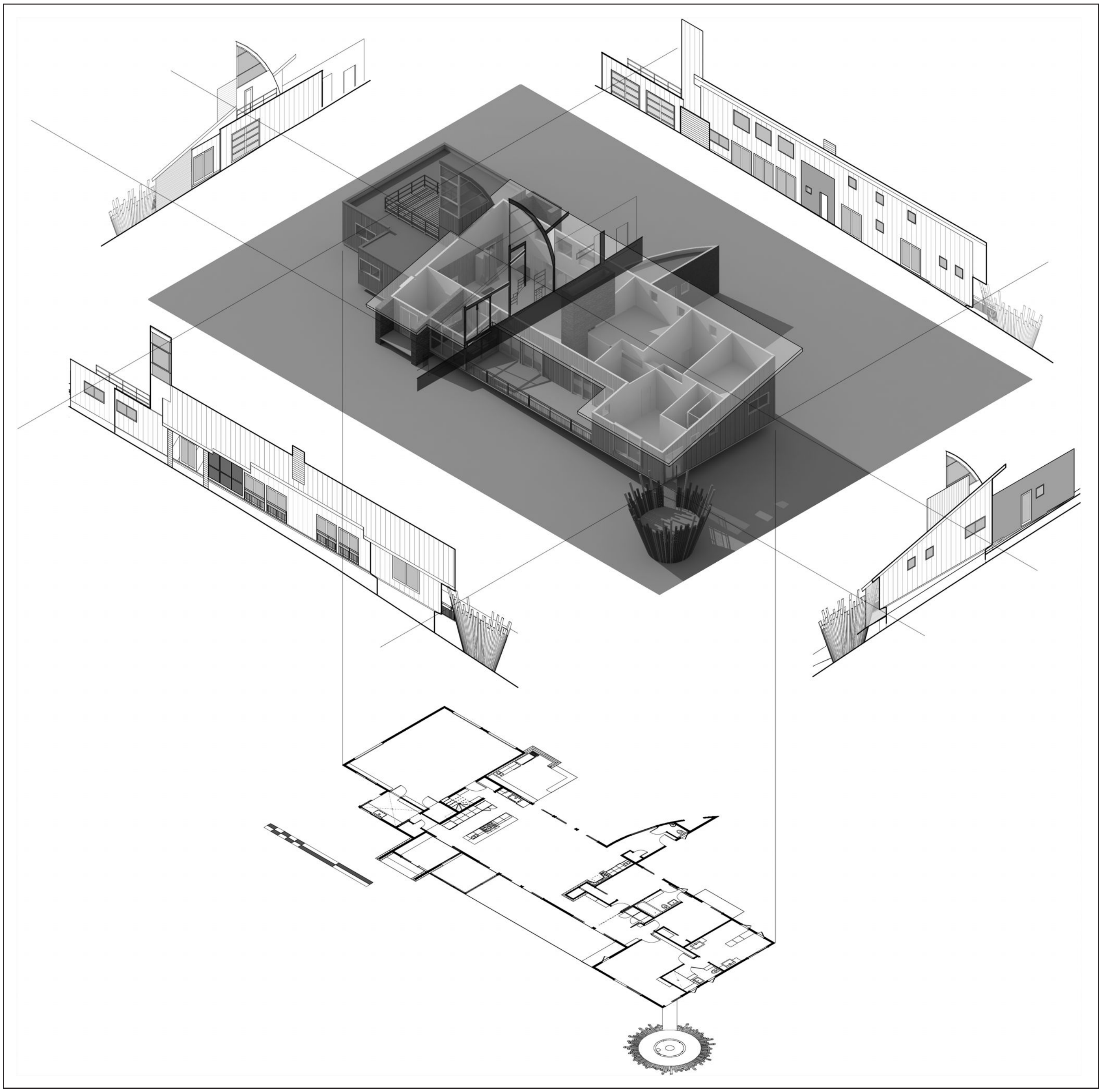

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FIGURE 11.6 A virtual model in BIM is the source of a series of extracted graphical—and tabular—views.

process (instead of being "exploded" into 2D views, which are then carried through the end of design), the various drawing deliverables will be automatically coordinated. This represents further efficiency gains over manual updating of plan, section, and elevation in CAD.

Project documentation likely also consists of tabular views, including:

- Door, window, fixture, and finish schedules
- Floor area takeoffs
- Material takeoffs, such as net exterior wall area, roofing area, concrete volume, etc.
- Envelope energy code calculations, confirming compliance with total thermal conductance codes

- Lighting power density calculations
- Various building performance design guideline reports, such as rainwater harvesting calculations and passive heating or cooling calculations (Lévy, *BIM in Small-Scale Sustainable Design*, 2012)

In a traditional hand-drafted or 2D CAD work flow, such tabular views are manually created and updated, which may be tedious and error-prone. In BIM, the geometric (dimension, area, volume, location) and characteristic (material type, cost, U-factor, etc.) data are either intrinsic to objects or can readily be assigned to them. Thus the creation and updating of these schedules and reports can be automated, saving time and avoiding errors.

Many of the more common tabular views, such as window schedules, can be automatically created by the various authoring software platforms. Others, like performance guideline reports, may initially need to be set up by a knowledgeable user. This requires expertise and an investment of time; however, once established, these reports may be incorporated in the firm's standard project template and leveraged for reuse in other projects.

Finally, it is well documented that BIM's inherently interrelated views are also conducive to fewer coordination errors.

Opportunities

While there are potential benefits of BIM that are common to all firms (including improved collaboration, efficiency, coordination, visualization, and clash detection), certain opportunities may be of particular interest to smaller firms:

- *Larger projects*. As technology affords greater efficiency and effectiveness, smaller firms can successfully execute larger projects than in times past. They can become more competitive in seeking larger projects and corresponding commissions.
- *Teaming opportunities*. Small firms that develop facility with the collaborative tools of BIM may be attractive team members for larger firms competing for large projects. Firms that embrace the technology might thereby gain opportunities to broaden their experience with project types and sizes historically barred to small-firm entry.
- *Visualization*. The 3D and data visualization characteristics of BIM, while useful to all, are particularly so for projects with less-sophisticated clients and contractors who may find 2D technical drawings unclear or uncommunicative. Such visualization may also improve conflict or clash detection on projects with smaller design teams and faster schedules.
- *BIM's efficiency benefits* are financially and competitively attractive for firms executing projects on shorter schedules or for leaner fees. Alternatively, BIM may enable a firm to realize greater profitability from the same fee.

BIM CHALLENGES

Along with the benefits of BIM for firms large and small, there are also challenges associated with BIM, some particularly acute in small firms. There are several common barriers to effective implementation of BIM, and approaches to overcoming them are addressed later in this article (and in the case study "Evolving to BIM"). Once a small firm has transitioned to BIM, there may be continuing challenges to effective use of the technology and work flow. Typically these are managed with greater confidence and skill over time, but may persist or recur with technological improvements, changes in personnel, or the evolution of the firm's portfolio of projects.

Appropriate Level of Detail (LOD)

A common concern in a BIM work flow is the appropriate level of detail attributed to the virtual model. AIA Contract Document E202™–2008, Building Information

Modeling Protocol Exhibit, identifies five levels of development (LODs) as well as the model element authors (MEAs). All five LODs may include attached non-geometrical data:

- 100: Massing, including location and orientation
- 200: Generalized systems or assemblies, approximately quantified and located
- 300: Specific assemblies, accurately modeled
- 400: Specific assemblies, accurately modeled and detailed so as to be suitable for fabrication
- 500: Accurate, as-constructed actual assemblies

A virtual model need not be uniformly developed or highly detailed to be useful (Figure 11.7). For example, in schematic design walls may be represented at LOD 200, but mechanical systems may be at LOD 100. AIA Document E202™–2008 provides a detailed protocol for establishing LODs for each building assembly at each phase of design.

While it may be more detail than required for, say, a detached single-family residential project, AIA Document E202™–2008 can serve as a useful internal guideline for small firms, stimulating a firm's internal consideration of appropriate expectations for a virtual model for a given project. Indeed, managing the designer's expectations for the virtual model deliverable—as well as those of owners and consultants—is an important component of a successful BIM work flow.

When BIM is criticized for its detailing capabilities, what is often meant is that BIM's representation of detail conditions is highly abstract. However, it is neither feasible nor advisable for the virtual model to incorporate every fastener or every piece of flashing that one would find in the real building. It is, after all, a *model*, which implies a certain degree of abstraction. Detailing every building component would be overwhelming in terms of both time and computational cost, aside from the potential liability exposure.

BIM can effectively be used to explore and resolve solutions to all manner of design problems, even at a detail level (Figure 11.8). An isometric detail, for example, can be quite valuable. Such details might be populated by libraries of conventional building components and supplemented by free-form modeling elements to address unconventional conditions. This allows for fully custom detailing in all three dimensions as needed. Furthermore, BIM applications have 2D drawing capabilities to help overcome any coarseness of detail conditions of the model.

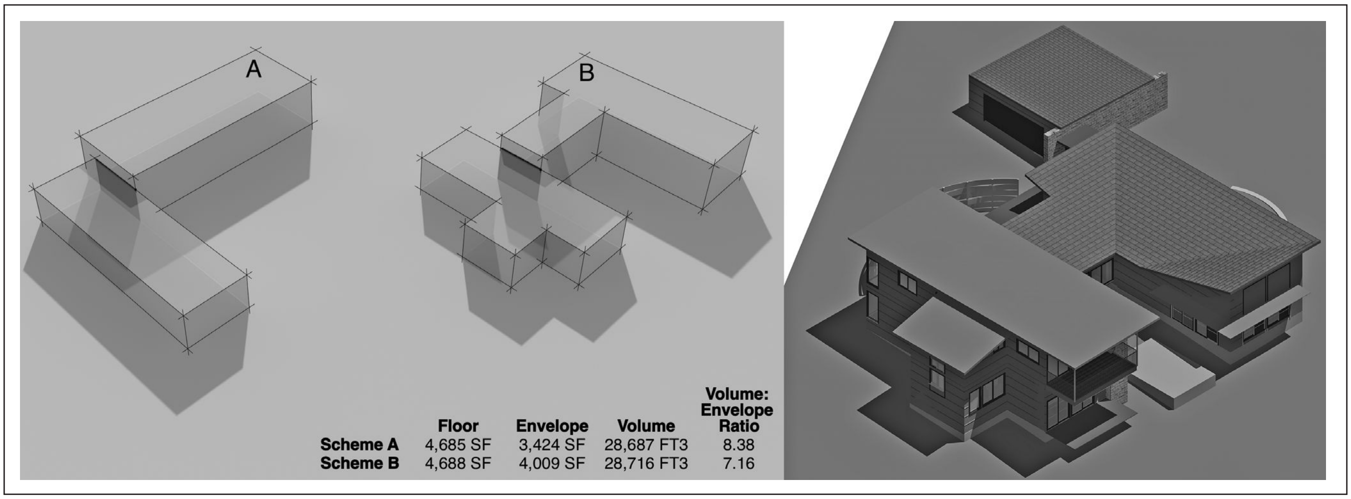

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FIGURE 11.7 An LOD-100 model *(left)* may yield useful quantitative design information, even if not nearly as detailed as its LOD-300 counterpart *(right).*

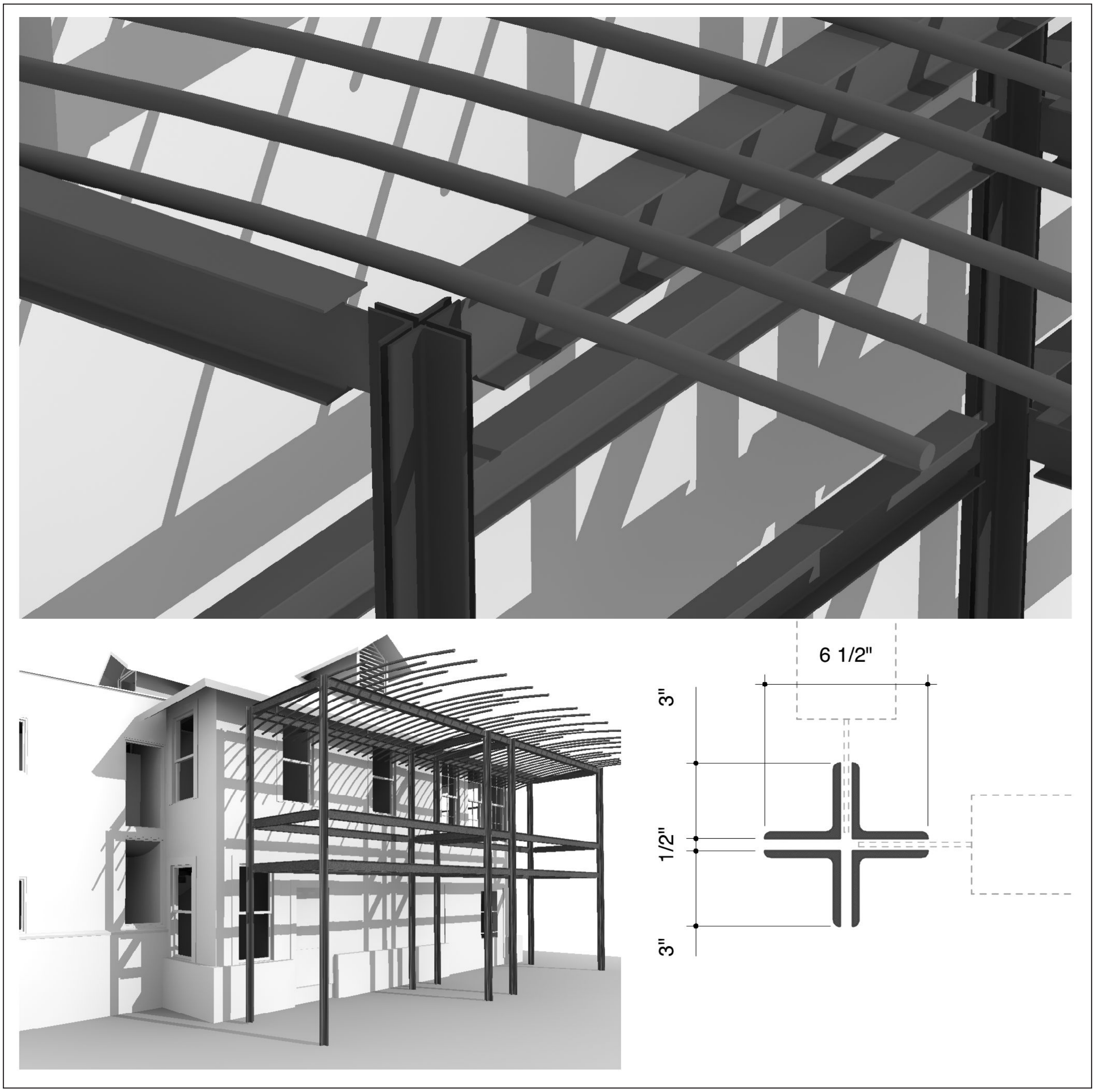

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FIGURE 11.8 BIM's 3D visualization capabilities, coupled with the ability to coordinate views and extract quantity takeoffs, make it a viable environment for designing and testing some details.

Avoiding Data-less Shortcuts

Often small firms, perhaps daunted by a perception of BIM's steep learning curve, eschew a true virtual model and settle instead for a data-less 3D sketch model in schematic design. Such a model may be roughly the equivalent of LOD 200, but generally lacks any real attributed information. While such a model may be very useful for the purposes of visualization, a data-less modeling work flow typically consists of converting the 3D model to lines after schematic design, and proceeding with a traditional 2D CAD design and documentation process. This is inefficient (LOD-100 or LOD-200 models can already be developed within most BIM authoring applications without recourse to sketch modeling software), and represents a huge missed opportunity. Design tends to be an iterative process, but once the model is set aside and the 2D drawings are developed, design decisions are undertaken without the benefit of 3D modeling or the data it carries. Updating the model to reflect 2D progress is time-consuming, tedious, and a duplication of effort. Often 3D modeling in the project is abandoned altogether.

As the virtual model is being developed, it is to the designer's advantage to use it to the fullest. "Harvested" orthogonal, isometric, and perspective views are an obvious and immediate opportunity. Building and site sections, often tedious to construct by traditional means, are trivial to generate from the virtual model. Indeed, BIM almost begs the user to generate an abundance of sections, possibly more than one might be tempted to construct using traditional methods. Given the ease of generating them, the number of graphical views derived from the virtual model becomes a function of project requirements, rather than being limited by available time (or fee). This is especially attractive for small firms, which, with more limited personnel and resources than bigger firms, may nevertheless be able to compete for larger and more complex projects than traditionally available to them.

Large File Sizes and Hardware Upgrades

The development of comprehensive models is not without its computational costs, however, aside from the financial costs of new software and training. Building information models easily outsize their CAD counterparts in file size and computational requirements. As a result, firms may need to anticipate new hardware (computer workstations) to handle larger files and potentially intense renderings. As file sizes increase, a small firm's network may need to be upgraded to handle increased local area network (LAN) activity. If a BIM server is employed (for those applications with a server-client configuration), then more server capability might be needed. These costs may not be prohibitive, but they must be budgeted by the firm.

Some server costs may be mitigated by the use of cloud computing services. However, cloud computing is generally not free, and is therefore an appropriate technology solution if implemented for its benefits: the availability of data from remote locations, secure backup files, and off-loading computationally intense tasks such as rendering computation.

► Collaborative Technologies (11.4) and Emerging Technology in Practice (11.6) provide further discussions of collaborative and emerging technologies.

Impact of Training Time

The smaller the firm, the greater the number of roles each individual generally assumes, and the more vital the role each individual plays. For a firm with a handful of staff, one missing person represents a significant loss of productivity and billing. One of the greatest BIM challenges that small firms face, therefore, is the temporary reduction in output as staff undergo training, and the time it takes for newly trained staff to "get up to speed." Eventually a well-implemented BIM work flow should yield significant efficiency and productivity gains, and even allow the firm to offer new services. But in the short term, it may seem that productivity decreases.

However, in most cases BIM requires that users have a greater understanding of building components and their relationship to the project. Experienced designers must therefore closely mentor junior architects, and work flows that rely on blindly drafting details will need to be reevaluated. On the other hand, a smaller team with greater architectural expertise can leverage that very effectively with BIM.

Moreover, when work is abundant it is extremely difficult to set it aside and make time for training, much less implement the radically new work flows that transitioning from BIM to CAD represents. When the pendulum swings the other way and work tapers off, it becomes difficult to budget for training. Add to this the reluctance some might have to learn what can be perceived as yet another software application, and it is clear why many firms make training a low priority. Yet training is both an essential and recurring requirement. Later in this article approaches to training are offered that may help firms negotiate the difficult conundrum that training represents.

Ongoing Challenges and Opportunities

BIM is a work flow, which is broader than a tool and may impact the social organization of the firm and its design processes:

- The production of a comprehensive building information model may encourage and even require that members of the team work more closely together, particularly in early phases of design.
- Increased 3D and data visualization provide an opportunity for firm members to interact and critique each other more effectively.
- Non-architectural design disciplines may be involved earlier than has traditionally been the case to help create a design that is structurally and mechanically more viable.
- Leveraging BIM's data is an opportunity to design with climate more effectively, as well as manage site resources (soil, water, and materials) more sustainably.

BIM WORK FLOW

Small firms have distinct needs determined both by the scale of their projects and the nature of their practice. With a less strict division of labor often found in small firms, there is the potential for close integration of design and documentation files in a BIM work flow. That is, 3D model files used for "design" are the source of 2D construction documents. This encourages a recursive production process that more closely matches the naturally iterative nature of design. Such an intimate link between the 3D design model and derived 2D deliverable views creates a potential for an effective and "flatter" firm hierarchy.

As design and production processes become integrated, it can become more critical that all firm members have facility with accessing and manipulating BIM project files. The Royal Institute of British Architects (RIBA) warned against the de-skilling of architecture firm principals as a serious concern (Jamieson, "The Future for Architects?" 2011). The spread of BIM into small firms might, by necessity, begin to reverse this trend, although small-firm principals are subject to a multitude of compelling requirements, and it is not uncommon for training to be a low priority. As powerful as BIM applications are, like any complex tool, they require training and practice for the user to gain and maintain facility.

Project Flexibility

Small firms require that their BIM work flows be flexible and accommodate a multitude of architectural design approaches, building types, and design vocabularies. BIM authoring applications include a variety of fairly flexible tools for addressing most common architectural conditions and details. Such tools tend to be parametric—that is, they are numerically editable, as opposed to modeling elements that must be graphically drawn. Parametric models are responsive to geometrical constraints—for example, columns automatically respond and reshape themselves to slab positions above them. As BIM software continues to evolve, parametric tools and libraries have progressed to accommodate a broad range of building elements, with correspondingly greater flexibility.

For those architectural elements that do not conform to the common object tools or libraries that accompany BIM authoring software, most applications now include fairly robust tools for generating custom objects (Figure 11.9). Such free-form

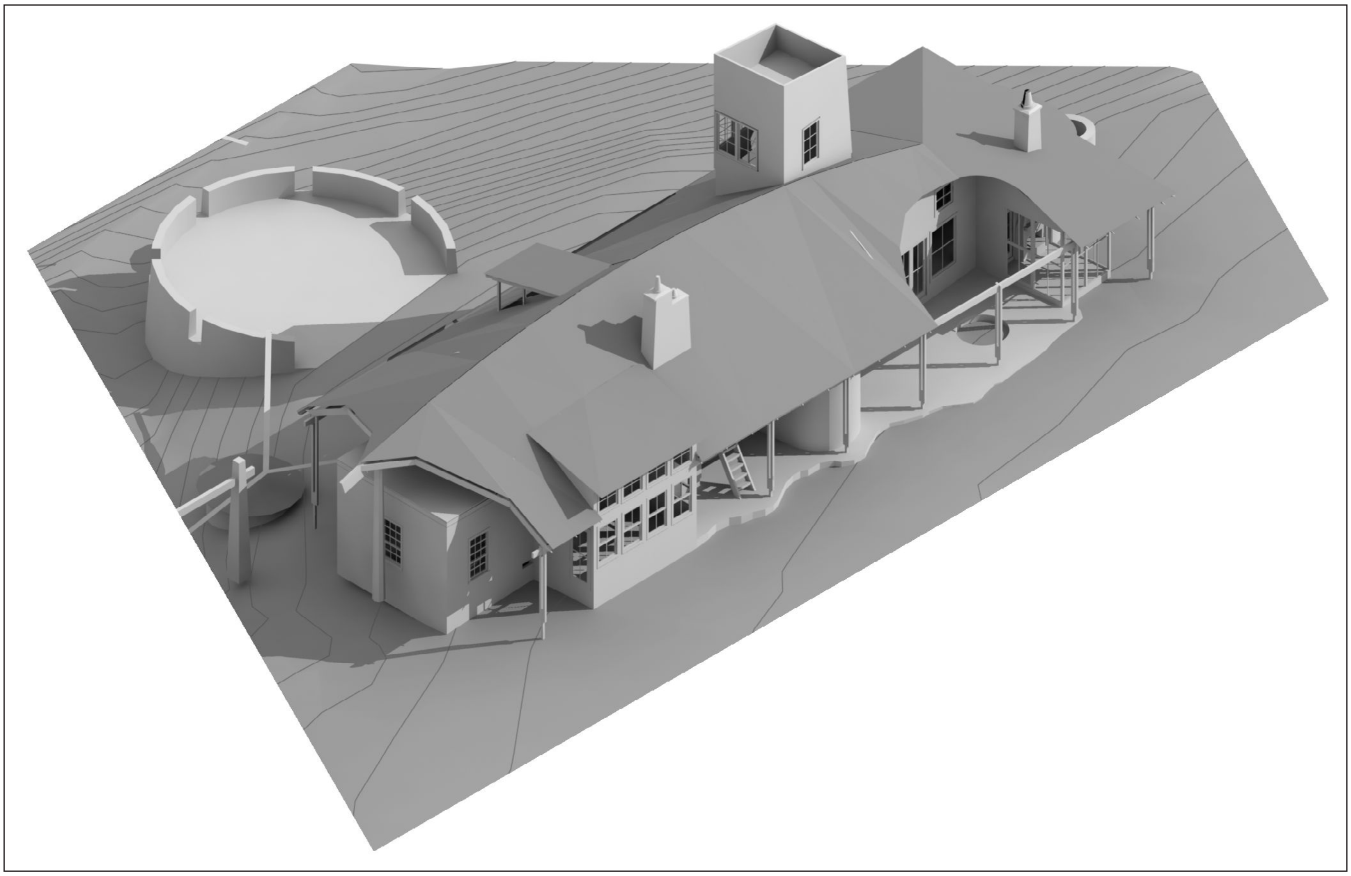

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FIGURE 11.9 While most architectural geometry can be modeled in BIM using a large array of standard tools, most BIM applications also allow custom modeling of unique elements.

modeling at its most elementary level consists of simple solid or surface geometry: extruded, swept, or revolved profiles; extrusions along paths; Boolean solids consisting of simple forms added to or subtracted from each other; and so on. Some BIM programs allow highly complex 3D modeling of free-form curved surfaces using NURBS (non-uniform rational Bézier splines)—imagine the warp of a tensile structure, for example. Other BIM applications allow the user to create custom parametric objects, sometimes without recourse to programming.

Project Scope

While not every project requires an expansive and detailed set of construction documents, the question remains: For the most common project types associated with smaller firms—single-family new construction, additions and remodels, small multifamily, small commercial, and small public projects—is BIM efficient and effective?

Nothing inherent to BIM precludes its use for small projects. When BIM is adopted, every new project gains efficiency and erodes the argument that the time spent learning the new software is not warranted. For any project that is designed and communicated in two or more orthographic views (e.g., plan and elevation), or benefits from three-dimensional quantitative analysis (volume, surface area), BIM could be appropriate. With the possible exception of some of the details, all BIM "drawings" are generated from a 3D model. This is true regardless of the scale of the project. Even tiny projects, such as a kitchen design or a few hundred square foot addition, can be more efficiently and effectively designed and documented in a BIM work flow. As the user gains facility with BIM, presentation and visual communication deliverables can expand. The author regularly includes exterior and interior perspectives in construction documents, with little or no additional effort. As a result, drawing sets are clearer and more communicative, with a presumed commensurate decrease in errors and increase in project quality.

This only considers efficiency, within the limited context of design documents: the ratio of productive output to hours of work input. It says nothing about effectiveness: the degree to which output is useful. There are other, critical measures by which the virtual model is a valuable design tool: for visualization (by the designer, client, contractor, and other stakeholders) and the quantitative validation of qualitative design.

Process Flexibility: BIM in Design Phases

BIM is more than just a documentation tool that can be used to optimize production efficiencies. There is the critical benefit of 3D visualization at early design phases, from conceptual design through design development. Such models are practicable since BIM authoring applications include schematic-level objects, such as:

- Generic walls of a nominal thickness, but whose structure and composition are indeterminate
- Undifferentiated slabs to schematically represent flat roofs, floor structures, or foundations
- Simplified openings to represent windows and doors
- Extrusion-like elements to generally represent columns, piers, and posts
- Parametric roof objects with basic geometry but of unspecified structure

Such simplified components are also suitable starting points for intern architects who might not be as experienced in building detailing, and for whom some BIM building components might be too specific.

With appropriate supervision and mentoring, these generic building models may be more fully developed as a design progresses. Unlike 3D sketch models, even schematic (LOD-200) virtual models can carry data. The virtual model can thereby be leveraged for reports, schedules, takeoffs, and performance analysis. This enables a vast array of potential quantitative analysis, even during the preliminary design stage (Lévy, *BIM in Small-Scale Sustainable Design*, 2012).

BIM processes lend themselves to quantitatively informed design in a variety of design tasks:

- *Site analysis:* slope analysis, viewsheds, cut and fill, drainage analysis
- *Massing analysis:* solar orientation, volumetric studies, architectural contextual studies, form-based code compliance
- *Design for solar geometry:* shading device design, roof optimization, solar collection potential, daylighting
- *Passive thermal controls:* south-facing aspect optimization, thermal mass analysis, total envelope thermal conductance, wind-driven and stack-effect natural ventilation
- *Building hydrology:* rainwater harvesting, roof design, wastewater reduction
- *Material waste reduction:* envelope material use efficiency, cost analysis, sustainable design guideline compliance

This is hardly an exhaustive list of the design uses that an imaginative user might put into play in a BIM work flow, but it is indicative of BIM's potential use in design (Figure 11.10). To ignore this potential is a missed design process opportunity.

Moreover, small buildings' energy use is more strongly influenced by climate than larger buildings, whose energy loads tend to be internally dominated. Small firms therefore have an even greater incentive to embrace BIM as a design tool if they wish to minimize the energy use of the buildings they design.

Thermal Chimney Calculations

Cd	T in	T out	A, lower	A, upper	A	K	g	Z, lower	Z, upper	ΔHnpl	Q	V	V
0.45	85 °F	105 °F	*55.0 SF*	*22.6 SF*	2.4	1.3	32.2 FT/S2	*3.5 FT*	*13.6 FT*	5.1 FT	**2,698 CFM**	**1.4 MPH**	**119.2 FPM**

Q = 60 Cd A K (2g ΔHnpl (To - Ti) / (To + 459.67))^(1/2)   *Source: ASHRAE Handbook of Fundamentals 2005, page 27.11*

Where:

Cd = 0.40 + 0.0025 |Ti -To|

A = Aperture area ratio, lower:upper

K = Aperture area ratio coefficient (empirical), where K is approximately 1.388 - e^-A (Source: François Lévy, M.Arch, MSE)

ΔHnpl = Distance to neutral point, assumed to be half of ΔZ

T out = Temperature at outlet (upper) aperture (user supplies value in °F, automatically converted to °R (Rankine; °R = °F + 459.67))

T in = Temperature at inlet (lower) aperture (user supplies value in °F, automatically converted to °R (Rankine; °R = °F + 459.67))

g = Gravitational constant

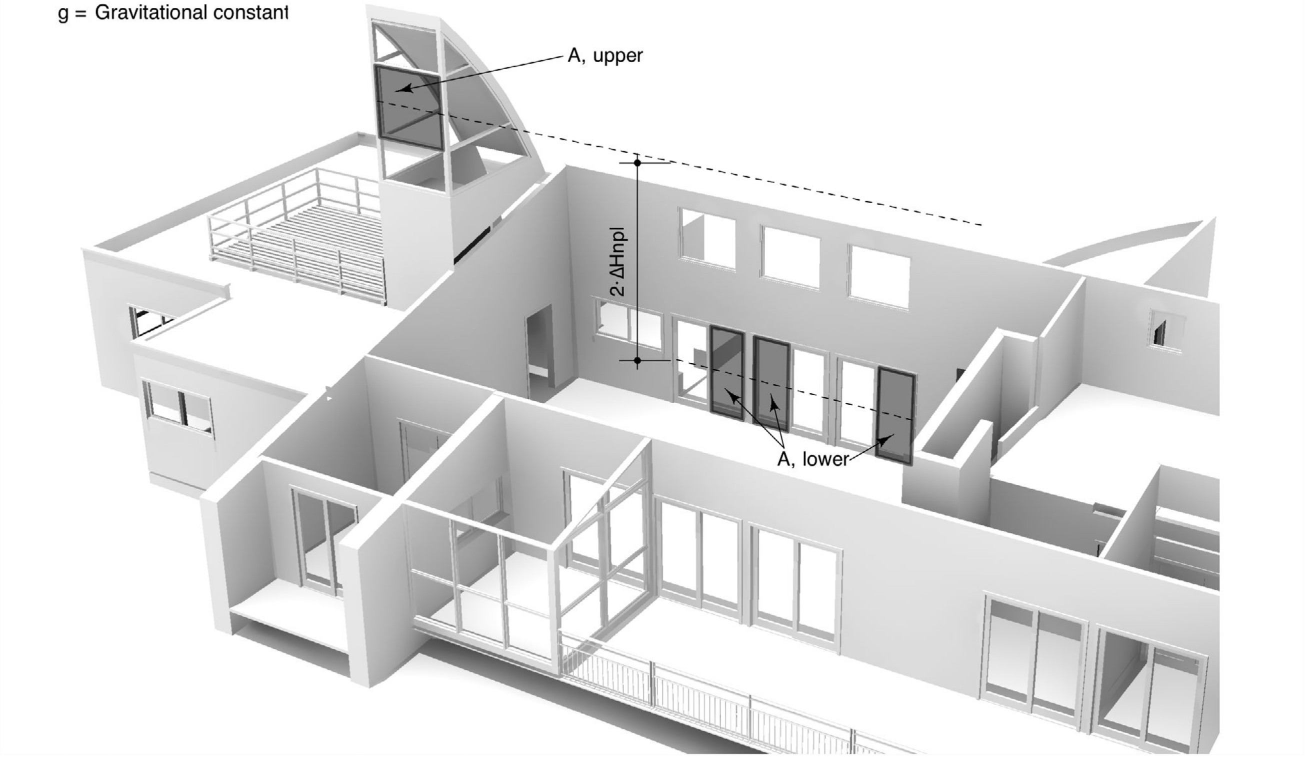

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FIGURE 11.10 A building performance worksheet, here calculating estimated airflow rate from a thermal chimney design capitalizing on the stack effect for natural ventilation, can be built into a BIM work flow by a knowledgeable user.

COLLABORATION

In addition to the building information model itself, the process of sharing data among members of the design and construction team can be one of the most far-reaching impacts of BIM. Shared project data has a potentially significant influence on the design process. BIM is intimately linked to IPD (integrated project delivery), a team-oriented design and construction framework intended to reduce errors and waste while improving building cost and performance.

But while "BIM to BIM" collaboration is important, it can be challenging for many small firms:

- Smaller projects tend to have fewer stakeholders, including fewer consultants. The fewer the number of stakeholders, the less data sharing is an issue.
- For many small projects, owners are unaware of the existence of BIM, and are not equipped to use virtual model files. This is distinct from "professional owners" (those who execute multiple projects over a period of time), who have more

sophisticated facilities management agendas and have a greater need to be left at project's end with a data-rich building model.
- Many consultants working on smaller-scale projects are slow to adopt BIM. It is therefore important that a BIM application and user be able to handle common 2D file formats for exchanging design information, since true "big BIM" interoperability may not be possible.

Collaboration Files

While some stakeholders' collaboration needs can be met with images and PDFs, others require more sophisticated protocols and correspondingly intense information exchanges.

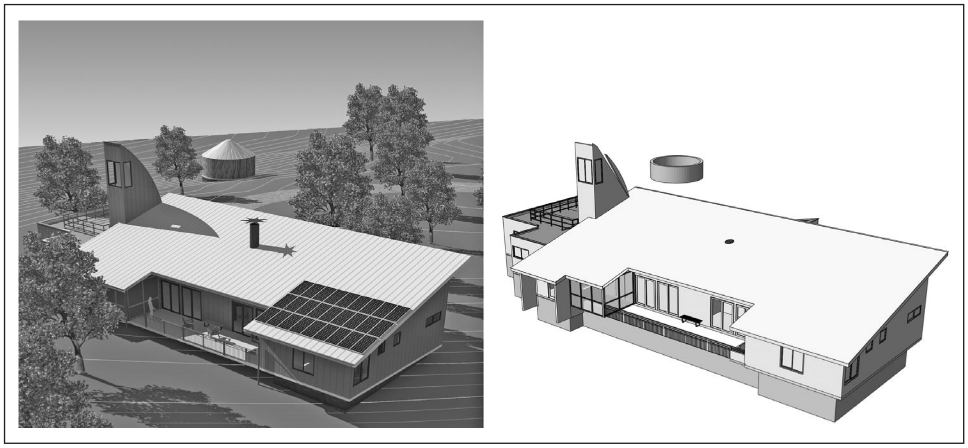
IFC *(industry foundation classes*) is a file format that is critical to the interoperability of BIM. This open, nonproprietary, data-rich geometry file format is an open file format that all IFC-certified BIM applications can import and export. Unlike other legacy file formats, IFC is truly made for BIM and is designed to translate geometry and data, not necessarily object functionality. Objects imported into a BIM application via IFC retain their appearance, dimensions, and attached data, but cannot be easily edited once in the receiving file (Figure 11.11).

Firms working in BIM need to be able to access legacy files of past projects in order to reuse details or reference past design solutions. 2D file formats are unlikely to vanish overnight, even as more firms transition to BIM.

For cooperation among members of the design team who are not using BIM, DWG (the native format of Autodesk's AutoCAD) remains a ubiquitous exchange format. Unlike IFC, while DWG objects retain their geometry in almost every case, the data attached are often lost, as well as the ability to easily edit. That is, they become static, nonparametric geometry. As a result, DWG is an appropriate medium to reference conditions or designs established by another discipline, but it is not a fully collaborative medium between two firms using different BIM applications.

When the BIM user is exporting project information for use by a team member, it may be preferable for the sender to selectively provide 2D backgrounds or 3D reference models instead of the entire project. For example, an architect working in BIM sending architectural design files to a consulting structural engineer working in CAD would not send the entire virtual model, but just selective 2D views of it (drawings). The engineer would tend to work in plan, using elevations and sections for reference only. The architect could omit several drawings, providing only DWG plans, building elevations, and sections. A more complete accompanying PDF set might be sent for context.

Cloud computing solutions exist that allow remote users to simultaneously share, view, and annotate 3D files exported from BIM authoring software. While such cloud



François Lévy

FIGURE 11.11 A view of a building information model *(left)* is juxtaposed with its corresponding exported IFC file. Geometry and data are preserved, but ease of editing is not.

collaboration may not allow native editing of the building model itself, only markups of an exported static model, it is a valuable visualization and meeting tool. Other cloud-based technologies, depending on the BIM authoring software used, process time-intensive renderings on remote servers, allowing the small firm to devote limited in-house hardware resources to other tasks while renderings are processed remotely.

Ultimately, collaboration is a social phenomenon first and foremost, rather than a purely technological one. File format exchange protocols are, of course, very important and should be carefully considered. However, clear and organized communication between team members is key. Roles must be clearly defined, whether they change slowly over time or day to day, and responsibilities must be clearly delineated.

Output

For the present, the eventual output media of most architectural instruments of service continues to be paper or PDF drawings. After some initial work to devise standard line weights and office graphic standards, it is possible to generate clear, communicative drawings from BIM. The model need not be redrawn to produce communicative drawing sets. Automatic depth cues, user-defined settings for line weights, and the application of hatches and shading are available in most BIM applications; when applied, they allow graphically communicative drawings from the model.

PDF is a very popular medium for communicating 2D drawings, whether among team members, as reference sets accompanying DWG transmissions, or in lieu of paper output. Some building departments accept PDF submittals, and this format is very familiar to most small project owners. One useful feature of PDF files (whether 2D or 3D PDF) is that they can be annotated (redlined) with simple markup tools like text, lines, ovals and rectangles, highlighting, and comment fields. PDFs exported from some BIM and CAD applications have their layer structure preserved, and the recipient may selectively control their visibility using Adobe's free Acrobat PDF viewer.

TRANSITIONING TO BIM: BEST PRACTICES

There are several strategies and tactics that the firm may consider in order to make a successful transition to a true BIM work flow. First, a word of caution: Transitioning to BIM is much more than just changing software platforms. When fully implemented, BIM is a new way of designing that may have a profound effect on a practice.

The costs of new software, hardware, and training required to run BIM are not insignificant. However, most firms upgrade software and hardware periodically even when maintaining the same 2D work flow. By phasing into BIM as these upgrades are scheduled, initial costs can be mitigated.

Select BIM Software Based on Firm Needs

There is a commonly held assumption that a firm should adopt the same software as everyone else. A particular software application's perceived market share may be a legitimate and important consideration if the firm regularly engages in joint ventures or teams with firms already using a given software application. Rarely, an important client may insist on a particular file format for project delivery. However, the U.S. General Services Administration, for example, requires that files be submitted in IFC format, which most BIM authoring tools support. Be sure to have legitimate reasons for selection of which tools to employ, since those choices can affect the quality of the design work flow.

A firm's decision makers should become (or should designate) an intelligent consumer of technology. In considering the firm's particular technological needs, include potential future needs. Once a particular platform has been adopted, changing becomes progressively harder over time. Consider:

- *Initial software cost.*
- *Cost of ownership*. Does the BIM application require an annual subscription, or a perpetual license with an optional added-value subscription plan?

- *Hardware requirements*, including whether the BIM application runs on the Macintosh or Windows platforms. Will upgrades be required, or can the application run on some or all of the firm's current hardware?
- *Training costs*.

Investigate similar firms with similar portfolios of projects. Ask what BIM applications are in use, and what has been learned from using it:

- What are the program's strengths and weaknesses?
- What would the other firm have done differently in the process of adopting BIM?
- What was successful about their implementation of BIM?
- Are the models, drawings, and reports generated by the software appealing to the potential buyer?
- Is there a local community of users that can support new users, and whose members are willing to share knowledge?

Start Manageably and Scale Up

Once a firm has acquired BIM technology (including hardware and initial training, formal or otherwise), there are a variety of strategies to help foster a successful implementation of BIM, some or all of which may be appropriate to a practice, given its particular circumstances.

- *Avoid shelfware; implement BIM and follow through*. Investing in the technology and initial training is of no benefit if BIM is not then used. The firm should make a committed effort to producing the next project using BIM.
- *Start with one project*. The above notwithstanding, it may not make sense for a small firm's entire portfolio of current projects to immediately transition to BIM. Select an appropriate new project as a sensible way to expand the practice's technological culture without compromising revenue or the stability of existing project work flows.
- *Consider an appropriate and gradual transition*. For the first project, it might also make sense to compartmentalize BIM, initially restricting it to plans, building elevations, and building sections, or limited to schematic design and design development. Once the design is established, 2D drawing views can be exported and completed in CAD. There will be loss of overall efficiency in this approach, as the advantages of deriving a full construction set from the model will not be fully realized. Those losses can be somewhat offset by the benefit of completing the project using familiar CAD processes for the most labor-intensive phase of design. Or the practice might gain enough familiarity in the new process in the first few phases that it may be completed entirely in BIM.
- *Start with a project with limited scope*. If a new project with limited scope is available, the firm may use that as a BIM "shake-out cruise." All the components of the BIM process will be present as a learning test bed. On the other hand, a project with a larger fee may better absorb the initial curve.
- *Start with a familiar project type*. It may be easier to transition to BIM on a common project type where there will be fewer architectural issues outside of BIM to complicate the learning process. In addition, the firm will benefit from having a familiar baseline against which to compare the new process.

As confidence, skill, and experience grow, the firm can fully transition to BIM. Generally, it is recommended to have only a few transitional projects and to operate fully within a BIM process as quickly as is feasible.

Build on Established Knowledge and Skills

Because BIM evolved from CAD, many CAD skills translate to BIM. The BIM paradigm differs more greatly than the specific skills employed. A 2D drawing is, in a sense, a model, too—albeit a more limited one—and it offers lessons that can be applied to BIM. Namely, a certain level of abstraction is both required and desirable in building information models, just as it is in CAD drawings.

Further, BIM still requires a certain degree of "drafting," if only for annotating views and developing details. Transitioning to BIM does not therefore imply entirely abandoning CAD skills. And as the practice transitions fully to a BIM work flow, access to legacy files, such as detail libraries and old projects for reference, will likely be required.

Invest in Training

Training is critical, particularly given the inherent complexity of a data-rich building model. Many small firms skimp on training, and as a result are far less productive than they could be, missing opportunities to fully use BIM for design and production. In the not-so-long run, training pays for itself, with dividends. Without training, powerful features that may be present in software the small firm already owns and deploys are underutilized—the firm may even be ignorant of their existence. For those firms that do not have the financial capacity to send staff to attend dedicated training courses, there are fortunately numerous free (albeit scattered) training resources for many BIM software applications. Some useful cost-effective training strategies include the following:

- Search the software developer's web site for free training resources, as well as training guides and YouTube channels promulgated by dedicated users with useful video tips and tutorials.
- Designate those firm members with the most technological bent and interests to collect and organize training material and build a training library.
- Sponsor a weekly office working lunch where staff is encouraged to take turns making a short presentation demonstrating a new tool, work flow, or best practice. Keep these learning sessions relaxed and informal.
- Attend local user group meetings for your particular BIM authoring platform (or form one if there isn't already one). Other users are a trove of knowledge and support. Don't neglect to share what your firm has learned.
- Bear in mind that training tends to imply task-oriented learning and might not fully address the design process implications of BIM (see "Ongoing Challenges and Opportunities" above). In addition to training, firms that successfully transition to BIM might also reorganize their design processes, and even how they go about project delivery.

BIM Management

In many BIM authoring applications, projects are typically set up using a fixed organizational system. As with CAD, there should at minimum be office standards established for graphic symbols, fonts, pen weights, hatches, and so forth. Some experimentation might be required, and some firms find that quite a bit of tinkering is needed to produce satisfactory drawing output. That said, once graphic standards are in place, they can be readily replicated for future projects.

If BIM is to fulfill its promise of interoperable design, standards must go well beyond pen weights, which are fundamentally a concern of deliverables. Tools must be used and implemented appropriately; a wall object might be misused to represent a beam when a structural object should be used. While this may pose no problem for a model that merely "looks right," it can be immensely problematic once that model is shared with other disciplines—as when an energy modeler misidentifies the "beam" as a wall because of the tool used to model it. IFC-compliant BIM authoring tools auto-class model elements; those that are custom-modeled, however, should be manually assigned the correct IFC class for export when necessary.

Organizations like the National Institute of Building Sciences and Penn State's Computer Integrated Construction Research Program have developed BIM and organizational standards to facilitate disciplined project collaboration. While many of these standards have been developed with an eye to larger firms and projects, small firms may find them useful references:

- As a checklist to help identify potential issues to be considered prior to embarking on a BIM project

- As a template developing (possibly streamlined) standards for model sharing among collaborators and consultants
- When collaborating with larger firms on complex projects where the small firm may be a consultant

Even if the firm is too small to justify a designated BIM manager, such BIM standards are advisable. Of course, standards are of little use if they are not adhered to. And, as the firm's projects, needs, and technology evolve over time, office standards should be periodically revisited and potentially revised.

CONCLUSION

As a result of BIM's data-rich 3D modeling capabilities, the various design professionals that make up a project team can extract and manipulate relevant tabular and graphical building views (reports and drawings, respectively). BIM is less commonly thought of as a design tool, yet the ability to rapidly derive alternate, information-rich views of building models can yield an efficient and effective design process. Despite some challenges, the efficiencies that large practices enjoy in designing projects using BIM are undoubtedly within reach of many small firms.

CASE STUDY: EVOLVING TO BIM

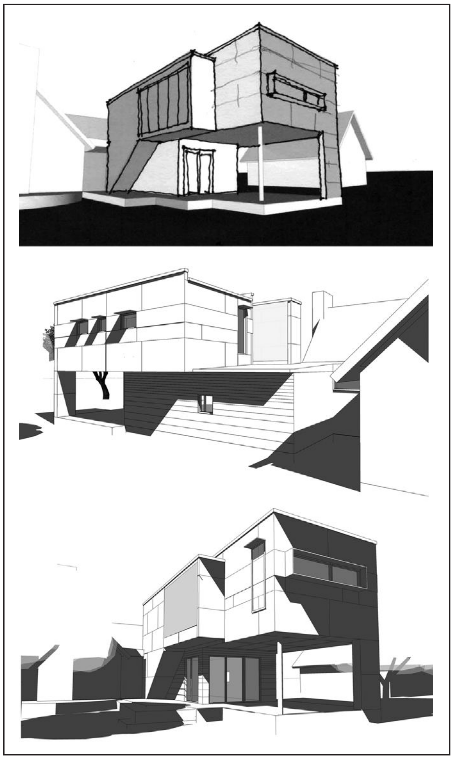
Andrew Nance, AIA, is an architect teaching at Texas State University–San Marcos and co-founder of A-GRUPPO Architects, where his interest in design technology and construction has led the office toward the investigation of emerging building and production technologies.

The Bley Sleeping-House Addition is a three-bedroom, two-bathroom, 1,000 SF addition to an existing two-bedroom home. The former master suite was also converted to a home office, storage space, and mudroom.

At the onset, I created as-built documentation of the existing house and site using BIM. The resulting model was appropriately detailed for design and was used throughout the schematic design phase. My partner (who works solely with non-BIM sketch modeling and 2D drafting tools) and I collaborated very closely, generating vignettes and studies in a variety of media as appropriate: physical and digital models, sketches, manual and digital drafting, using a variety of computer programs to convey design ideas (Figure 11.12). As much of the schematic design proposal was generated outside of BIM, the virtual model had been constructed with nominal dimensions and without specific attention to construction details. For example, exterior stud wall framing and floor trusses were not represented other than as undifferentiated elements (generic walls and slabs).

The design underwent considerable transformation, and during design development the building information model evolved into a very "real" and highly accurate digital artifact, recalling the traditional practice of exploring design with physical models, whose representative attributes must be translated to an alternate medium for use.

We were able to work closely with, and provide drafting services for, our structural engineer, SWStructural LLC, who performed stand-alone structural calculations outside of BIM. In spite of the engineer's not using BIM, we were able to coordinate and improve our building information model's accuracy by including engineered structural information in the model (Figure 11.13). In addition, the BIM was used to



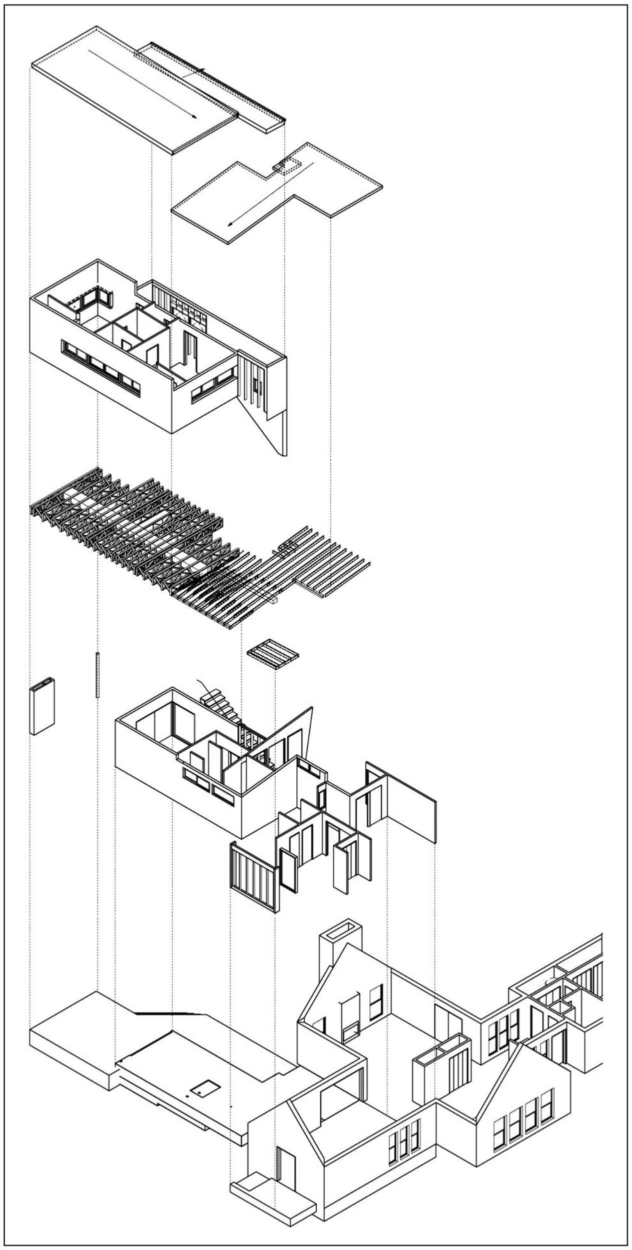
Andrew Nance, A-GRUPPO Architects

FIGURE 11.12 BIM can support a collaborative design process even outside a pure BIM process. Here, manual sketching is used in conjunction with the virtual model.

generate information on surface and materials quantities, solar studies, clash detection, and rainwater collection calculations.

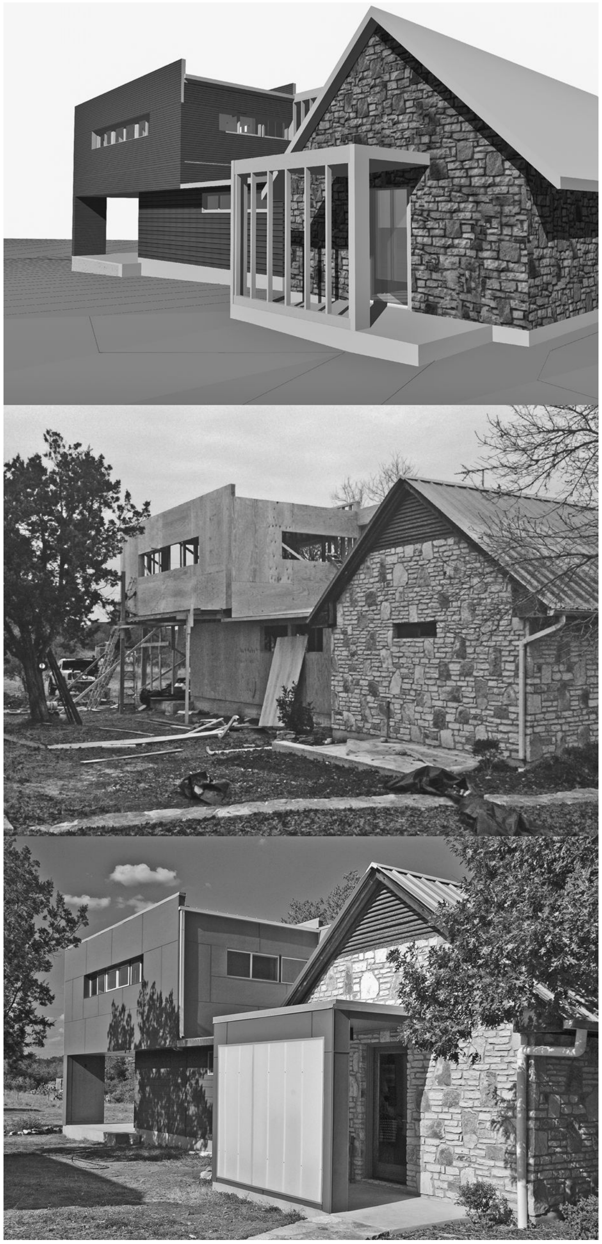
Our work flow has steadily evolved to increasingly implement BIM. However, we have found the efficiencies in drawing and coordination in the software pose a challenge in delegating workload to users not working in BIM. While robust import/export capabilities exist in most platforms, any information imported is not linked to the model, thereby negating some of the coordination and efficiency benefits of BIM.

As architects, our tools have required that we translate and interpret ideas from one medium to another, whether from manual to digital, sketch to model, or model to drawing or vice versa. In many ways, these procedures have not changed, since collaborating through various software and processes still requires interpretation. However, the ability for BIM to act as a repository for many of these interpretations and translations offers the benefits of data, drawing coordination, and accuracy unparalleled in traditional work flows (Figure 11.14).



Andrew Nance, A-GRUPPO Architects

FIGURE 11.13 An Exploded View of the Highly Accurate Building Information Model



Andrew Nance, A-GRUPPO Architects

FIGURE 11.14 From BIM Through Construction and a Finished Project

Moreover, the energy performance of smaller buildings is far more influenced by site and climate than their larger counterparts. Good quantitative data is essential for architects to make more intelligent choices about how they design all projects—but especially small ones, given their skin-load–dominated energy performance. Use of BIM can enable quantitatively informed decisions to be made in the early stages of design. This represents an inversion of the habitual view of BIM as a tool for large projects late in the design process (construction documents).

For More Information

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11.4 Collaborative Technologies

Kimon Onuma, FAIA

This article discusses collaborative technologies that allow project stakeholders to swarm around a design and solve complex problems together. Being connected to a common online framework through cloud computing opens up a whole new world of how tools and people can connect.

ARCHITECTURE IN THE CLOUD

Cloud computing is software that runs as a service on the Internet and as such, does not need to be installed on a personal computer. Users just log in and start to use the tools. Cloud computing applications such as Google Drive allow many users to work on the same document, spreadsheet, presentation, and other applications together in

Kimon Onuma, president of Onuma Inc., is known for his architecture and technology acumen. He is the creator of the award-winning BIMStorms that have engaged over 4,000 global participants. A frequent contributor to trade publications, he teaches collaborative technologies, practices, and processes on the web and at conferences worldwide.

real time. Users can also log out from one computer and then log in from another to access the same documents. Cloud computing is a game changer for collaborative technologies. Being connected to a common online framework opens up a whole new world of how tools and people can connect.

Many cloud-based applications, such as DropBox™ for file sharing and Evernote® for saving snippets of text, graphics, and other information, also have apps that run on tablets and smartphones. This type of functionality accelerates collaboration for the building industry. Architects can share their building information models (BIMs) in real time with solutions such as the Gehry Technologies online G-Team™ tool, Ecodomus, the Onuma System, Autodesk BIM 360™ Field, and other applications that run in the cloud. The end result is more choices, agility, and quick connections to other professionals, specialists, and clients. The most important aspect of having architecture in the cloud is that it sets up an ecosystem of building information created by architects that can connect to everything else on the Internet. The possibilities are endless, and architectural data is the glue that holds everything together.

DESIGN AND INNOVATION

Collaborative technologies allow us to "swarm" around a design and solve complex problems while the whole project is in motion. The ability to run many simulations for a design while getting input from many participants during the process is a reality. Just like in a traditional charrette, collaborative teams can interact throughout the process. The interaction now can include participants who would normally not be as hands-on. For example, owners can track the progress of a project. Knowledge sharing and innovation explodes with collaborative technologies.

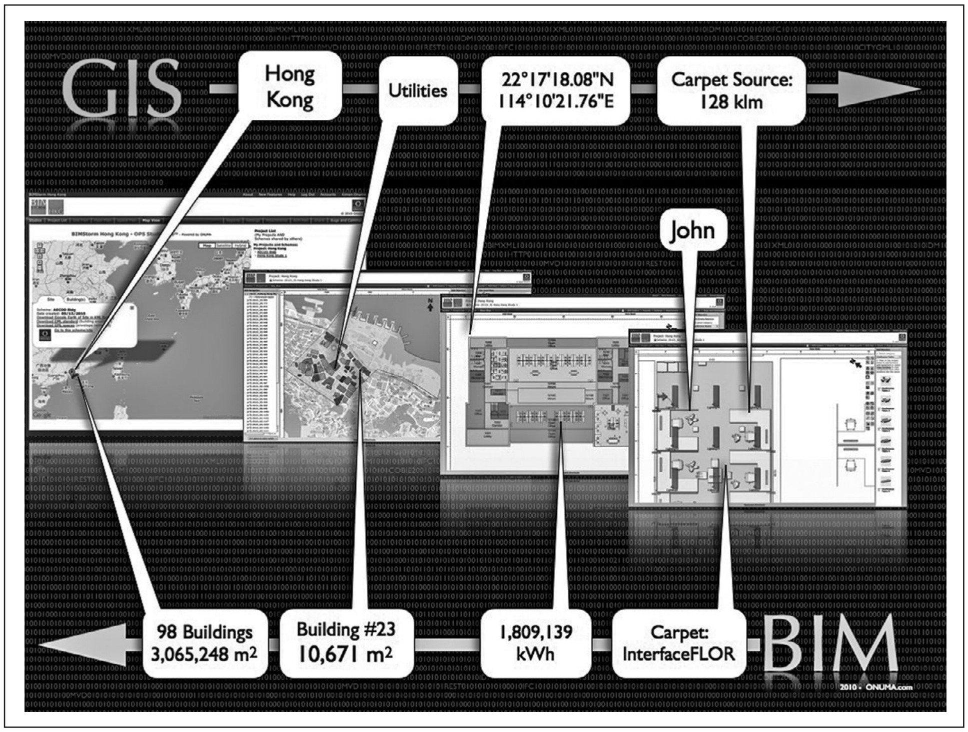
Virtual and Face-to-Face Collaboration

Without question, face-to-face collaboration is very valuable. Collaborative technologies enhance teamwork by allowing more flexibility. Teams can work both virtually and face-to-face. Collaborating virtually first can make the face-to-face time more valuable by focusing the discussion. Architects can also use a hybrid approach on some projects. Instead of sending two or three people across the country to a meeting, one person can go, with the rest of the meeting held via screen sharing and audio. The "home" team can support in real time the needs of the off-site meeting. For example, client input on design options triggers the preparation of another design that can then be presented to the client during the same meeting, not weeks later. Meeting notes are created by the home team while screen sharing is turned on in GoToMeeting or Skype.

Collaborative technologies can allow team members to spend more face-to-face time by freeing them from being tethered to a desk. It is much easier now to be on the road and have face-to-face meetings. One no longer has to run back to the office to connect to a desktop or office phone to talk or work in real time with others. It has become as easy as logging on to a smartphone or tablet from wherever a person happens to be. This capability is not only changing how meetings are conducted, it is changing the way offices and the built environment must be set up to support a mobile workforce.

Collaborating in a 3D World: Location, Location, Location

Mapping applications such as ESRI use geographic information systems (GIS) to map and place elements on a map. GIS is central to many of the map-based applications on smartphones. GIS is also a natural extension of being able to collaborate on placing buildings in relation to each other. Moreover, GIS is central to collaborating with others. Google Maps, Google Earth, Bing™, and OpenStreetMap have brought GIS to the masses. (See Figure 11.15.)



Kimon Onuma, FAIA

FIGURE 11.15 In referencing a lot of data, being able to pinpoint them helps in communication and in creating relationships to other elements in the building.

By default, many smartphone applications tag photographs to latitude and longitude. GIS linked to BIM is the foundation for being able to "tag" information about facilities. GIS drives the interconnected world. It has become invisible to the end user, who does not need to know about GIS to use it as a collaboration tool. The two case studies in this article use GIS as a core part of locating project data and allowing all the participants to be working with the correct data.

Most users of smartphones and tablets do not even know the term GIS, yet they use it every day. Finding things, people, business, and events on a map is second nature. What happens next is that events can trigger specific results based on where you are located. For example, as one walks into a room in a building, the sensors in the room interacting with the smartphone can alert the person to the condition of the mechanical equipment in the room. As location boundaries and rules of events happening within that location become smarter, collaboration between people and the building will become more commonplace.

CASE STUDY: BIMSTORM CHARRETTES FOR THE TWENTY-FIRST CENTURY

As architects we see the value of getting everyone in the same room and collaborating in charrettes to make decisions. BIMStorms are charrettes that use collaborative tools and are open to anyone. At Onuma Inc., we have been using BIMStorm techniques since the early 1990s, and in 2007 it was opened to the entire industry. Since 2007 there have been over 40 BIMStorms that have involved more than 4,000 participants from the full life cycle of projects (Figure 11.16). Each BIMStorm is centered on a theme, such as urban planning, health care, education, or emergency planning, and typically runs one to three days. With this many participants it is a given that many tools will be used, and collaboration becomes critical.

A challenge of using new technologies is in the cultural shift that needs to happen in people's minds to jump into the sandbox and participate. In BIMStorms we encouraged any level of user participation. We especially wanted architect, engineer, contractor, and owner participation, even if they knew nothing about BIM. In fact, hand sketching quick ideas was encouraged. We emphasized collaboration and communication. Scanned hand sketches were converted to BIM and shared with others around the world.

Each BIMStorm adds to the list of what is possible with collaborative technologies. Participants witness new processes and even form teams for real projects post-BIMStorm. Teams can be more fluid, forming and disbanding as needed on a project. Ad hoc meetings and relationships form on the fly. BIMStorms have resulted in a higher acceptance in the industry of open standards–based BIM exchanges and new ways to collaborate.

Kimon Onuma, FAIA

FIGURE 11.16 Penn State iCon lab and John Messner's class participating in the Los Angeles BIMStorm. Over 130 teams from around the world participated in this BIMStorm.

COLLABORATING WITH OWNERS

Collaborative technologies allow architects, engineers, and builders to communicate about the design and construction of "the project." Collaboration also happens before the project is defined and for the entire life cycle of facilities. Owners need to manage their facilities and information about their facilities.

There is an opportunity for architects to engage owners and make them part of the ecosystem of the project. Collaboration with owners can happen at many levels. At the start of a project, architects are often handed a stack of documents and digital files about the project. The background information may be missing and have to be collected again. This is a problem of not having access to the right information and not being able to collaborate effectively because of this lack of data. This is a challenge with projects large and small. It is also an opportunity for architects to help owners manage their project in order to enhance communication with all those involved. This provides an immediate value to the owner, and the architect becomes integral to the entire ecosystem of the project.

Collaborating with owners during the design and construction process could include giving owners more direct access to project data and decisions with tools that are easy to use and do not require them to be technology experts. The architect's, engineers', and builder's challenge is to deliver a well-designed building and its associated data. Simple collaborative tools (listed in "Architecture in the Cloud," above) to access complex data are critical to make this possible.

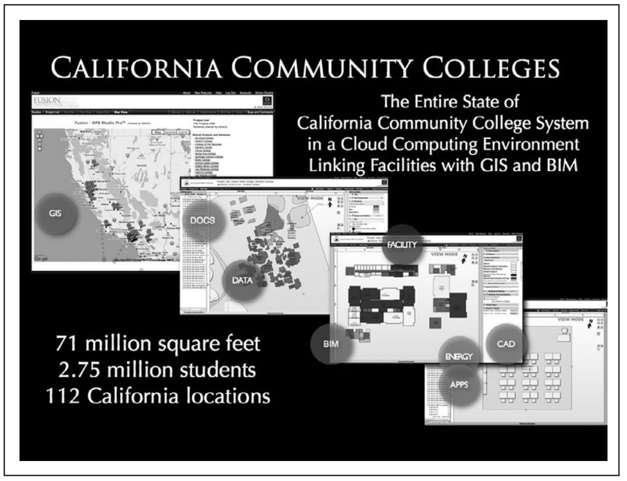
CASE STUDY: CALIFORNIA COMMUNITY COLLEGES

The California Community College System (CCC) serves 2.75 million students at 112 California locations with 5,000 buildings. It is the largest system of public higher education in the world. The Foundation for California Community Colleges (FCCC) wanted to implement building information modeling (BIM) but did not know how a file-based system of BIMs could scale. In addition, there was not an economical way to get all 5,000 existing buildings into BIM or wait for all 5,000 buildings to be in BIM before the entire portfolio could be managed. Budget constraints, demographic shifts, energy challenges, and the dynamic nature of all of these factors were a huge risk and liability unless managed properly. A strategy and solution was needed.

(continued)

Onuma Inc. worked with FCCC to develop a rapid prototype to connect the facility data from CCC to BIM and geographic information systems (GIS). This was accomplished within a few months for one district. During this period an analysis of existing systems and capabilities was developed. The next step was to implement the resulting strategy statewide. This happened in a very short time using an agile approach based on open standards to connect BIM, GIS, and facility data (Figure 11.17).

The CCC FUSION (Facilities Utilization, Space Inventory Options Net) system, with the entire California inventory of 71 million square feet, 5,000 buildings and spaces, along with the CCC GIS Collaborative of campuses and buildings, was brought together with BIM, GIS, and facility management (FM). Dynamic data-driven floor plan graphics and site plans allow for pattern recognition, better decision making, and accounting of valuable facilities and assets. Owners, architects, engineers, builders, and others can use the system to collaborate.



Kimon Onuma, FAIA

FIGURE 11.17 California Community Colleges Case Study

The U.S. Coast Guard in the 2006 SFCAM Road Map identified that "over the life cycle of a building, the data about our facilities is more valuable than the physical facility itself."

Connecting to the Building Life Cycle

Design and construction is an ongoing conversation among many participants throughout the process. This conversation naturally continues after construction completion and into the life cycle of a project. Collaborative technologies make it possible to have this conversation and capture decisions from the conversations that can be accessed at a later time. The tools of the past made it difficult to capture all this data. Now it is possible to structure the data and make it useful throughout the life cycle.

The BIM of the project becomes the place to create the links to data and move them into facility management tools. Standards such as Construction Operation Building Information Exchange (COBie) give us a structure to place data: contact information, product information, performance characteristics, and warranty details. Collaboration among project participants generates valuable discussions in real time and can then be stored for future use. In this way, the collaboration about the design decisions can become part of the fabric of the physical building.

The end result is a living digital "engine" that can be queried. This resource can be used for future renovations or as a basis for new projects. The use of such collaborative technology and processes is adding to the trend toward more transparency about the design and construction process.

Buildings Collaborating with Architects

As the price of the hardware and software of building automation systems, sensors, and controls drops, buildings will increasingly become part of the mix in collaborative technologies. Equipment can report overheating; room sensors can manage energy use, temperature, lighting, and more. Smart BIMs will know what they were designed to do, and report back when they get out of range. Many of these technologies are not new. The difference now is that they are starting to interact with other systems and increasingly provide for ways that building owners can collaborate with their buildings. The opportunity for designers is to define what is the best value in these interactions. There will be a lot of noise generated, and the task becomes to filter out what is relevant. Architects and their understanding of buildings can help to define the future of collaborative technologies that connect building and people.

For More Information

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Construction Operation Building Information Exchange (COBie): http://www.buildingsmartalliance.org/index.php/projects/activeprojects/25.
World Wide Web Consortium for Internet standards: http://www.w3.org/.
Open Geospatial Consortium: http://www.opengeospatial.org/.

11.5 Technology Management

Tony Rinella, Assoc. AIA

Technology can accelerate or impede a firm's success in achieving goals. With thoughtful planning, thorough adoption, and careful management, appropriate technologies can enhance qualitative and quantitative performance.

PERSPECTIVE FOR INFORMATION SYSTEMS IN ARCHITECTURAL PRACTICE

Technology touches almost every facet of architectural practice today, from casual conversations to significant design and resource management decisions, and on to building components. This article treats the management of technologies directly related to information systems, that is to say the interaction of people with technologies to create, store, retrieve, analyze, and communicate information and knowledge.

The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency.

—Bill Gates

Information systems underlie design, business, and educational functions essential to the life and prosperity of the firm. They help shape external perceptions of the firm's identity and competence, affecting status and marketability. The quality and success of information system management strongly influence the firm's destiny.

Technology leaders in architectural firms of all sizes are challenged to understand the value various technologies hold for their firm; select technologies appropriate to the business goals and character of their firm; plan implementation, present findings and decisions, guide adoption to optimize results, and maintain smooth functioning in fault-intolerant environments. In very large firms, these leaders may be technology professionals with little or no firsthand architectural experience, while the sole architectural practitioner may have little affinity for newer technologies, and limited resources for technology acquisition and management. In these extreme cases, as well as conditions falling somewhere between, a systematic approach to technology can help maximize benefit for investments, control, and predictability. A clear mapping of technological capability to architectural imperative is crucial. An understanding of the intended benefit for each action, as well as the measures and targets for success, will improve outcomes.

Gaps between a firm's current practices and emerging needs or aspirations are frequently catalysts for change and adoption of new technologies. However, the introduction of technology by itself rarely solves problems. Where the underlying processes are flawed, applying new technologies can even serve to amplify rather than resolve the existing dysfunctions. Effective technology planning begins with well-articulated goals and sound project design and delivery practices, and is best performed in concert with broader strategic and tactical planning efforts.

▶ Strategic Planning for the Design Firm (5.3) further discusses the strategic planning process to help firms achieve positive results.

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Once plans are in place, proper adoption and execution are necessary to realize the full potential of technology investments. Improved performance, or, alternatively, positive return on investment, is the ultimate goal of technology introduction and use. Measuring success of technology investments and management on a periodic basis and comparing results with quantified targets are important steps in justifying technology costs to senior decision makers. Publication of performance accomplishments can in some cases actually stimulate performance improvements. An organized approach covering all these aspects of technology management is a valuable asset to technology leaders.

AREAS OF TECHNOLOGY MANAGEMENT

Many systems and conceptual models are used to organize the various components of technology management. Chronological process models are organized in task order, for example: research, selection, implementation, administration, and decommissioning. While these stages map well onto project management timelines of IT professionals, they do not address broader organizational needs and business objectives. Other mission-focused models, such as the People + Process + Technology approach, begin by first considering ways to increase the efficiency of people and process, and then provide appropriate technologies to increase their effectiveness (Williams and Leask, "People, Process, Technology Strategy for Enterprise 2.0," [Booz Allen Hamilton, July 2011]).

This article organizes technology management themes in four areas: Planning, Adoption, Technology, and Performance, with two or three further divisions defined for each area as described in the sidebar "Areas of Technology Management." The framework is inspired by the BIM and VDC Scorecards developed at Stanford University's Center for Integrated Facility Engineering.

► For more on BIM and VDC Scorecards, see Emerging Technology in Practice (11.6).

Although the Scorecard was developed to evaluate the maturity of building information modeling (BIM) and virtual design and construction (VDC) technologies used in design, construction, and facility management, the underlying framework adapts well to broader technology management needs. The framework described in this article has direct applicability to evaluate special technologies essential to the core function of architectural firms, architectural design, as well as more general technologies found in architectural firms. Moreover, the framework includes a mechanism to evaluate performance achieved through the use of technologies. Articulation of goals, definition of explicit targets and measures of success, dedication to monitoring, and periodic reporting are intrinsic elements of the BIM and VDC Scorecard framework. These fundamental characteristics provide sound guiding principles whether used to structure a formalized technology program for large corporations, or organize the internal thoughts of an individual.

Planning

Each piece and type of technology is introduced into a firm to achieve particular goals. Telephones and e-mail may be seen as basic necessities accepted into firms without question to support business communication. Design analytics and simulation tools may be considered exceptional tools introduced to help a firm meet design high-quality and efficiency goals, or perhaps brought in because an important decision maker has faith or interest in this type of technology. Motivations and goals, be they focused on design quality, productivity, value to client, client care, firm reputation, market positioning, or other motivations, will inform the evaluation and selection of tools. Even solutions for the conceptually simple data storage tasks present myriad possibilities, such as physical vs. virtual, local vs. remote, secure vs. open, singular vs. redundant, and site vs. cloud, each with distinctive advantages, liabilities, operating parameters, management requirements, and costs. No one solution is best for every environment.

To navigate these decisions effectively, the technology leader must have a clear understanding of the firm's strategic and business plans, the firm's culture, and available technologies, and from this background develop a system of goals and objectives for the firm.

Objectives

The first step in developing objectives for information services is to become thoroughly familiar with the firm's strategic and business plans in order to understand the roles information systems can play in achieving these goals. Where possible, technology leaders should participate with other key decision makers in establishing attainable firm-wide goals and realistically appraising the contributions technology can make in achieving these. Evolving technology goals and firm-wide goals in harmony will clarify the position of technology investments in the firm's strategy, simplify later resource

AREAS OF TECHNOLOGY MANAGEMENT

The four areas establish an overall management framework for technology in an architectural firm. Although presented in a specific order for consideration here, in practice elements from all of these areas, especially adoption and technology, will progress and mature in parallel. The results and measured performance will also inform and suggest improvements to planning, adoption, technology, and performance.

PLANNING

The first step of planning is to develop the *objectives* for technology within the firm—in particular, how technology will contribute to success in the firm's overall strategic and business plans, what measures will be employed to determine progress, and the target values of these measures which will indicate success. Planning will also establish *standards*, including guidelines and policies, for managing technology; and proper *preparation*, including tracking tools and dedication of appropriate resources such as funds and staff hours.

ADOPTION

In order to achieve the plan, team members must have clearly defined processes in place to use technologies throughout all appropriate project phases, and organization established to support efforts throughout the firm. Training, incentives, and well-defined work flows are also necessary components of effective technology adoption.

TECHNOLOGY

Decisions regarding the selection and deployment of technology are best informed through the consideration of several factors of various technologies such as expectations for maturity, stability, and capabilities of tools; coverage and application through all aspects of design and firm management; and interoperability to support integration throughout the fabric of the firm along with other business partners.

PERFORMANCE

Continual measures of qualitative and quantitative performance are necessary to track the degree to which firm-wide goals are met, the satisfaction of staff and clients with systems and services in place, and the return on investment in adopted tools and processes. (See Table 11.1.)

TABLE 11.1 Four Areas and 10 Divisions of Scorecard Framework and Their Related Considerations

Area – Division	Considerations
Planning – Objectives, Standards, Preparation	Goals, targets, policies, guidelines, analysis, budget
Adoption – Organization, Process	Stakeholder involvement, organizational dispersion, use throughout life cycles or phases, training, incentives, work flows
Technology – Maturity, Coverage, Integration	System selection, system capability and maturity, depth and breadth of use, communication and interoperability
Performance – Qualitative, Quantitative	Efficiencies, client satisfaction, staff satisfaction, key performance indicators, return on investment

allocation processes, and form a sound basis for prioritizing technology objectives and selecting performance metrics and associated success targets used to gage the firm's progress.

Direct engagement of technology planning with strategic planning will also provide a basis for comparison between the current state and the desirable state of operation and achievement. This understanding will be useful in prioritizing technology initiatives, and will also help suggest key indicators and target values to measure success in meeting objectives.

Documentation of the objectives, measures, and targets established in the firm's technology plan is useful in memorializing agreements and acquainting staff with the underpinnings of the plan. The success of technological efforts will depend in large part on staff action; ensuring their understanding, and ideally acceptance, of the technology plan and goals can be a critical step in achieving objectives. See "Adoption," below, for other ways to increase staff participation in achieving firm technology goals.

EXAMPLE OF OBJECTIVES/METRICS/ SUCCESS TARGETS/TECHNOLOGY INTERVENTIONS

What are the primary objectives driving the firm to adopt and maintain technologies?

- Marketing messages, performance goals for quality and efficiency, external pressures

What are the measures of success?

- Productivity gains, data reliability, award recognition, design features (such as more alternatives considered, reduced energy or water use), money or time savings, client satisfaction

What are the target values to achieve?

- Invoicing produced with 50 percent of former work hours and 100 percent accuracy, 3 design awards, alternatives evaluated increased from 3 to 150, 20 percent energy savings, 0 percent field RFIs due to coordination errors, 10 percent time reduction, client satisfaction rating at least 9 on a scale of 1 to 10

How will technology contribute to these efforts?

- Update accounting systems:
  - Establish a single source responsible for each datum such as project names, employee names, and billing rates.
  - Connect project tracking systems with agreements and invoicing.
  - Connect project management systems with HR systems.
  - Automate invoice generation.
- Specially organized program to pioneer use of BIM and introduce other technologies for:
  - Production
  - Visualization
  - Analysis and simulation
  - Generative design
  - Graphics
  - Virtual and remote collaboration, iRooms
  - Project collaboration web portals and extranets

Ideally, every member of the firm will be engaged in this process, if not in actual decision making, at least to a level that helps them see the end goals of technological investments made by and for the firm.

Key performance indicators (KPI) are used to track attainment of specific goals, and *return on investment* (ROI) calculations are used to cost-justify decisions, or represent their relative cost or contribution to positive cash flow. These concepts are easily understood and applied. Tracking and reporting can be accomplished with spreadsheets. If needed, spreadsheets can be converted to simple database applications, creating a more robust system for use by several individuals. These in turn can be scaled up to create web-based applications. Many online service providers offer free online forms connected with spreadsheet-like applications that are easily shared with a large number of people in different locations.

Reporting mechanisms to track KPIs—such as time saved by using generative design tools—can be assembled in a few moments by creating a table with rows to track time spent in design activities (e.g., exploration of massing options, façade development) and columns for periods of time (days, weeks, months). Organizing KPIs so that larger values always indicate better performance is a good practice. For example, it is easy to understand that larger numbers indicate better performance when measuring time saved. A key performance indicator such as the number of failed communications, where smaller numbers indicate better performance, can be confusing when presented alongside a KPI tracking time saved. In this case, percentage of successful communications would be a better choice for this indicator; larger numbers will indicate superior performance.

ROI calculators can be more complex, frequently requiring conversion of quantities related to time or number of occurrences into dollar equivalents, accounting for initial and continuing costs of the new solution, and backing out savings recovered through reduction of expenditures for the current solution while providing similar or better services, and finally charting these over time to determine a payback period.

Figure 11.18 illustrates ROI calculation on a proposed Internet service upgrade. Although the example assumes a firm with a few offices, the thought processes relating to problems in evidence and potential impact of possible technological solutions can easily be applied in much larger or smaller environments.

In the example case, a project manager promptly analyzes the upgrade and reports that long file transfer times and model loading failures repeatedly interrupt work flow, decrease productivity, reduce staff morale, and jeopardize deadlines. The situation negatively impacts the firm's ability to maintain its high standards for client care, an important component of the firm's reputation. Technology team members research options for system upgrade. They also institute KPI tracking and quantify the loss of billable hours per week occasioned by Internet connection underperformance.

In Figure 11.18, the ROI calculation includes a modest accounting for lost time: one billable hour per week for a few selected staff members. Although the upgraded

Internet Service Upgrade ROI Calculation

Site	Redundant T1 Line			Fiber Optic Private Network			Totals							
	Speed	Installation Costs (non-recurring)	Monthly Costs (recurring)	Speed	Installation Costs (non-recurring)	Monthly Costs (recurring)	Installation Costs (non-recurring)	Monthly Costs (recurring)	Current Monthly Cost (discontinued) (recurring)	Monthly Incentive Credit (recurring)	Monthly Staff Time Savings (recurring)	Adjusted Monthly Costs (recurring)	Annualized Recurring Costs	First Year Total
Branch 1	1.5MB	waived	$470	5mb	waived	$2,622	waived	$3,092	($1,200)	($359)	($1,720)	($188)	($2,251)	($2,251)
Branch 2	1.5MB	waived	$470	5mb	waived	$3,337	waived	$3,807	($900)	($442)	($1,720)	$744	$8,933	$8,933
Branch 3	1.5MB	waived	$470	5mb	waived	$3,097	waived	$3,567	($1,200)	($414)	($1,720)	$233	$2,796	$2,796
Branch 4	1.5MB	waived	$470	5mb	waived	$2,658	waived	$3,128	($1,200)	($363)	($1,720)	($155)	($1,865)	($1,865)
Secondary	n/a	waived	-	10mb + 5mb	waived	$5,402	waived	$5,402	($4,050)	($627)	($8,600)	($7,875)	($94,504)	($94,504)
Main Office	2MB	$5,489	$1,156	34mb	$15,138	$7,096	$20,627	$8,252	($5,000)	($958)	($12,900)	($10,607)	($127,279)	($106,652)
Total		$5,489	$3,036		$15,138	$24,211	$20,627	$27,247	($13,550)	($3,165)	($28,380)	($17,848)	($214,170)	($193,544)

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FIGURE 11.18 **Return on Investment Spreadsheet Example**

system has higher fees than the existing service, an overall accounting, including recovery of unproductive staff time, shows that the investment in superior Internet connectivity will result in immediate cost savings for most locations, and for the overall enterprise.

Standards

Standards for technology implementation take many forms, from wide-area networking protocols and operating systems, to standards describing data-formatting supporting particular information-sharing transactions. From a technology management perspective, standards will also include guidelines and policies describing the provision of services and levels of services, and may include detailed descriptions of which services are provided as part of standard indirect (part of the firm's *overhead* expense), and which are directly chargeable to a project (*direct expense* charged against the project's financial account).

Standards and policies will govern aspects of information system design and service delivery. Data storage allocation, backup and archive procedures, hardware allocation and rotation, quantity and diversity of software packages, telecommunication provisions, data privacy expectations, guidelines describing which materials can be copied into individual's professional portfolios, and even educational budgets will require thoughtful consideration and decisions from the technology leadership. While detailed assessment and advice for every topic is beyond the scope of this article, the mechanisms for targeting, evaluation, education, and performance reporting will provide a strong operational framework from which to consider up-to-the-minute advice from other sources.

Reference one or more of many fine management and technical publications for in-depth exploration of topics not explicitly covered here; some are listed in the "For More Information" section below. Since technology-related information, capabilities, and opinions of best practice change rapidly, online sources, technology consultants, and even sales representatives can be good sources for state-of-practice information.

SAMPLE EXPENSE POLICY

LARGE OFFICE ENVIRONMENT

Services Provided as Part of Standard Indirect (Overhead) Services

- LAN and Internet services
- Security, antivirus, firewall, data backup
- VPN for travelers
- 6 × 8.5 helpline (operated six days a week, and 8.5 hours on each of these days)
- Standard hardware and software setup and maintenance (per list)
- System planning, provisioning, administration

Services Provided as Direct Expense (Premium) Services to Projects

- Project commissioning
- Extranet and file sharing
- Milestone archives and documentation
- Production assistance
- Customizations, automation, special development (outside firm-wide plan)
- Setup and maintenance of nonstandard hardware and software
- Remote office (e.g., trailer) support

SMALLER OFFICE ENVIRONMENT

Overhead or Project Budget

- All communication, hardware, and software expenses
- All computer-related education and training

Billed Directly to Clients

- Reproduction expenses (to paper or electronic media)
- Shared data storage (project management sites, third-party electronic file boxes)

Consider also participation in professional peer organizations. Organizations composed of colleagues leading technology efforts in other firms can be excellent forums for knowledge sharing among professionals confronted with similar challenges and operating environments. Valuable insight and inspiration can equally come from groups composed of technology leaders stationed in diverse industries who, working with different objectives, firm cultures, and deliverables, will often have different and refreshing perspectives on technology and technology management.

Preparation

With objectives and standards in place, the next step in technology planning is to prepare by rallying the appropriate resources and tools to accomplish the goals. Preparation will include budgeting and use of various business tools such as Strength, Weakness, Opportunity, Threat (SWOT) and effort/value (E/V) matrices to analyze processes and establish priorities for action.

There are several popular and viable methods for establishing technology budgets. Among the decisions to be made are:

- Benchmark to other firms
- Establish internal parameters
- Allocate expenditures on percentage of gross revenue
- Allocate expenditures on per capita allowances
- Allocate expenditures on a case-based ROI calculation
- Allocate expenditures on merits or mandates (e.g., as part of innovation budgets, or to comply with client requirements)

In benchmarking to other firms, figures can be sourced from commercially available market reports; in some communities and market sectors, practice owners are willing to share their own internal budgeting guidelines and historic figures. Internal guidelines may be the best choice for firms with particularly aggressive technology goals, specific regional or market sector conditions, or with pronounced strength in ROI calculation and performance reporting. Compare this decision with the decision to achieve energy or structural performance goals by following code and rule-of-thumb requirements verses performance analysis methods. The first approach (comparable to the decision to benchmark budgets to other firms) is safe, well tested, and conforms to established industry norms. The analytical approach (comparable to the decision to formulate internal budgeting guidelines) usually requires more effort, but can reveal and justify innovative or unusually efficient solutions.

Benchmarks for technology expenditures as a percentage of gross revenue may be in the range of 4 to 7 percent for large firms, depending on size, setup, and corporate policy. The percentage may be slightly higher for small firms, especially during phases of expansion or introduction of new business processes or tools. Per capita expenditures will be based on cost of equipment, software, training, and standard services delivered as part of standard indirectly billed overhead for the firm.

The technology leader will use a wide variety of tools to establish and prioritize needs, balance the needs of various stakeholders, and schedule initiatives over time. Typical tools for establishing priorities and urgency, such as

TECHNOLOGY OPERATIONAL BUDGET

Sample breakdown of a standard technology operational budget for a midsize firm during an average year without special initiatives (Table 11.2). This firm outsources a significant percentage of computer maintenance. Note that costs of computer hardware and major software purchases will be accounted for in the firm's depreciation schedule.

TABLE 11.2

Item	Percentage of Technology Budget
Labor	22%
Information access (online knowledge)	4%
Consulting	40%
Software allocation	8%
Data/communication	6%
Computer training	2%
Computer maintenance	7%
Supplies, shipping, taxes	7%
Miscellaneous	4%

In the case of smaller firms, budgets may be greatly simplified, for example, allocating 80 percent of the technology budget to software acquisition and software maintenance fees, while all other costs consume the remaining 20 percent.

effort/value matrices and SWOT analysis, can be employed fairly quickly using subjective analysis, or developed to a high degree of detail including analysis of costs and benefits. The importance, complexity, availability of data, and projected cost of a proposed project will help guide the degree of effort expended in the analysis. For example, a quick subjective decision loosely guided by an effort/value matrix may be all that is needed to select between use of spreadsheets or a complex time management system for a two-person firm already using spreadsheets to prepare invoices for clients. The exercise may be carried out in seconds using a mental diagram of the chart. (See Figure 11.19.)

Adoption

The next crucial step after planning is adoption: how teams execute the plan throughout various processes and organize to achieve goals and objectives. The people and processes supporting technology objectives are intrinsic to the scope of the adoption area. Establishing an environment conducive to adoption success is essential in achieving performance goals, and begins by asking these questions (see the section "Performance" later in this chapter for their answers):

- Are procedures clearly outlined?
- Are appropriate technologies used in all phases of project delivery and management?
- Do staff members receive proper training to follow processes and use the technological tools provided?
- Are staff members expending their energies to further these efforts, or creating friction?
- Are incentives in place to motivate progress toward firm and project goals?
- Do staff members have clarity on the objectives and the plans to achieve them? How are they informed of progress?

Technology is neither good nor bad, nor even neutral. Technology is one part of the complex of relationships that people form with each other and the world around them; it simply cannot be understood outside of that concept.

—Samuel Collins

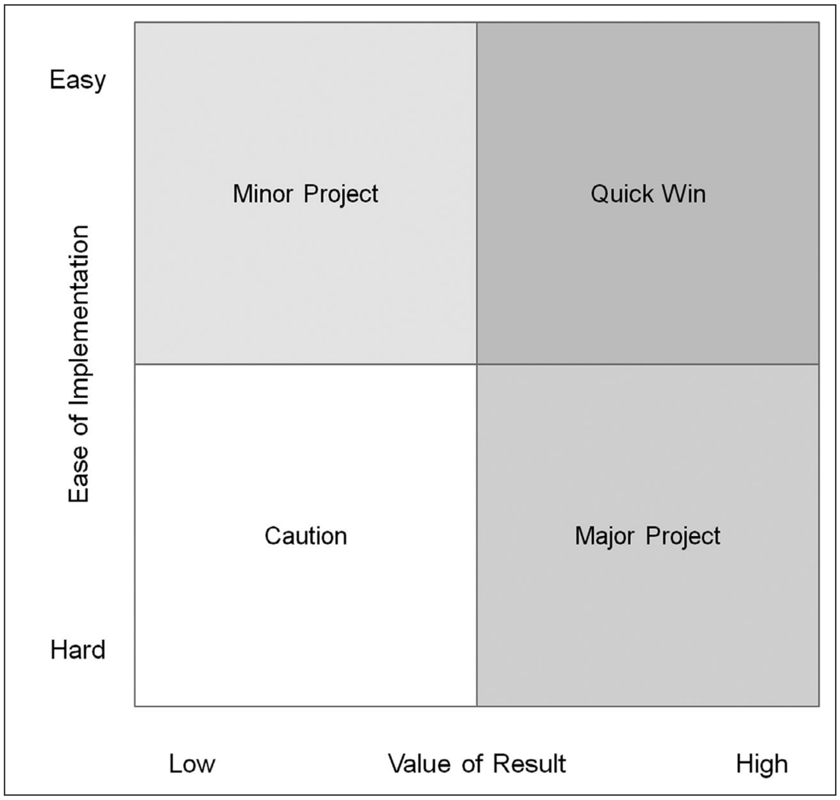

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FIGURE 11.19 Effort/Value Matrix

Organization

Greatest leverage of technology is achieved through deep and meaningful involvement of all stakeholders with technological implementations. Education and training programs can be pivotal in achieving acceptance of technologies, as well as developing skills essential for productive adoption of tools.

Engagement with technology can be measured by a number of factors highlighting different aspects of the organization:

- Number and diversity of tasks augmented or supported by technology
- Proficiency with which employees use available technologies
- Attitudes toward technology throughout the firm

Review of these measures may point to areas of deficiency or opportunity. Finding that few capabilities of the accounting systems are exploited, building models are only used to generate 2D plans, or staff is resistant to use of available technologies would each reveal particular problems with the current technology management and indicate different interventions to improve performance.

A comprehensive, well-documented plan to provide conceptual education and procedural and instrumental training, as well as reference guides to encourage adherence to best practices under the pressure of design and production deadlines, are essential for all processes involving technology, especially processes where new technology is introduced. Training can be delivered through in-person instruction, live or recorded webinars, online self-paced learning management systems (LMS), tutorials, books and reference guides, or even individual exploration. Each method has benefits and drawbacks, which should be carefully weighed for each application and audience.

- *Procedural training* explains processes adapted for and adopted by an organization, firm, or team. Elements tailored to comply with the firm's standards, including the procedural guidelines to follow in a work flow, such as sequence of actions, nomenclature, and filing structures, are covered in procedural training. Steps to follow when organizing functional spaces within a building, including space standards and nomenclature, and the steps to follow when authoring and filing e-mail, are examples of procedural training topics. This type of training is most frequently developed in-house, or in collaboration with in-house experts, and is typically difficult to share between organizations. Self-paced learning via LMS and intranet-delivered guides easily accessed during task execution are excellent avenues for procedural training.
- *Instrumental training* focuses on the use of specific tools such as software applications down to the level of software features and command sequences. Developing operational skills with spreadsheet and database systems used in space planning activities, and precise use of e-mail tool features, are examples of instrumental training. The content of instrumental training is most frequently specific to tool rather than a firm's individual standards or processes, and can be shared with a broad user community. Self-paced online reading, coupled with hands-on exercises and access to an expert, can be an effective mix for instrumental training. Because the content is not usually customized, this type of training is well suited to outsourcing.

E-LEARNING

Webinars, online guidelines, and full-featured learning management systems (LMS) provide excellent opportunities for efficient educational events. Webinar and Internet-delivered systems provide cost-effective options for content delivery in a range of situations, from widespread organizations taking advantage of centralized education resources while avoiding travel costs to very small organizations in remote areas lacking easy access to commercial training facilities.

Hybrid educational events featuring both web-delivered content and locally provided content, often with direct access to domain experts for questions and discussion, are an effective solution now gaining in popularity. Available systems supporting e-learning range from extremely affordable (free) Internet communication options to robust (and expensive) LMS solutions supporting customized content, self-paced learning, knowledge verification quizzing, and individualized automated tutorial review functions.

Conceptual education treats topics at the level of ideas, developing a theoretical or abstract understanding most often relating to intent rather than implementation. An introduction to space planning or a description of e-mail's transit through the Internet are examples of conceptual education topics. Live, in-person hybrid events and other mechanisms supporting discourse and shared experience are useful in modification and expansion of ideas promoting conceptual education.

- *Just-in-time, just-enough (JITJE) training systems* are also very useful in promoting smooth project execution. JITJE systems are used to answer immediate questions in the moment they arise during work processes.
- *Reference guides* providing standards and procedural training information supplemented with small amounts of instrumental training information, all organized for quick reference, can be the simplest and most economically produced form of JITJE information. More complicated systems providing online help, application wizards to guide users through complicated procedures, and in some cases systems to monitor the user's work patterns and suggest more efficient alternatives, are also available.
- *Conferences, educational events, and topical social media* are excellent ways to stay abreast of latest developments and thinking, connect with peers, share knowledge, and seek advice. The American Institute of Architects (AIA) offers information to members and nonmembers through a number of channels. The Technology in Architectural Practice Knowledge Community website is an excellent place to start finding resources appropriate to those managing technology in architectural settings (see www.aia.org/tap).

Process

Technology leaders can make valuable contributions in analysis and of processes associated with design and firm management by suggesting technologies to improve efficiency and quality. Responsibilities stretching across departments and individual project interests equip technology leaders with a broad perspective on enterprise-wide harmonization, integration, and improvement. Given this vantage point, along with the skills, tools, and data at their disposal, technology leaders may be best positioned to lead process and evaluation and improvement planning.

Introduction of new applications, frequently accompanied by changes in work flow, are excellent opportunities to develop fresh, comprehensive standards, guidelines, and training materials. Figure 11.20 shows a timeline of events supporting introduction of a new building information modeling (BIM) tool into a studio. The new tool requires harmonization of office standards, protocols, work flows, and training in support of the initiative. Diagrams such as these are useful as planning tools, and also for communication of steps and schedule expectations throughout an organization.

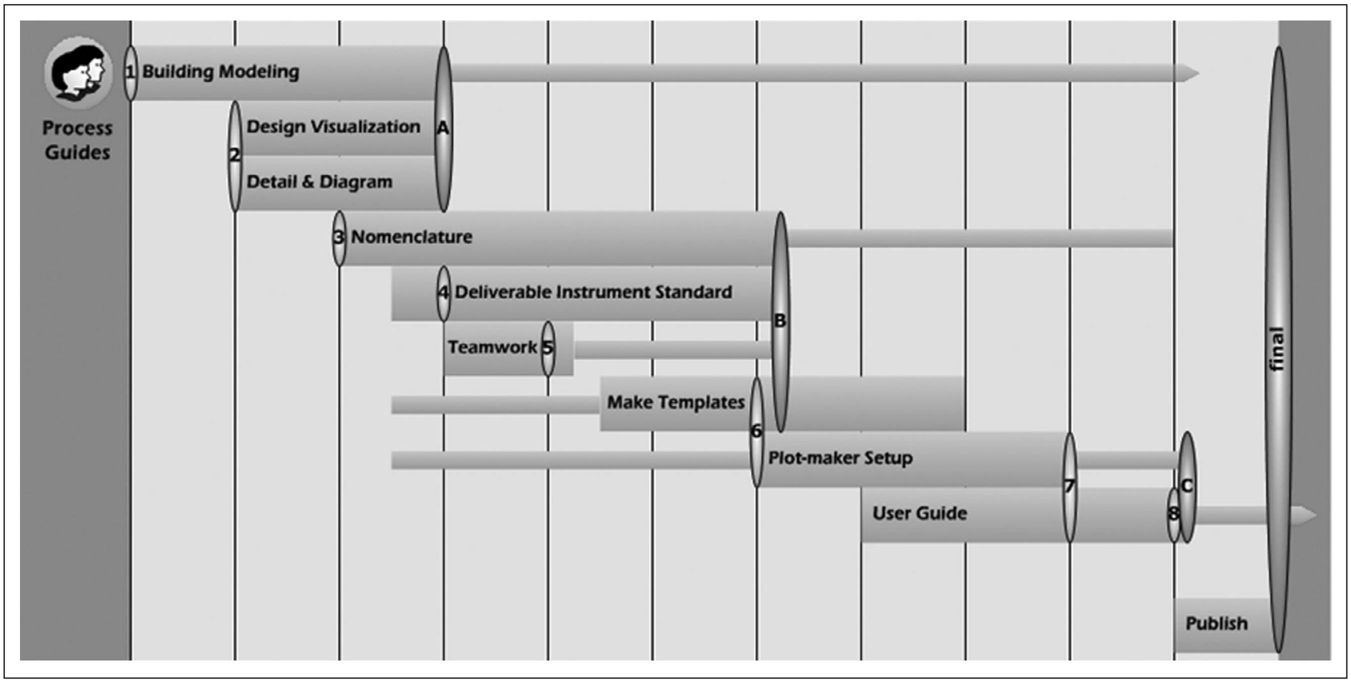

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FIGURE 11.20 New Process Timeline

PART 3: PROJECT DELIVERY

Some technologies, such as timecard or e-mail systems, are best introduced at once throughout an organization, or in very large organizations by large functional units, to maintain standard work flows, information compatibility, and simplify support. The impact to the end user is primarily around instrumental training.

Introduction of other technologies, such as generative design, performance analysis, BIM, and virtual design and construction (VDC), frequently require conceptual education and procedural training as well as instrumental training, and in fact can be quite disruptive to work flows. In these cases, incremental introduction may be chosen to create a more manageable environment and "pilot" or "test bed" experiences. Team members with exceptional skills or attitudes supporting introduction of the new technology may be assembled to execute projects with well-defined parameters and simple requirements, all elements selected to maximize chances for success.

Based on learning experiences from these team members and projects, the technology can be either rejected or more confidently introduced to a wider range of projects. Over time, successful technologies will be mainstreamed throughout an organization, becoming the customary practice to be supplanted by later innovations. Figure 11.21 illustrates an approach to virtual building environment (VBE) introduction, beginning with a carefully selected environment, then moving to more demanding expectations, riskier projects, and a broader pool of team members over time.

Incentives can be used to motivate and accelerate adoption of technology. While performance bonuses can be quite effective with project teams and multi-firm contracts, other forms of reward can be effective with a firm or project team and need not involve large dollar investments. Acknowledgment during staff meetings or in office communications can be an effective motivator. Other forms of recognition, such as supplements of paid training time as opposed to requiring all training to be accomplished during unpaid time (a practice still observed in many firms), can be extremely effective. Publicizing success stories can also be motivational; as project teams and individual staff members learn the benefits of technology, many will seek out training and access to the tools for their own use.

Technology alone is rarely the key to unlocking economic value: companies create real wealth when they combine technology with new ways of doing a business concept.

—James M. Manyika, Roger P. Roberts, and Kara L. Sprague, *Eight Business Technology Trends to Watch*

Technology

Selecting the appropriate technologies aligned with firm objectives and culture, and optimizing their use, are important factors in the successful implementation of technology. *Maturity* of applications, the depth and breadth of their function, is a crucial factor in *system selection*. Careful consideration in system selection is given to the features most important to achieving identified goals, objectives, and work flows, as well as assessing the capacity of candidate applications for expansion into areas of potential future interest. Figure 11.22 shows an assessment of five software applications for use in a particular environment. Note that in this case the objectives established by the firm

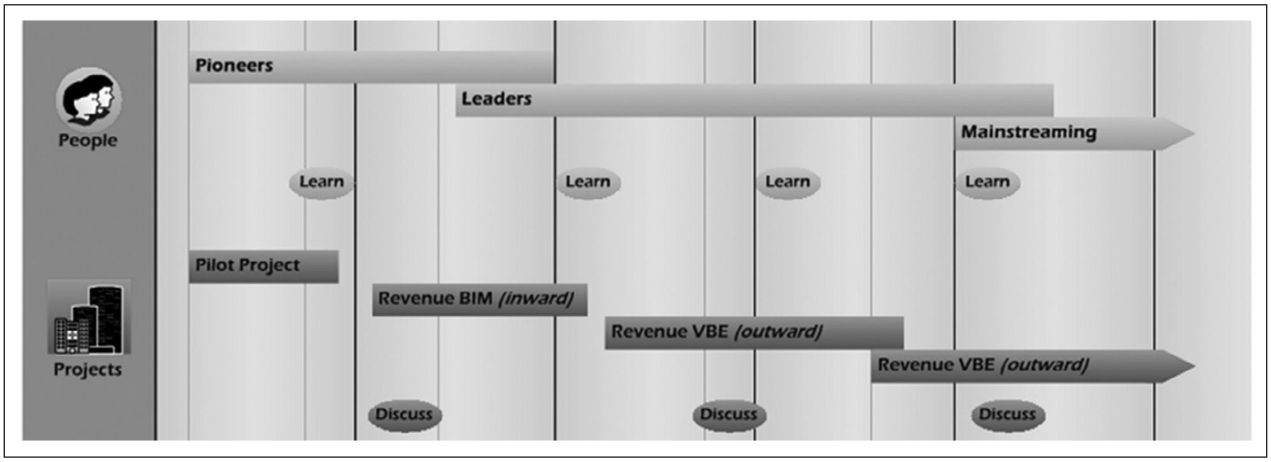

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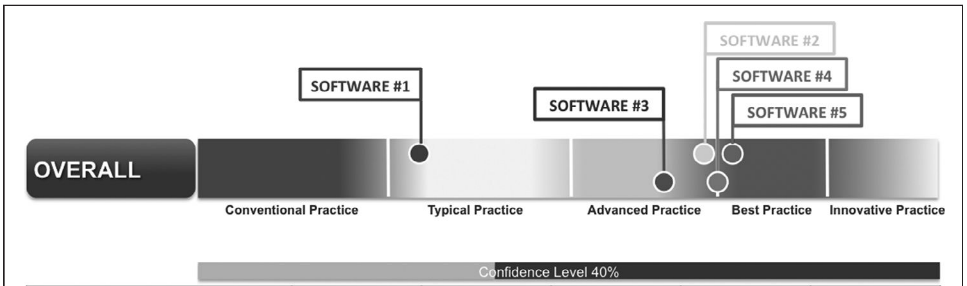
FIGURE 11.21 Adoption Timeline



	Software #1	Software #2	Software #3	Software #4	Software #5
Cost	Free				Free
1.12 Team Collaboration	☆☆	★☆	★☆	★☆	★★
2.11 Ease of Exchanging Comments & Markups via Email	★☆	★☆	★☆	★☆	★★
2.12 Attribute Comments & Markups to Individual User	☆☆	★☆	★☆	★☆	★★
2.15 User Friendly GUI	★★	★★	★☆	★★	★★
3.13 Redline on 3D Model	☆☆	☆☆	★★	★★	★★
3.14 Manage Markup	☆☆	★★	★★	★★	★★

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FIGURE 11.22 Software Selection Criteria

and criteria contributed by the studio teams are clearly indicated; they are grouped by planning, adoption, and technology areas of evaluation.

System selection should be revisited periodically to ensure that systems stay in step with emerging needs of the firm. The yearly budgeting cycle is a good time to review tactical decisions and secure the best purchasing arrangements. More strategic reviews may be appropriate every two or three years, depending on the speed with which the firm's needs change or technologies meaningful to the firm's operation evolve.

A firm with modest needs and resources, perhaps just introducing technologies into the work flow, may find appropriate solutions in free or extremely low-cost cloud-based packages integrating communication services (e-mail, text and video chat, voicemail) with data services (collaborative document sharing and online storage), eliminating the need for elaborate backup and archiving processes. Business management functions (word processing, spreadsheet, business graphics) may also be provided as part of cloud solutions. Many cloud-based solutions require constant Internet connectivity to function. Where productivity loss during Internet downtimes is unacceptable, open-source and free software alternatives such as those offered by GNU may be appropriate.

Firms desiring more control, reliability, or customization of communication and data services may choose to provide these services in-house or through facilities managed by IT providers. They may select and purchase popular software packages that are known to most employees and potential hires, and offer seamless interoperability with software used by collaborating firms.

In either case, evaluation based on planning, adoption, and technological capabilities can quickly and objectively lead the decision-making process; periodic refreshment of the evaluation will show emerging trends that may alter selection decisions.

Coverage, the range of different tasks accomplished with a software tool, can be an informative indicator of opportunities to better leverage software. This can be a direct comparison of actual practice within the firm to benchmarks of technology used in other firms, or to an idealized situation of all possible uses. Of a more immediate impact may be a survey of actual use compared with software capabilities already in-house, and quick analysis of missed opportunities. These are a few examples:

- A time-tracking system currently used for its recording stopwatch features may offer direct data transfer to timecard and invoicing applications, saving time and reducing errors and rework.

- A BIM application used to understand shadow patterns may provide useful functions to optimize daylighting, energy use, view corridors, and breeze patterns, improving design quality and expanding marketable services.
- A cloud-based file storage system used primarily for backup and file transfer protocol (FTP) transactions may offer real-time multiuser collaboration on certain document types, reducing turnaround time for decisions and avoiding data loss due to updating conflicts.

Other measures of coverage may include the percentage of staff members or projects making beneficial use of technologies provided, and the level of detail to which applications are used. All of these indicators may reveal opportunities to better leverage technology within the firm.

Integration of technologies further leverages investments to magnify returns. Data sharing between applications can support communication and reduce the need for redundant data entry and the attendant opportunity for dissimilar or outdated versions of the same datum. The benefits of *interoperability* between design systems made in other sections of this handbook also apply in analogous manner to data systems used for administrative functions. From an operations standpoint, care should be taken to select accounting, project management, communication, employee intranet, human resources, facility management, marketing, client management, and client extranet systems that can easily and directly share data in real time and with a minimum of conditioning or reformatting. System interoperability at this level reduces rework and data coordination failures by increasing efficiency and data reliability. Open standards hold the best promise for interoperability over time and across platforms. Many governments around the world now have open standards/open-source requirements written into contracts for data management systems (Government Open Source Policies, Center for Strategic and International Studies, 2010). While connections via custom-built conduits may be subject to changing market forces and business alliances, and may disappear over time, adherence to open standards at least offers security beyond the fate of individual companies and agreements. Firms with generous budgets may choose to create customized linkages between systems using neutral intermediary standards such as standard query language (SQL) databases.

An enterprise-wide data map is a useful asset for developing and verifying a unified data management plan. Data integrity can be compromised when users performing different operational functions use similar names to describe data fields, which are factually quite different. Field content can also vary from user group to user group. Data mis-coordination can appear in many locations and in different guises. An accounting team will likely use different names for projects and clients, and different primary contacts, than those used by the marketing team. The marketing team will keep different employee resumes, perhaps several versions for selected individuals, than those kept by the human resources team. The human resources team may keep confidential employee information, which by law is not sharable with other departments. Data maps can help manage and guide information exchanges and sharing of materials, preventing opportunities for errors, miscommunications, and information loss.

Ideally, each datum will have one reliable source responsible for inputting and maintaining it. This efficient approach tends to increase data reliability, or at least reduce miscommunication and confusion. Single-source data management increases efficiency by eliminating redundant work, and removes confusion and time loss that can result when a data field such as an address is represented differently in different databases.

The very act of measuring performance and publishing results can have dramatic effect on actual performance. Many professionals will improve their performance and productivity once they understand success targets, and see that the results of their actions matter.

Performance

Actively measuring, reporting, and publishing performance is a key success factor for technology adoption efforts. Results of key performance indicators can and should be published through a wide variety of channels: within project teams, across the entire enterprise, and at industry gatherings to move the marketplace toward more quantified evaluations of performance. Performance factors can be organized by another form of the four-quadrant diagrams seen earlier for effort/value. The axes for performance classification are Quantitative to Qualitative, and Subjective to Objective. In this case, a third axis can be added for Controllable to Circumstantial.

For quick reference here: Quantitative measures relate to numerical data such as money or time spent or saved, while qualitative measures pertain to relational assessments that may be expressed in terms such as "better" or "quicker." Subjective evaluations may be the intuition or opinion of one or two individuals; at the other end of the scale, objective evaluation may result from the consensus of a large number of individuals, and/or quantitative measures of resources. Controllable measures are those that result directly from actions one can control, such as the number and frequency of training sessions offered to a staff member for a particular purpose. Yet the actual uptake of knowledge or building of skills may be *circumstantial*, based on the gifts of the learner. Each type of evaluation has meaning and use to describe the acquisition of goals. Quantitative, objective, controllable measures are most compatible with management efforts related to time and money. At the other end of the spectrum, design and aesthetic considerations may rely more heavily on qualitative, subjective, circumstantial measures.

Whatever measures are selected as key performance indicators, reliable information collection and reporting are important factors in assuring decision makers and all team members are aware of the effects the efforts have on the enterprise. Quarterly financial performance reports may be sufficient to track overall performance of an enterprise, whereas project teams may need weekly or daily reporting to track their performance on resource use while they have opportunity to correct variances between planned and actual results.

Technology leaders may also want to report on key performance indicators for the systems they oversee. Easily obtained quantitative measures such as uptime, data storage capacity, network connectivity and throughput, and staff satisfaction with information services can increase understanding and appreciation for the level of service provided. Benchmarking to similar firms can be informative for information services staff, and may, in well-functioning environments, increase satisfaction levels.

Any information not deemed confidential or proprietary to the firm should be published frequently to staff via efficient mechanisms appropriate to the culture and means of the firm. Smaller organizations (small firms or project teams) may choose to announce results at weekly staff meetings or post results on announcement boards. Staff intranets are an excellent publication channel for performance data. In larger organizations, each studio, functional unit, and project team can assess their performance in comparison with similar units, as well as enterprise-wide achievements, and then use knowledge gained from higher-performing groups to improve performance. Connecting experience holders with those working to improve performance can be an efficient way to raise overall enterprise achievement, and promote a culture of Kaizen (continuous improvement) and mutual assistance throughout a firm.

CONCLUSION

Management of technologies in an architectural setting, when compared with other environments, requires a different, and perhaps a unique approach. The business of architecture is, after all, a blending of typical business activities with analysis and artistic expression; this can color values, expectations, and decision making.

There are functional realities as well. The data storage requirements in design firms can be higher per project, owing in part to a reliance on precise visualizations and analysis of bulky data sets. Deadlines may be more frequent, more urgent, or more dramatically consequential, or perhaps simply perceived to be so. Although technology forms a structural backbone for many architectural practices today, the technologies themselves are frequently viewed with skepticism and hostility, or, conversely, embraced with an evangelical fervor and a magnitude of expectation impossible to fulfill.

Technologies, market conditions, client demands, and firm priorities can all change rapidly. The best solution available when a decision is made may be obsolete the next day. Idealistic and pragmatic temperaments may clash or fail to communicate.

A clear, objectified framework can provide guidance on the complex journey of technology management. The central themes of relating resource investment directly to firm-wide strategic plans and aspirations; educating to achieve support for change initiatives as well as teaching tool-based skill sets; establishing performance targets and then monitoring and reporting results through neutral, objective measures; and maintaining open standards to facilitate data transfer and knowledge sharing within the firm and throughout the broad team structure are all concepts and approaches that will equip leaders to excel and prosper through the excellent management of technology in architectural practice.

For More Information

The New CIO Leader (Gartner Inc., 2005) by Marianne Broadbent and Ellen S. Kitzis.

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BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors, 2nd edition (Wiley, 2011) by Chuck Eastman, Paul Teicholz, Rafael Sacks, and Kathleen Liston.

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PART 3: PROJECT DELIVERY

11.6 Emerging Technology in Practice

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The technologies introduced in this article are considered to be emerging as of 2012 because of their recent introduction or their lack of widespread adoption by the industry despite proven values in early implementations. This article will discuss key drivers for technology development and adoption, followed by descriptions of several emerging technologies and their value to firms and projects.

INTRODUCTION

Navigating the value propositions for the adoption of emerging technologies requires weighing many considerations. Technology management decisions should account for the value and impact of a new tool to existing processes, the firm's target clients, the project delivery methods, and the larger strategy of the firm. To support an adequate

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consideration of competing factors in the decision to adopt a new tool, this article will provide a listing of emerging technologies, described in terms of their capabilities and value to firms and projects. The technologies introduced in this article are considered emerging, as of 2012, because of their recent introduction or their lack of widespread adoption by the industry despite proven values in early implementations.

Although this listing is not intended to be comprehensive, it provides a useful overview of technology that should be in an architect's vocabulary, if not common in their practice. As project delivery methods become increasingly collaborative, technologies previously outside the architect's scope are becoming important to the design process and effective collaboration with builders and operators throughout a project life cycle. The technologies listed are therefore arranged in order of their potential application within a project's life cycle, progressing from early design and analysis of existing conditions, to facility management and eventual decommissioning.

These sections are followed by a listing of tools for communication and connectivity, which are integral for collaboration in all project phases. Preceding this listing, a summary of notable influences on technology adoption will provide context for the development and adoption of emerging tools. Government influences on technology maturity in practice will be the focus, illustrating how BIM requirements throughout the world have motivated BIM and technology adoption. By establishing these requirements, governments are acknowledging the proven value of BIM and its benefit to design and construction productivity.

Driving Factors

In spite of the value propositions of technology in practice presented in the previous article, the profession tends to be conservative in adopting emerging technologies. The construction industry alone invests less than 0.5 percent of contract volume in research and development, much less than the average of 3.5 percent across all major industries (Paul Teicholz, "Labor Productivity Declines in the Construction Industry," 2004). The reluctance to adopt new tools may be due to their perceived costs and to uncertainty in pinpointing or quantifying the benefits. Although firms may be conservative in adopting new tools, external driving factors are continuously incentivizing and requiring technology adoption even by resisting firms.

Government Initiatives

Government initiatives and innovative public owners are beginning to require BIM deliverables, both globally and across the United States. These requirements support meeting strategic goals of design excellence, better and more reliable project delivery, and higher productivity in the design and construction sectors. With BIM becoming a prerequisite for government projects, design firms and builders must reassess their technology tool sets, organizational fit, and work flows, and prepare to adopt new tools as needed to pursue public projects.

International

Throughout Scandinavia, and increasingly in Asian and European countries, governments are requiring BIM deliverables for projects that meet certain size and type criteria. The Finland government's public buildings service, Senaatti, or the Senate Properties, has been requiring building information models in forms of the IFC open standard since 2007 (Senate Properties, 2007). The Senate Properties BIM requirements are very specific with respect to scope and use of models, requiring modeling of the architectural design from early project stages to support the cost comparison of various alternatives, and also to predict energy consumption (Senate Properties, 2007). Statsbygg, Norway's equivalent of Finland's Senaatti, also has mandated BIM deliverables for all projects since 2010 (Statsbygg BIM Manual, 2011). The motivations behind these requirements were to improve efficiency in the design, construction, and operation of a facility, and to reduce costs and errors.

In Asia, the Hong Kong Housing Authority is requiring full BIM adoption by 2014–15. Singapore's Building and Construction Authority (BCA) will require BIMs on all projects over 20,000 square meters (~200,000 square feet) for permit approval by 2013, and the threshold will reduce to 5,000 square meters (~50,000 square feet) by 2015 (BCA, 2011). South Korea's Public Procurement Service (the South Korean equivalent to Senaatti or Statsbygg) is making BIM compulsory for all projects over $50 million and for all public sector projects by 2016. This is part of a larger South Korean effort to establish national BIM guidelines and a BIM roadmap to motivate systematic use of BIM in the public industrial market ("OpenBIM Is Taking a Big Leap Forward in Korea," *Solibri Magazine*, 2011). Following the lead of Asian and Scandinavian countries, the United Kingdom is mandating BIM deliverables on public projects, requiring collaborative 3D BIM on its projects by 2016.

United States

In the United States, a number of federal agencies have been driving the adoption of BIM through requiring BIM deliverables. Since 2003, the GSA Public Buildings Service has incorporated building information modeling in over 100 capital projects, while proving its values in the accuracy, efficiency, and performance improvements for spatial program validation, existing condition capturing, project phasing, energy prediction and management, circulation simulation and validation, and building elements, as well as facility maintenance and operation. GSA has been requiring BIMs for spatial validation on all major capital projects since fiscal year 2006, and has published the GSA BIM Guide Series as part of its National 3D-4D-BIM Program. The GSA has also cooperated in an international effort to promote and mandate BIM adoption in public projects, signing an eight-country agreement in support of interoperability, smarter buildings, and BIM submissions for validation and analyses.

The U.S. Department of Veterans Affairs (VA) has required IFC-compliant BIM authoring tools since 2009 for all major construction projects over $10 million, with the goal of using BIM to assist with spatial and equipment validation, energy performance simulations, and facility management, among other uses ("The VA BIM Guide," 2010). The U.S. Department of State's Bureau of Overseas Building Operations (OBO) has been requiring BIM deliverables since 2007, including architectural BIMs, walkthroughs, and renderings, clash detection and QC reports, and facility management (FM) data in spreadsheet form for export to FM software ("BIM Technologies," OBO, 2007). The U.S. Army Corps of Engineers (USACE) has also established BIM requirements and deliverables, with the goal of using BIM on all projects no later than 2012 and achieving automation of certain life cycle tasks by 2020 ("Building Information Modeling," USACE, 2010).

At the state level, Wisconsin is mandating BIM on all projects exceeding $5 million; Texas has adopted BIM as standard for documentation for all state projects; and New York City's Department of Design and Construction (DDC) has established BIM guidelines that require BIM on new projects between $15 million and $50 million ("DSF BIM Guidelines and Standards," Wisconsin DSF 2009; "Guidelines/Standards," TFC, 2008; "BIM Guidelines," NYC DDC, 2012). Several municipal and state governments are participating in pilot studies of "AutoCode" technology, which requires BIM submissions to automate the checking of designs against the accessibility and egress provisions of the International Code Council's (ICC) International Building Code ("Game Change Enables Automated Code Checking for BIM," Fiatech, 2012). The goal of requiring BIMs for automated code checking is to shorten the construction plan review process, removing a bottleneck that often affects business development (Fiatech, 2012).

Integration

The drive for owners and project teams to integrate on both the project and the enterprise levels have provided a more natural platform for technology innovation and implementation. On a project basis, architects and other design professionals engaged in traditional project delivery methods often find low direct project incentives for them to invest in technologies, where the majority of benefits are realized after design is complete and by other stakeholders. Builders benefit from more accurate documentation and a clearer vision of design intent provided by designers, while owners see savings from high-performing designs throughout a facility's life cycle. Further complicating the cost justification equation are design fees, which typically account for a small portion of total project delivery costs and a negligible proportion of total life cycle cost of ownership. There is, however, marginal value to designers operating in a design-bid-build or other traditional delivery environment. Architects can leverage new tools to offer unconventional and value-adding services to clients throughout the facility life cycle, and design and analysis tools have greatly increased productivity and design quality. However, the full benefit of emerging tools is often realized through multi-stakeholder collaboration at the project scale, which is facilitated by a higher level of collaboration and integration. Integrated project delivery (IPD), integrated forms of agreement (IFOA), and other collaborative contracts and delivery methods can mitigate to a certain degree the difficulty of justifying technology expenditures. Common profit pools distribute the financial benefits of project success among participating stakeholders, incentivizing and motivating the collaborative implementation of emerging tools.

On the enterprise level, new technologies have empowered firms to reorganize and optimize their personnel, leverage their corporate knowledge, and expand their service offerings. Integrated enterprises, which to varying degrees act as developer, architect, construction manager, and owner-operator, can manage the entire design-build-operate life cycle for a facility. These firms fully leverage the value of new tools without worrying about benefits lost or shared with other project stakeholders. Adopted technology can be applied throughout a facility's life cycle in a holistic and collaborative manner, reducing the information loss and redundant work associated with multi-stakeholder exchanges. The evolution of firm services and organization is a predictable effect of technology adoption. Emerging tools make it easier for one firm to play multiple roles in a project, and do so in an efficient and integrated manner.

Productivity

One of the most important drivers behind BIM's adoption is its impact on design productivity, through increased automation, higher degree of collaboration, better accuracy, as well as reduced information loss and interoperability costs. Improved productivity is one of the primary motivations behind the development of government BIM requirements, particularly those of the Singapore Building and Construction Authority (BCA), which has set a goal for 2 percent improvement in construction productivity per year for the next 10 years (BCA, 2011). With BIM and other technology tools, professionals can accomplish the same amount of design work with fewer resources; 2D drawings can now be automatically generated from the BIM, models can be more speedily shared among various applications and stakeholders, and design changes can be more efficiently propagated among various mediums of project documentation. These gains in efficiency provide more time for design iterations or analyses to optimize facility performance and overall quality.

Although technology helps increase automation and collaboration, problems with interoperability have had significant impacts on potential productivity gains and cost savings. A report by the National Institute of Standards and Technology (NIST) in the United States estimated the cost of inadequate interoperability in the AEC industry to be $15.8 billion per year ("Cost Analysis of Inadequate Interoperability in the United States Capital Facilities Industry," NIST, 2004). The state of interoperability has improved since the publishing of the 2004 report, as emerging tools and open standards are constantly improving the integration between different tools and file formats, driving down the design costs associated with information loss and modeling rework.

The ever-improving state of interoperability is an important driver of technology adoption, as firms require better integration to improve their productivity and continue to collaborate effectively with other design disciplines and trades.

PLANNING AND DESIGN

3D Imaging and Laser Scanning

3D laser scanning and 3D imaging not only aid in the preservation and digital reconstruction of historic structures but also allow for the accurate capture of as-built conditions for renovations and new construction. 3D laser scanning exists in two major methodologies: time-of-flight scans and phase-based scans. Both types emit a narrow laser beam that scans an object, collecting tens to hundreds of thousands of 3D points, coordinates, and reflectivity per second (also known as a point cloud) that are used to generate a 3D virtual representation of the existing condition. To create a point cloud, time-of-flight scans rely on the accurate measurement of the time required for a pulse of laser light to reflect off an object and return to the source (so-called time of flight), whereas phase-based scans use a constant beam of laser light and calculate the change in phase of the reflected light to find distances to an object's surfaces. Once created, point clouds can be converted to 3D models, allowing them to be incorporated into or compared against design models.

3D imaging is a lower-cost alternative to laser scans, as it relies on more readily available digital cameras to generate point clouds instead of specialized laser scanning equipment. Static photos or videos can be used to generate point clouds similar to those captured by laser scanners, though at a lower level of accuracy. This technology relies on triangulation, where a point's location in space is calculated based on 2D locations of the point in different images. Relying on images or video for acquiring spatial data makes 3D imaging much faster and easier than laser scanning, and more financially feasible for smaller projects.

Geographic Information Systems

Geographic information systems (GIS) capture, store, maintain, and analyze geographically referenced data. In design, GIS tools are useful for evaluating the social, environmental, and geographical aspects associated with a potential site or location. This includes 3D satellite images to view a model in relation to its future surroundings; analyses of nearby amenities, land uses, and infrastructure; and climate data for energy simulations. These tools enable professionals to make intelligent and informed planning, programming, and design decisions with respect to a particular site, its demographics, and their associated activities.

Requirement Modeling

Requirement models allow for the functional and spatial requirements of a building to be defined and tracked during project planning and programming, and throughout the design and project delivery process. This is accomplished by checking a model with a requirement formulation and validation application, which verifies that the programmatic requirements of a design are being met, using user-defined rule sets. These rule sets can be defined before or after a design model is built. Before design, requirement formulation allows performance specifications, user requirements, and programs from previous projects to be referenced to create program criteria. This allows new projects to benefit from the knowledge base of previous projects, refining and optimizing requirements that have already been employed in past work.

The proposed design model can be imported into the validation application where deviations from requirements are automatically identified and reported. Following this iterative process, the finalized model, enriched with requirement information such as room and equipment labels, can be exported from the checking application. By incorporating known design requirements into the design process and tools, designers can make sure the final design meets all of the client requirements, despite many iterations and owner-directed changes. Furthermore, by using a BIM with unique space and zone labels, and creating programming rules that describe spatial requirements, a firm can check their design against efficiency metrics to optimize the program layout for occupant convenience, cost, and other design goals (GSA BIM Guides, Series 02).

Product Modeling

The proliferation of BIM has enabled an increase in detail within drawings and models, not only for major building components such as structural, MEP, and architectural systems, but also for lesser, more standardized building components such as light fixtures, doors, and plumbing fixtures. Instead of designers using their own resources to model these standardized components, models and details of these products are available through manufacturers and third-party sources. This simplifies the process of modeling or detailing manufactured components, as their drawings, 3D models, and specifications can be readily inserted into drawings and BIMs.

Although the use of standardized product models can increase design productivity, these objects must be carefully inspected for interoperability and standards compliance before being used in a model. Important considerations include file format, object and attribute naming conventions, and level of detail (object geometric complexity should be consistent with needs and overall model detail).

Electronic Specifications

Document or paper specifications have been available in electronic versions for well over a decade, and today's electronic specifications usually refer to the linking of BIM to digital performance specification through BIM-based software applications. This allows for the relevant specifications for a building component to be accessed by simply selecting the desired model object. This eliminates not only the need to refer back to a separate electronic or paper specification but also the tedious lookup process to find all of the relevant specifications for a building component. Specification sections can be defined and linked to the appropriate model objects early in the design process, and edits to the specifications can be made as requirements change. Once model objects have been associated with the appropriate specification section, changes to the model will automatically update the specifications to include new components or materials.

Model Checkers

Similar to a requirement model, described above, model checking software allows for sets of functional rules to be defined and tested against a design model. Examples of these rule sets include spatial requirements for the Americans with Disabilities Act (ADA) or circulation requirements for courthouses, where security dictates limited public access to many areas. Once a rule set is defined, a design model can be imported to the checker application, where it is validated against the rules and any violations are identified. By automating the checking process, designers can not only save time but also increase the likelihood of meeting strict specification requirements.

3D Printing

3D printing generates physical models using printers that deposit a succession of very thin layers of a modeling substrate, resulting in a scaled 3D model. This provides a more tangible representation of the design to supplement virtual models in their communication of design intent to the owner and project stakeholders. 3D printing relies on applications and programming similar to computer numerical controlled (CNC) machining, which translate model geometry into the physical movements of a fabrication tool to create a physical model. At the time of this writing (2012), 3D printing is already being used to create engine parts in the aviation industry, and it's expected that this technology will be applied to the fabrication of building components within the life span of this publication.

Optimization

Design optimization software relies on algorithms that permute model or design variables and optimize them with respect to specified constraints and design objectives. With clear criteria defined before optimization, competing design goals can be optimized by priority, giving designers an understanding of the trade-offs between performance objectives. Examples of design variables could include energy performance, daylighting, user comfort, cost, and schedule duration. Outputs of optimization simulations can be presented in graphical form, with response curves illustrating optimization objectives in terms of their relationship to and impact on other variables. As design optimization techniques and software advance, analysis cycle times will decrease, and optimization criteria and objectives can expand in order to better inform design and improve building performance. Improved optimization techniques will ideally analyze a limitless number of design alternatives, whereas conventional practices analyze only a few alternatives, or use a limited number of parameters.

CONSTRUCTION

Supply Chain Management

Technology is improving the accuracy and efficiency of supply chain management during construction. Construction teams are using bar codes or radio frequency identification (RFID) tags to track equipment and materials throughout the job site, increasing the precision and timeliness of supply inventory. With bar codes on materials, workers can use portable scanners to confirm a shipment has arrived, and then confirm each piece as it is installed. With on-site tablets or office computers, this data can be brought into a BIM to show the progress of the structure. This detailed approach can help maintain a tight schedule, manage inventory, and communicate among work teams about the status of many layers of the project.

Off-Site Fabrication

BIM-enabled prefabrication and computer numerical controlled (CNC) machining are two processes enabling the shift of construction from the field to controlled, off-site facilities. CNC fabrication methods have long been relied upon for creating unique or custom objects, both for building systems and architectural components. Other means of prefabrication include precast concrete, modularization of rooms or repeated units, custom molds for fiber-reinforced elements, and pre-assembly of MEPF components. CNC, precast, and glass fiber elements are particularly useful for fabricating unusual shapes that cannot be efficiently or adequately constructed with on-site methods. These include custom or unique metal structural components, and decorative glass or other façade cladding.

These custom shapes can be generated relatively easy in BIM or 3D modeling applications (in comparison with 2D methods), and then exported or translated into a fabrication model to drive the CNC machine or mold creation. BIM-enabled design and fabrication allow architects to employ more unusual and custom shapes in their designs, and have simplified on-site construction. After arrival on site, these components may only require installation, resulting in lower labor costs, less rework, and less field supervision. Tighter production control in an off-site facility also contributes to less material waste and closer conformance to dimensional tolerances.

Field Mobility

Field management software on portable tablets is bringing BIM technology from the office to the field. Applications allow for mobile access to models and specifications, field report and punch list completion, and comparison of as-built conditions to design models on augmented reality displays. Tablets eliminate the need to carry paper documents into the field, simplify recording of field information and inspection results, and make it easy to collect comprehensive construction and design information to hand off to facility owners.

OPERATIONS AND MAINTENANCE

Facility Operations and Management

As mentioned in the overview article of this chapter, advanced public and private owners have recognized that design and construction information relevant to their facility's operation can be incorporated into models and made easily accessible to their operations and maintenance (O&M) personnel. Integrating facility management (FM) information into the model during design and construction has been made possible through advances in software interoperability and increased collaboration between designers, builders, and O&M personnel. Various trades and designers can link important FM deliverables into their models, including operations manuals, maintenance schedules, and product data, providing the owner with a data-rich model that can populate or work alongside existing FM databases.

If a building is equipped with building automation systems (BAS), then certain software tools allow O&M personnel to locate rooms within the model and access their controls to optimize energy performance in real time. Energy performance data arranged in dashboard format gives operators an executive view and control of their facility performance, allowing them to observe trends and identify opportunities for improvement. For additional information on facility management, refer to the GSA's BIM Guides Series 08, which focuses specifically on goals and guidelines for supporting facilities management with BIM.

Life Cycle Planning

Incorporating life cycle assessment (LCA) into the design process has increasingly become a priority in the context of the broader movement toward sustainable building practices. A building's environmental impact comes not only from its long-term use but also from design, construction, and either decommissioning or recycling upon demolition or renovation. Accounting for the environmental impacts of decommissioning, demolition, or renovation requires using designs, materials, and construction practices that facilitate deconstruction, recycling, and reuse of building components and materials. Technology assists LCA through the construction of databases containing relevant energy and materials inputs, and environmental releases for products and materials. Having easy access to this data can inform design decisions and model-based analyses, quantifying the environmental impacts in terms of inputs and releases for various design components.

COMMUNICATIONS AND CONNECTIVITY

Interactive Displays and Workspaces

Interactive displays with features such as touchscreens, video conferencing, and digital whiteboards are becoming integral tools in design and construction, enabling focused presentations and enhanced collaboration. Use of these tools in conjunction with Big Room or i-room environments is particularly valuable, where multiple stakeholders can interactively participate in design review and revision. New technology is bringing more than large displays and touch screens; it is also combining them with motion-sensing input devices to control model authoring tools in a more intuitive manner with only hand or finger movements. The evolution of display technology may soon have transformative effects on how we control and use design tools, significantly increasing design productivity.

Computer-Assisted Virtual Environment

A computer-assisted virtual environment (CAVE) comprises a large room with images projected or displayed on all or several walls to immerse the viewer in a 3D virtual reality environment. This enables an architect or end user to experience and interact with a design in three dimensions, on a human scale, before it is constructed. An immersive environment allows for a more intuitive and complete review of design features than is possible using a typical computer monitor. Advances in this technology will soon enable real-time design changes to be made while within the CAVE (so-called CAVE-CAD), reducing the latency between review and revision.

Cloud Computing

Cloud computing refers to delivering computing requirements such as storage and applications as a service through a network. This centralizes software and data on remote servers, while ideally providing the same—and often higher—performance than if the software and data were locally installed and stored. This centralization has resulted in energy savings, lower maintenance staff costs, and the reduction of downtime from failure of individual workstations. These improvements in data delivery and performance are compelling business reasons to consider cloud computing in almost any size design firm, although proper consideration should be given to data connection speed and security measures in order to adequately support cloud computing goals.

In design, cloud computing allows computing power to be pooled when necessary to handle increasingly computationally intensive analyses and rendering. Cloud computing is also facilitating tighter integration between various design disciplines and builders, helping them to share and update models, and generate and send various communications, including RFIs and submittals. Markups and comments can be seamlessly shared through one application, reducing the steps to gather and send information while also increasing the clarity of requests.

Model Server

Model servers with BIM software installed enable the creation and maintenance of a centralized BIM that can be managed by multiple users and merged with model updates. This goes beyond using a centralized server to simply store files and share them among a project team, as the software can read and write at the object level with IFC or other file formats in order to maintain a centralized, up-to-date BIM. This allows for automatic updates to affected team members when model revisions have been made, as well as automatic checking to identify differences between model revisions. Using a BIM-enabled centralized model server reduces or eliminates data loss and the need to e-mail large files, facilitates multiuser model editing, and ensures access to the most current model.

Electronic Submissions

Electronic submission systems facilitate the submission and processing of construction-related documents and applications via the Internet. Although these systems began with 2D submissions, several building authorities are moving toward enabling BIM-based submissions. By submitting BIMs to code-reviewing authorities, code-checking applications can automatically review and validate designs, bypassing the latency associated with manual drawing review processes and permitting.

As noted in earlier sections, many forward-thinking regulatory agencies throughout the United States and around the globe already require or accept electronic submissions, and the trend is accelerating. Many government agencies further require models to be submitted in open standards (such as IFC). This follows a global trend among governments around the world to protect the public welfare by adopting and enforcing policies requiring open standards to be used in all aspects of data management for public service needs.

Performance Dashboards

Although performance dashboards and their associated key performance indicators are valuable in all phases of a project's life cycle, their primary function is as a management and communication tool, informing managers and executives of project and facility performance. Dashboards consolidate and graphically display the performance of key indicators, selected by the user for close monitoring and tracking. A facility operator may be interested in monitoring and controlling the energy consumption of a building, whereas a project manager may be interested in the change order rate, or the number and latency of RFIs. Dashboards collect these indicators, and provide a simplified glance at performance to quickly identify problems and inform management decisions.

The data collected for dashboard display can come from a number of sources that require varying degrees of effort to maintain. Data can come from project management systems, building automation controls and sensors, spreadsheet databases, or web-based survey tools. These various sources may require application programming interfaces for automatic data extraction, or manual collection and input. The BIM and VDC Scorecard presented in the accompanying sidebar is an example of a dashboard oriented toward measuring the BIM and VDC maturity of a project, informing managers of their project's strengths, weaknesses, and state of practice on a global scale, as shown in Figure 11.23. By measuring, visualizing, and sharing performance in key areas and metrics, projects and firms can manage and motivate the attainment of objectives.

STANFORD BIM AND VDC SCORECARD: DECISION SUPPORT FOR TECHNOLOGY PLANNING AND PERFORMANCE MEASURES

Integrating technology in practice requires holistic and thoughtful decision making and implementation attention in order to justify the investments, potential risks, and foster measurable improvements in efficiency, collaboration, and quality.

The BIM and VDC Scorecard, developed by the author at Stanford University's Center for Integrated Facility Engineering (CIFE), has taken a holistic and objective approach to evaluating technology maturity within a firm or project. As shown in Figure 11.23, the Scorecard offers a structured decision-making checklist for professionals to navigate through the four major areas pertaining to Planning (objective, preparation, and standard); Adoption (people and process); Technology (maturity, coverage, and integration); and Performance (qualitative and quantitative).

Project or firm-based decisions can be made more objectively and scientifically by using the evaluation frameworks backed by quantitative criteria and metrics. By relying on an unbiased review of investment and implementation performance, technology management strategies can be properly validated to mitigate financial risks and the potential for disruptions and productivity losses at both the project and enterprise scales.

The Stanford BIM and VDC Scorecard has been applied to about 100 industry cases as of 2012, to validate and inform its measures, while demonstrating its scalability and the value of a global knowledge base of BIM and VDC maturity to benchmark project performance. These case studies have resulted in an accurate benchmark of technology maturity in practice, providing a valuable tool to gage the practices employed within a firm or project against other cases throughout the world.

The evaluation process largely relies on inputs received from project team members during small-group interviews, and also project or firm documentation of BIM and VDC standards and goals. The accuracy of and confidence in an evaluation depends on the length of interviews, the disciplines and positions of interviewees, and the documentation reviewed, but a reasonably accurate

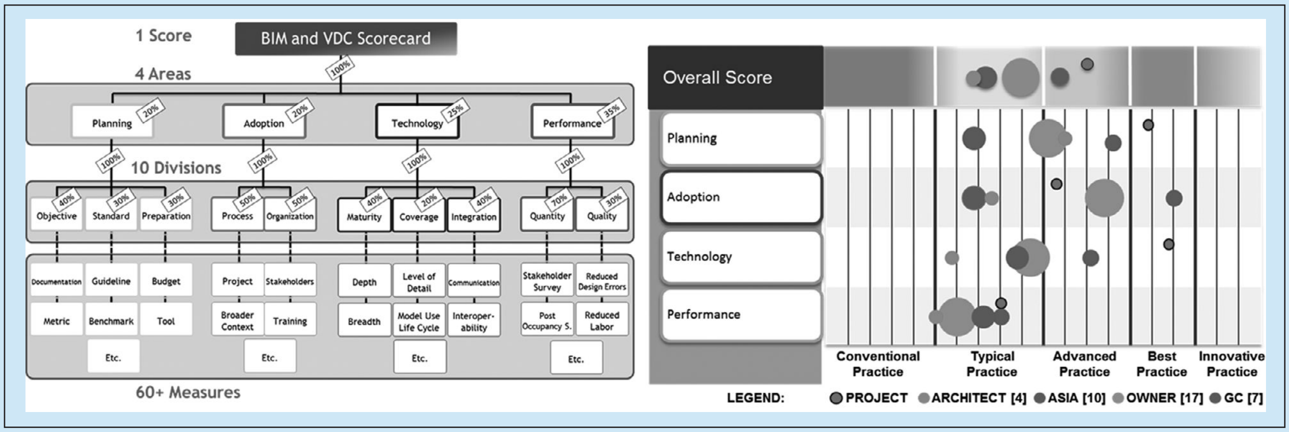
(continued)

assessment can be made with a one- to two-hour time investment. The Scorecard framework is organized into four areas: planning, adoption, technology, and performance. The four areas can be further broken down into 10 divisions and over 60 measures, offering an interconnected and scalable vocabulary and measurable attributes that can lead to reliable tracking and assessment of VDC implementation throughout the entire facility life cycle. (See Figure 11.23.)

Each overall area, division, or measure will be scored with respect to a spectrum of five tiers of industry practice: conventional, typical, advanced, best, and innovative practice. These five tiers of scoring allow project teams to benchmark their technology maturity within the context of global practice. The goal of benchmarking performance is not to push every team to achieve the highest level of innovative practice, but to see that current practices are meeting expectations, whether those expectations are to employ technology in an innovative or typical manner.

The Scorecard evaluation process results in an assessment of project or enterprise performance with respect to technology implementation, and identifies areas for improvement in both applications and management processes. To make these improvements, the evaluation includes actionable advice and recommendations to raise practices to higher industry standards, while considering any financial and organizational constraints.

The ultimate goal behind the Scorecard is the optimization of the built environment through continuous improvements in business decision making, processes, and technologies. By quantifying BIM and VDC maturity and providing actionable advice for improvements, the Scorecard helps individual firms and projects objectively manage their BIM investments, reducing uncertainty and focusing human and financial resources on high-priority areas. An unbiased scorecard-type evaluation and quantitative measures of performance are integral tools in supporting technology's contributions to increasing the productivity and efficiency of the design and construction industry.



left: Center for Integrated Facility Engineering (CIFE), Stanford University; right: bimSCORE.com

FIGURE 11.23 ***(left)*** **The BIM and VDC Scorecard Framework, composed of 4 areas, 10 divisions, and over 60 measures.** ***(right)*** **Dashboard illustrating a project score in comparison with the scores from various stakeholders and countries in the global database.**

CONCLUSION

We are embracing technology in our daily lives: Over 85 percent of adults in America own a cell phone (over half of whom own a smartphone), 57 percent have a laptop, 19 percent have a tablet computer, and 63 percent go online wirelessly with one of those devices ("Digital Differences," Pew Research Center, 2012). Technology adoption in professional practice has followed similar trends. Referring to Geoffrey Moore's Technology Adoption Life Cycle, BIM has captured the "early adopters" of disruptive innovations and has started capturing the "early majority," or mainstream market of design practitioners (*Crossing the Chasm: Marketing and Selling Disruptive Products to Mainstream Customers* [HarperBusiness, 2002]). Over 70 percent of those who participated in an AEC industry interview in North America have reported adoption of BIM and BIM-related tools. BIM's adoption seems to have crossed Moore's infamous "chasm," as it is no longer predominantly employed only by visionaries in the industry but also by mainstream adopters who demand proven value before adoption (SmartMarket Report, McGraw-Hill Construction, 2009 and 2012).

If the current pace of technology evolution in practice is maintained, architects today can and should have an optimistic outlook on the future of technology in practice. Based on the observable trends and the emerging tools described throughout this article, one can imagine the impact of technology on practice in the future:

- Before designs are even conceptualized, GIS tools will leverage geographic information to inform evidence-based site selection and planning.
- Immersive and stereoscopic 3D environments will be used for not only design review but real-time modeling and revisions.
- Automation of many design tasks will allow more alternatives to be generated and evaluated, enhancing design performance and optimization.
- Permitting agencies and owners will accept BIMs as part of their regular submission and review process, decreasing turnaround time and improving code compliance.
- During design and construction, integrated teams will use 4D simulations and model-based estimation and scheduling to maintain tight control over budget, schedule, and resources from early design phases.
- At project commissioning and turnover, owners and operators will be supplied with a data-rich BIM for facility management, increasing operations efficiency and prolonging facility life with well-managed maintenance.

Many of these visions are nearly reality today, but their use is expected to expand beyond the visionary firms and designers to mainstream adopters, having widespread impacts on the industry as a whole. Especially with the proliferation of integrated forms of project delivery, the value of emerging tools will be more apparent and accessible to firms large and small, motivating leaps in productivity that have so far eluded the larger AEC industry.

For More Information

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CHAPTER 12

Quality Management

12.1 Origins and Development of Quality Management

Cliff S. Moser AIA, MSQA, LEED AP

Quality management is a system that supports and improves a firm's performance. More than a document checking system, quality management provides guidelines, support, and metrics to holistically advance the practice and the profession.

INTRODUCTION

Quality control and management began in the early part of the twentieth century by creating and managing standardization in the manufacturing industry. Quality control was based on minimizing deviation in the production of equipment and parts that needed to be readily interchangeable and transportable. Standardization turned craftsmen into assemblers. Industrial designers became involved in quality control because their specifications determined the interchangeability and adaptability of parts and systems. World War I and World War II gave rise to a need for suppliers everywhere to create precise and interchangeable components for the military. This standardization helped facilitate a diverse but robust global supply chain.

After World War II, quality control and assurance matured as a profession whose practitioners focused their efforts on industry. Soon quality experts like Walter A. Shewhart and W. Edwards Deming were instructing industries in countries like Japan, which were already in competition with the United States. These consultants taught how to develop

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organizations that used *quality* as a core competency driver. Toyota began its recovery after WWII with Deming's guidance, building an organization that would change manufacturing in the late twentieth century with "lean production" methodologies.

Inspection-Based Systems

The origins of quality management lie in statistical process control and inspection. In this model, products were made and then measured to see if they met a specified standard before release to the customer. This inspection-based system reviewed output and then adjusted the inputs and processes supporting production in order to provide products within an agreed range of deviation. If necessary inputs were modified, processes were calibrated, and in some cases specifications were modified to support the successful development of a product.

Architectural quality control was also based on the development of inspection-based systems. Quality control for professional service providers such as architects was built around the specified requirements of the instruments of service, drawings and project manuals, and construction phase services.

Following the apprentice-based model of staff training and the inspection process of deliverable review, architecture firms tried to create robust systems of deliverable development through production and oversight. Inspection-based systems are built on drawing review and revision. This requires a skilled staff and team, as well as continual training, in order to be effective. It requires that there be organizational standards within the practice that are the baseline for acceptable delivery. If a practice has expertise in a particular building type, then the firm must train its staff in those requirements. In the past this was accomplished by pairing experienced project architects with junior staff, and it is also the same process recommended today with computer-aided drafting (CAD) and building information modeling (BIM) solutions. Through development of drawings and details, and continuous oversight, the drafting staff would gradually learn the requirements of a firm's building types and standards, including broad nonspecific technical knowledge such as how to detail cavity walls, and the proper use of flashing. Standards, such as the sheet numbering of drawing sets and the typical specifications used by the firm, were also conveyed. In this model, quality control is the responsibility of the project architect overseeing and reviewing the work of junior staff.

However, as the profession moved into using digital 2D CAD to produce deliverables, the apprentice- and inspection-based model began to fail. No longer could senior staff review deliverables while they were still "on the boards." The old process of "over the shoulder review," common in a hand-drawing and paper-based model, is not as effective when computer drawings need to be plotted out and then "redlined" for input back into the CAD file. CAD introduced a gap in the oversight process, and the development of multiple hard copies with separate multiple inputs and outputs has the potential to create numerous opportunities for mistakes and miscommunication.

Process-Based Systems

While inspection-based quality systems remain important and necessary, the advent of accelerated project delivery models, globalization, and increasingly more complicated building types require quality management (QM) systems that include a more integrated and process-based organizational approach.

Furthermore, reliance on checklists and inspection alone does not guarantee that correct work will be delivered to the client. This could be owing to inspector oversight, or to incomplete understanding of a project's requirements by the design and production team. Process-based systems promote quality by incorporating quality reviews into the process, instead of waiting to inspect the results at the end. There are many systems of process-based QM, including ISO 9001 and Six Sigma. Process-based QM also includes supplier-based initiatives such as Lean Systems and customer-focused quality requirements. A successful quality management program must be based on a blend of process-based systems and integrated checklist and inspection-based services.

► The accompanying backgrounder on Utilizing ISO 9001 in an Architectural Practice discusses that system of process-based quality management.

As an industry, practitioners are now challenged to focus on developing quality processes into the use of new software tools such as building information modeling (BIM). There are a number of 3D tools that enable electronic review of the BIM against program and code requirements, as well as clash identification and coordination of architectural work with consultants' work. BIM also enables an ongoing collaborative development review of the 3D model throughout the design and construction process. A central shareable model allows for ongoing third-party review and calibration during the design, preconstruction, and construction process.

▶ See Quality Management in Schematic Design (12.2); Checklists (12.3); Quality Management in Procurement, Construction Contract Administration, and Post-Construction (12.4); and Construction Drawings (10.6) for detailed discussions of those aspects of quality management.

▶ See Chapter 9, particularly Emerging Issues in Project Delivery (9.7), for an examination of project delivery methods.

▶ The AIA Documents Program (17.5) presents a detailed discussion of the AIA contract documents.

ESTABLISHING A QUALITY MANAGEMENT PROGRAM

A quality management program that reflects current and emerging design and production processes, and also incorporates existing inspection programs, should be flexible and scalable. It does no good to create a system that works for only one type of project or contract type. Traditionally, most projects used design-bid-build (DBB) project delivery. Projects were organized exclusively around the requirements of the design team, who created a set of biddable construction documents. This process usually included sequential internal and consultant reviews, as documents were created that matched the phased deliverables of schematic design, design development, construction documents, and construction contract administration.

In addition to DBB relationships, other types of project delivery are becoming more common, such as design-assist, design-build, and integrated project delivery (IPD), which all create new and different alliances between the builder, owner, and architect. Therefore, creating a successful and robust QM system is dependent on understanding and defining a firm's role in project delivery and in the design and construction ecosystem.

For reference, the instruments of service outlined in the AIA contract documents describe deliverables expected and the role the architect plays in a particular type of project delivery. Careful definition and review of the architect's role within the project is the first step in sorting out the boundaries of deliverables and service. From there it is possible to carefully refine the requirements necessary to perform the work to the expectations of all stakeholders in the project team.

CUSTOMER-BASED PROGRAMS

Beginning in the latter part of the twentieth century, customer-based quality became the model for creating a successful organizational QM program. Customer-based QM systems recognize that all project activities, beginning with the first meeting with a client, continuing through project entitlements, progressing through construction, and culminating with project turnover, are a series of customer–supplier engagements. Each of these should be treated as an opportunity to identify and provide for the requirements of the customer. Customer-based systems rely on a service and delivery model which recognizes that everyone engaged—the client, the contractor, the reviewing agencies, and the consultants—is a customer. This understanding enables organizations to identify and build relationships that support a quality-focused engagement. For example, in architecture practice, internal customers are the project team (including staff and consultants), and external customers include the client, the contractor, and the end users of the building. Viewed this way, an organization can begin to identify the needs of each customer, and calibrate deliverables and service to provide benefit for all customers.

Focusing on a customer-based system helps an organization identify the customer's requirements (all customers, internal and external), and provides the appropriate service and deliverables to satisfy each customer's needs. In this approach, if one customer's requirements clash with another's, the friction provides an opportunity to redefine expectations with the customers. A customer-based system sees each party as customer to the other project partners, and helps identify each party's needs within the project team. This kind of relationship will help highlight inconsistencies and deficiencies within the entire project delivery process, and reinforce everyone's role in providing the necessary services and deliverables to foster project success. However, reframing engagement to a more customer-focused model may require all members of an organization to modify long-standing habits.

Checklists

The use of checklists enables the transfer of explicit knowledge, standards, and requirements to the individual doing particular tasks. Explicit knowledge consists of project requirements including program, design type, code requirements, and site conditions. Explicit knowledge also includes the way a firm prices a job, sets up file folders, and bills the client. All of these items can be made into checklists to help the team members understand a firm's standard methods, successfully include all required information, and clearly convey all information and requirements in the construction documents.

Tacit knowledge is "learning on the job" knowledge: the knowledge gained from experience. This may include knowledge such as understanding the nuances that result in a successful drawing package, knowing how to talk to contractors and clients, and understanding how to manage a recalcitrant coworker. Tacit knowledge requirements cannot be defined in a checklist. Instead of creating checklists that try to define every activity and include a mix of explicit and tacit requirements, keep checklists short and habit-forming. As Atul Gawande writes in his book *The Checklist Manifesto*, "Failure results not so much from ignorance (not knowing enough about what works) as from ineptitude (not properly applying what we know works)." Best practices for checklists include keeping the list short and looking for existing checklists that can be modified to suit the practice, such as LEED rating requirements and the CHPS rating systems.

▶ Checklists (12.3) further addresses the role of checklists in quality management.

Process Quality

Process quality is based on creating systems that promote quality without human intervention. This means reviewing business processes that lend themselves to automation and designing systems that routinize these processes. Process quality helps recognize and remove variance from the system, and enables staff to focus on value-added activities rather than, for instance, tracking down missing information.

Fix the process, not the problem.

—Harold L. Sirkin and George Stalk

An example of such a system is a simple software application that enables a staff member to post information about a lead from a client meeting—a business card dropbox, or a module in a customer relationship management (CRM) system—and that enables registering of information such as the fact that a call was made, what the call was about, if there is an active interest, and when a follow-up call should be made. Another example would be software that assigns a job number once a project is under contract, and initiates automatic infill of client information for billing, including address and payment requirements. Process-based systems identify and automate systems within a firm to minimize variance and prevent reliance on human intervention.

Lean Systems

Lean production is based on the revolutionary Toyota Production System (TPS) and is categorized as the elimination of waste within process systems. TPS was first presented and popularized by James P. Womack, Daniel T. Jones, and Daniel Roos in their two books *The Machine That Changed the World* and *Lean Thinking*.

The term "lean systems" describes a manufacturing model that is based on five principles:

1. *Specify value in the eyes of the customer.* This is an augmentation of customer-based quality systems, which recognizes that the customer defines quality: what the customer needs and wants, as well as what it takes to satisfy and delight the customer. In lean systems, value-added service and delivery to the customer is the first priority. Therefore, define processes around the customers' needs and requirements, not the internal systems of the practice.

2. *Identify the value stream.* In delivering value to the customer, there are steps within project delivery processes that add value, and there are processes that add negligible or no value. Take RFI responses, for example: The added value of reviewing and responding to an RFI is the answer delivered back to the builder. The internal processes used to inventory and control RFIs add no value to the builder (nor to the owner). Therefore, the value stream for an RFI process would be identified as: (1) receive the RFI, and (2) respond to the RFI. All the other steps needed in processing, copying, logging, and filing the RFI provide no value to the customer (the builder and owner).
3. *Make value flow*. Continuing the example with RFIs above, the goal with the "make value flow" principle is to map the RFI value stream and cut out as many steps as possible between (1) receiving the RFI and (2) responding to the RFI. The ultimate value flow for an RFI process would be for the builder to write a question on the top of the RFI and the architect to write the response on the bottom, followed by the builder making the necessary change—two steps.
4. *Institute pull*. Toyota built a major portion of its TPS system after visiting a supermarket in the United States. As manufacturers, they liked the idea of a customer coming into a store (which they saw as a supplier) and grabbing only what they needed. Customer pull is based on the supplier delivering to the customer what the customer needs only when they need it. Therefore, there is no inventory, no stockpiling in anticipation of need, and no waiting while a request is processed. Toyota focused on customer pull with its just-in-time (JIT) deliveries, using principles two and three—"identify the value stream" and "make it flow"—to leverage pull from the customer side.
5. *Pursue perfection*. All organizations should understand the need to continuously improve. Pursuing perfection is the feedback loop trigger that requires the firm to go back to principle one and then go through the subsequent principles one by one to improve its processes over and over again. Each time through should remove waste from the value stream and allow organizations to "lean" their processes.

Toyota used lean production to improve all of its processes, from design to manufacturing to supplier development. An architecture practice can implement lean principles into any of its services or deliverables. Lean methodologies can be integrated into project-based phases such as construction contract administration (through discrete activities such as shop drawings and RFI review). Lean principles can also be implemented throughout entire project processes with the use of value-added methods such as collaborative teams or shared design models. Lean processes can also be integrated into entire organizations through review of the same five principles for all activities, including invoicing, business development, IT, and filing. However, lean systems cannot work unless there is an established customer-based QM program as well as a strong and integrated process quality system.

▶ See Construction Drawings (10.6) for a discussion of lean principles as applied to architecture practice.

Six Sigma

Where lean production is based on eliminating waste, Six Sigma is based on eliminating variation. As an improvement program, Six Sigma focuses on identifying processes and then subjecting them to almost ritualized improvement projects.

Six Sigma uses what is known as the "DMAIC" process:

- *Define* the problem, the voice of the customer, and the project goals, specifically.
- *Measure* key aspects of the current process and collect relevant data.
- *Analyze* the data to investigate and verify cause-and-effect relationships. Determine what the relationships are, and attempt to see that all factors have been considered. Seek out the root cause(s) of the defect under investigation.

- *Improve* or optimize the current process based upon data analysis using techniques such as design of experiments, *poka yoke* (mistake-proofing), and standard work to create a new future-state process. Set up pilot runs to establish process capability.
- *Control* the future-state process to see that any deviations from target are corrected before they result in defects. Implement control systems such as statistical process control, production boards, and visual workplaces, and continuously monitor the process.

SETTING QUALITY REQUIREMENTS

For a professional service provider, the role of quality is fungible. This is important because in negotiating contracts, there is an opportunity to define what is meant by "quality" and to define the level of quality that will be provided for a particular project. Quality, in this context, is adaptable to the service and deliverables provided.

Defining level of quality with a client is fraught with the same emotion and potential conflict that is encountered with fee discussions. Level of quality conversations can be painful because of the possible implication that a design professional may wish to deliver less than excellent service or documents. Yet expectations and a level of standard must be discussed and established with the client and the project team. This is where a customer-centric approach helps facilitate the discussion of expectations and quality standards. This is even more important with IPD and BIM, since the traditional project phases of SD, DD, and CD now have elastic definitions, and collaboration needs. There will be multiple clients (and customers) with disparate requirements and expectations. Without an honest discussion regarding the intent and value of the quality needed and required, more time and fee than necessary might be spent to validate a level of completeness and the quality of that completion. This might go beyond customer expectations or needs and add no additional value.

Therefore, identifying the requirements of the deliverables, and being clear about the cost of providing that level of quality, is critical. For example, in some circumstances, it may add more value to deliver simple design intent diagrams for guidance to the contractor than to prepare a detailed set of CDs that might change once the construction team comes on board. This strategy may allow for more fee to be devoted to value-added steps during the construction or turnover phase.

CASE STUDY: QUALITY NEGOTIATIONS

My company once was asked to provide a quote to a client for design services, which included learning and then using a very complicated third-party add-on CAD drafting program to generate hard copy drawings. Because of the numerous steps required to create drawings through the program's interface, there was a chance that my team's revisions would not be properly recorded and that the program would generate incomplete output.

In this case, using the interface created the possibility of generating omissions with little relationship to whether or not the work was accurate or completed. However, payment for the job was to be based on an accurate delivery, which might be misrepresented by the program we were asked to use. After reviewing the program with the client, and explaining that the program might generate incomplete information, the client was asked if there was an acceptable level of omissions in the deliverable.

The client's first response was to state that a deliverable with zero omissions was the only acceptable standard. We restated that the software procedure might generate false positives and therefore, if zero omissions were the standard, we would have to charge to inspect, find, and fix these omissions. The client was reminded that most of these omitted items would be site-located, and that the cost of our inspection and rework time was akin to him paying a dollar for twenty-five cents of value. Was he willing to pay for this level of quality? Did the additional inspection and rework add value to the received deliverable, or was it smarter to accept a "lesser quality" for the project?

In this conversation we actually priced the level of quality, and identified that a quick sampling by our inspectors could determine if our revisions were within the client's acceptable variance.

STEPS FOR QUALITY IMPROVEMENT

Once you have defined the project's level of quality, a quality improvement plan needs to be implemented in order to increase performance and minimize waste in delivering that defined level of quality. While all QM programs should have a goal of baseline quality, ongoing quality improvement is a critical part of quality management. A customer-centric QM program will assist in developing quality as well as organizational improvement goals.

The most successful quality management approach is to treat quality as an organizational activity, with associated costs and standards. As stated previously, defining a quality standard and achieving that level of quality is essential. One way to identify the cost of quality management is to audit a project from the viewpoint of the client.

According to quality science theory, there are four types of quality costs:

- Prevention costs
- Appraisal costs
- Internal failure costs
- External failure costs

For the design firm, prevention costs are defined as staff training and education. Appraisal costs are sourced from reviewing and checking drawings and other contract documents before delivery to internal and external customers.

Internal failure costs are the costs associated with project delivery or process failures such as incomplete or uncoordinated consultant drawings. Finally, external failure costs are those costs incurred after delivery of the product or service to the client.

It is possible to develop a "cost of quality" metric that utilizes requests for information (RFIs) as the measure of quality failure. The AIA contract documents identify an RFI as an approved contractual communication tool between the design team and contractor. In addition to formally posing questions regarding the project, an RFI can also serve as a useful tool to survey the quality of the project documents. This is because the RFI compels the customer (contractor) to identify the scope and scale of inconsistencies in the documents, as well as to determine the impact of such questions on the price and schedule of the project.

Establishing the Metric

According to the AIA contract documents, an RFI is a document used by the construction team when, during review of the contract documents (drawings and specifications), they discover one or more of the following:

- An unforeseen condition or circumstance
- An omission
- A conflict or discrepancy

The design team's response to the RFI affirms the recognition of a deficiency within the documents. Unless the RFI is of a frivolous nature, there will usually be rework to the documents required in response to the RFI. Whether the RFI highlights missing information or identifies areas where the design is incomplete, an RFI provides an opportunity for the design team to experience a third-party review of their documents. For small firms that may not use RFIs as a means of communication with their builder customers, other forms of feedback such as meeting minutes, shop drawing and submittal review, and pay requests provide an opportunity to measure delivered quality.

As a cost-of-quality tool, RFIs can be used as a post-delivery checklist to delineate the level of quality within the contract documents. All that is required is a simple metric based on labor hours to rework the documents.

A metric can be established by tracking and assigning points to the number of hours it takes to respond to a RFI. For example:

Type 1: Graphic/Confirming RFI. The most straightforward type of RFI would take approximately one to two labor hours (LH) of rework for a full-time equivalent employee (FTE). Thus, this type of RFI received a 2-hour point.

Type 2: Coordination/Missing Information RFI. Processing a Type 2 RFI is more complicated; it takes approximately three to seven LH of FTEs. Thus, this type of RFI receives a 5-hour point.

Type 3: Code/Contract Information RFI. This RFI involves adding code-related issues and project scope errors or omissions. A Type 3 RFI is the most serious and complicated to process, taking approximately eight or more LH of FTEs. Therefore, for calculation, this type of RFI would receive a 10-hour point.

The number of each type can then be tracked and the metric can be applied to a completed project as follows (see Table 12.1):

Four, Type 1: Graphic/Confirming RFI might be a result of illegible information issues created during the construction document (CD) phase. (2-hour point) times 4 = 8 hours

Two, Type 2: Coordination/Missing Information RFI could result from deficiencies during the CD and the design development (DD) phase. (5-hour point) times 2 = 10 hours

One, Type 3: Code/Contract Information RFIs may be the result of serious issues overlooked very early in the design and documentation process, during the Schematic Design (SD) or DD phase. (8-hour point) times 1 = 8 hours

Once inventoried, the labor hours necessary to complete the required rework are calculated (utilizing blended billing rates of all project team members), and the cost of quality can be measured by totaling the amount of rework necessary as a result of the RFIs. Baseline costs should be measured against the traditional 20 to 30 percent fee allotment for the CA phase, or using a firm's historical data. For forensic purposes the team could determine the expected percentage for document rework based on RFI response, then measure the cost of quality as the overage to that amount.

Another approach to determining the cost of quality is to examine the more problematic Type 2 and Type 3 RFIs. These RFIs may point to serious staff development issues during the early document phases. Once a cost-of-quality metric has been established, the firm may want to create a quality improvement program to target a reduction of Type 2 and Type 3 RFIs, by allocating additional prevention costs during the early phases of the project. For example, a firm might assign additional self-checking QA/QC time for use by the design team.

TABLE 12.1 RFI METRIC TABLE

RFI Type	Labor Hours (LH)	Hour-Point	# of RFIs	Total Hour-Points
Type 1: Graphic/Confirming	approx. 1–2	2-hour point	4	8
Type 2: Coordination/Missing Information	approx. 3–7	5-hour point	2	10
Type 3: Code/Contract Information	approx. 8–12	8-hour point	1	8
Total Hour-Points				**26**

Using RFI metrics to uncover and calculate external failure costs of a project can be an effective way to discover deficiencies in the project design and delivery process. To summarize, RFI-based improvement initiatives can involve:

1. Creating lower targets for Type 2 and Type 3 RFIs, or
2. Reallocating external project costs during the construction contract administration phase into preventive costs during earlier project phases

OTHER QUALITY METRICS

Reinforcing the need for new robust quality systems within the practice, new quality metrics have been developed to support and improve quality processes. Using the tools of the "balanced scorecard" (BSC), a strategic management system originated by Drs. Robert Kaplan and David Norton, will assist in developing holistic measures that leverage improvement within an organization.

The balanced scorecard overlays a series of perspectives, providing measures in people, processes, customers, and financial elements of the organization. The system was established as a way to provide performance goals and metrics that go beyond strictly financial accomplishment.

Because an architecture practice's value is generated by intangibles (people, expertise, intellectual property, and knowledge), a balanced scorecard provides tools to identify, capture, and measure the activities within a firm. It also provides a mechanism to create holistic performance goals that include all aspects of a practice. With a balanced scorecard, each perspective supports the adjacent perspective. For example, people support processes, processes support customers, customers support finance, and finance supports the organization.

In using a balanced scorecard to support a new quality initiative within a firm, a goal is first identified (fewer RFIs, for example), and then performance metrics to help achieve that goal are built within each of the perspectives:

- *People*: Additional training within the staff (all of the staff including managers, administrative and accounting staff) to help them understand contracts and the purpose of RFIs.
- *Processes*: Investigate the tools for producing construction documents within the practice, including CAD and BIM software, specifications, and construction phase communication and feedback.
- *Customers*: This perspective imagines the entire perspective of customers, not just clients. For RFIs, customers would be consultants, modeling staff, reviewing agencies, and contractor, as well as the client. Therefore, customer metrics should include activities with all customers. Reducing RFIs may require rethinking review activities with consultants, client, and contractor. The customer metric should also support new activities with customers. Perhaps this means better kickoff meetings before construction starts, as well as more integrated activities during construction.
- *Financial*: The financial perspective for RFIs provides support for all of the preceding activities. For example, the training, the new processes, and the integrated customer meetings will all cost money. The financial perspective will help identify and account for the additional cost and reallocation of fee or additional services.

CONCLUSION

Quality management should not be a separate activity within a practice. Instead, it should be an integral part of the way a practice is managed. Quality should infuse back-office activities such as invoicing and collections, as well as client-related activities such as business development and marketing. Quality management activities should also include consultant and supplier relations, contract formation, training programs, project review, and technology services. Quality management is more than making sure that deliverables are as accurate as required and meet the expectations of the customers. A quality system measures and improves firm processes and deliverables, which helps drive firm success.

For More Information

The American Society for Quality: www.asq.org.
The Lean Construction Institute: www.leanconstruction.org.
The Lean Enterprise Institute: wwwlean.org.
Managing Quality in Architecture: Handbook for Creators of the Built Environment (Architectural Press, 2006) by Charles Nelson.
Positioning for Architecture and Design Firms (Wiley, 2011) by Jack Reigle.
Architectural Quality Control: An Illustrated Guide (McGraw-Hill, 2005) by Fred Nashed, AIA.

BACKGROUNDER

UTILIZING ISO 9001 IN AN ARCHITECTURAL PRACTICE

Edward R. Frenette, AIA

The International Organization for Standardization (ISO) 9001 system of quality management is one of the most used management tools in the world today and has many advantages for architectural practice. Constantly updated standards and a rigorous system of accountability are available for virtually every aspect of professional practice.

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The International Organization for Standardization (ISO) is the world's largest developer of guidelines for best practices, helping to make all types of organizations more efficient and effective. Its ISO 9001 system of quality management is designed to help firms ensure that they meet the needs of clients and other stakeholders. Eight management principles, addressing the fundamentals of quality management, form the basis of the system. Third-party certifications provide independent confirmation that organizations meet requirements. More than a million firms are certified worldwide, making ISO 9001 one of the most-used management tools in the world today.

BACKGROUND

Beginning in 1946, delegates from 25 countries met at the Institute of Civil Engineers in London to create a new organization to facilitate the international coordination of industrial standards. Since its official start in 1947, ISO has published nearly 20,000 documents that provide requirements, specifications, and guidelines that can be used to ensure that materials, products, and services are fit for their purpose. From its headquarters in Geneva, Switzerland, ISO now serves members in 164 countries. ISO 9001 has evolved considerably, from a focus on manufacturing to one on all business and professions. Following major changes in 2000 and minor ones in 2008, the system now embraces wider issues concerned with managing firms, client focus, and continual improvement. A firm can now select standards from ISO's resources for working drawings, BIM, sustainability, building and civil construction, and virtually every other aspect of its business.

KEY FEATURES

ISO's eight management principles include the following:

1. ***Client Focus.*** Architectural firms depend on their clients and therefore should understand their current and future needs, meet their requirements, and strive to exceed their expectations.
2. ***Leadership.*** Only firm leaders can establish unity of purpose and direction of the firm. They should create and maintain the internal environment in which staff can become fully involved in achieving the practice's objectives.
3. ***Teamwork.*** Staff at all levels are the essence of a firm, and their full involvement enables their abilities to be used for the practice's benefit.
4. ***Process Approach.*** A desired result is achieved more efficiently when activities and related resources are managed as a process.
5. ***System Approach to Management.*** Identifying, understanding, and managing interrelated processes as a system contributes to the firm's effectiveness and efficiency in achieving its objectives.
6. ***Continual Improvement.*** Continual improvement of the firm's overall performance should be a permanent objective of the practice.
7. ***Evidence-Based Approach to Decision Making.*** Effective decisions are based on the analysis of data and information.
8. ***Mutually Beneficial Consultant Relationships.*** A firm and its consultants are interdependent, and a mutually beneficial relationship enhances the ability of both to create value.

(continued)

COMPARABLES

ISO 9001's system of quality management is unique. Most QM methods are theories or philosophy of individual independent authors, defined in one-off books or manuals. Total quality management (TQM) was developed in the 1950s by American management consultants, including W. Edwards Deming. It focused on industrial production and first won favor in Japan, but was reimported back to the United States, in part to stem the tide of quality Japanese autos. Six Sigma originated in 1986 from Motorola's drive to reduce defects and minimize variation in its products. Implementation of these and similar QM methods are unique one-off custom adaptations of a specific methodology. In contrast, ISO 9001 is a library of constantly updated guidelines for best practices that incorporate a rigorous system of accountability. It is backed by more than 150 full-time professionals at its headquarters, whose work is peer-reviewed by thousands of professionals worldwide.

APPLICATION TO ARCHITECTURAL PRACTICE

Understanding that quality management activities already exist in rigorous practice—deliberate or by default, conscious or unconscious—adopting a formal system only makes existing processes more effective. Of the QM systems available, ISO 9001 has many advantages for architectural practice:

- Can be implemented incrementally or in total.
- Practice elements can be included or excluded, beyond core requirements.
- Flexible record keeping.
- Able to be customized for how practices are instinctively run.
- Leads to less costly rework and increased client satisfaction.
- Comprehensive, internally consistent, and continually updated.
- Backed by a full-time organization and comprehensively peer-reviewed by professionals.
- Supported by third-party courses, seminars, text, and consultants.
- Performance is validated by third-party audits.
- Has marketing value for some clients.
- Successful clients and architects recognize that quality and its assurance are most credible when validated by a respected third party. ISO 9001 is the only QM system with true accountability.
- The ISO 9001 QM system is particularly well suited to solving the quality management needs of large growing rigorous practices serving diverse international clients with highly technical projects from several branches. Conversely, a small, stable, design-focused practice with a highly professional staff serving similar local clients with like projects will find securing ISO 9001 certification a distraction.

TABLE 12.2

Firm Characteristic	More Suitable/ Needed	Less Suitable/ Needed
Size	Large	Smaller
Location	Several branches	One office
Practice	National/ international	Local/regional
Focus	Business	Design
Project management	Discipline	Part of architecture
Culture	Rigorous practice	Creative freedom
Change	Fast growing	Established
Staff	Multidiscipline	Closely knit
Recruitment	Young talent	Stable staff
Expertise	Unique/diverse	Standard
Computer literacy	Firm-wide	Staff only
Clients	Diversity	Alike
Project types	Variety	Similar
Building technology	Highly technical	Standard practice
Project work plans	Detailed	Casual
QM/QC systems and manuals	Operational	Informal
Standard details	Comprehensive	Sketchy
Contracts and practices	Innovation	Industry standard

Table 12.2 will help to determine, between these two extremes, the suitability of the ISO 9001 QM system to specific practices.

When used to describe a practice, such characteristics are not mutually exclusive or of equal value. It's possible to have a large, rigorous practice focused on design, or any other amalgamation. They only define relative positions on a continuum of suitability.

CHALLENGES

A common criticism of ISO 9001 is the amount of money, time, and paperwork required for registration. Critics also complain that registration does not directly guarantee quality. The first is true only if the baseline comparison is a casual practice with no successfully operating quality management, control, or manual in place. Rigorous firms working diligently to operate a comprehensive quality system will find the cost of registration justified. The second is partly true. ISO 9001 certification only confirms that a practice has accomplished what it set out to do with the standard of quality to which an independent observer would agree.

GETTING ORGANIZED

The decision to become ISO 9001 certified is strategic and needs to be made and committed to by those at the top of the firm: partners, principals, or board of directors. Once decided, a champion should be identified, preferably someone in top management, familiar with the workings of the total firm and with knowledge of, or at least significant interest in, ISO standards. This champion should determine feasibility of certification, author the work plan for realization, manage the certification process, and eventually lead its long-term implementation.

Advantages of the ISO system of quality management first become evident at the feasibility stage. Several tools are easily available to assist champions with the process. Learning about the program can start with purchasing manuals from ISO and by taking an online or in-person course through an accredited body. It is even possible to hire a dedicated consultant, but such decisions are normally left to the certification phase. Feasibility should conclude by addressing several strategic decisions:

- ***Structure.*** Should the firm follow the structure of the standard, or adapt the standard to architectural practice? It is generally agreed now that the structure of the standard should be adapted to each specific industry. This is especially true of a service industry like architectural practice.
- ***Terminology.*** Is it best to teach everyone in the firm the terminology of the standard, or translate the standard for the staff? Translating the standard for the staff will negatively affect the periodic external audit, but sticking with language of the standard may negatively affect staff functionally and emotionally every day. (This backgrounder has been translated from the quality management jargon of the standard.)
- ***Comprehensiveness.*** Beyond core requirements, what aspects of the practice can be included or excluded? Since it is possible to add requirements once certified, it is best to start with only the requirements critical to the success of the firm.
- ***Documentation.*** What level of documentation best meets the needs of the firm? Documentation requirements can be added once certified, and it is best to start with only the level of documentation necessary.
- ***Focus.*** What aspects of the firm should be the focus of the quality management system—knowledge management, programming, conceptual design, technical documentation, management, construction, or marketing? A firm can customize its unique direction.
- The process of becoming ISO 9001 certified can take anywhere from six months to three years. A typical work plan for implementation will include:
  - Review current knowledge management system, office manuals, and other organizational documents; and determine any changes or updating necessary.
  - Organize the knowledge management system into 6 to 12 functional groups, prioritized according to the effect on work quality.
  - Assign roles and accountability for knowledge management subdivisions to managers and staff.
  - Outline your organization and knowledge management subdivisions according to the process map in the standard.
  - Document the changes desirable for the firm's organization.
  - Conduct a preliminary audit by using audits available online or published.
  - Hire a consultant full-time if the firm can afford it, or for the initial audit and then again halfway through the process.
  - Train auditors through an accredited instructor or a public course.
  - Train the staff at all levels to be familiar with the system and to ensure compliance.
  - Perform an internal audit(s) to assure readiness for certification.
  - Request a certification audit. Once a firm has finished all the requirements it can request an independent, third-party audit by an accredited certification body.

TRENDS

There is growing trend away from TQM (total quality management) and toward ISO 9001as a tool to improve quality within architectural practices. Medium and larger firms are organizing their training into internal "colleges" or "universities." At the same time, some small and midsize practices are recognizing the need for sophisticated long-term quality management systems.

The current trend in professional service firms of accepting fee competition as a way of getting work conflicts with a long-term trend in all business toward the demand for greater quality. If, due to fee competition, compensation remains significantly below that required for quality design services, the design output of the profession will ultimately be below client requirements for quality.

For More Information

ISO 14001 for sustainability: http://www.trst.com/sustainable.htm.

ISO 26000 for CSR and sustainability: http://www.trst.com/sustainable.htm.

ISO Technical Committee 59 focuses on building and civil works: http://www.iso.org/iso/home/store/catalogue_tc/catalogue_tc_browse.htm?commid=49070.

ISO Technical Committee 59 recommended standards for building information modeling (BIM): ISO 29481-1:2010 at http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=45501.

Building Smart's BIM interoperability standards, developed in conjunction with the ISO requirements: http://www.thenbs.com/topics/bim/articles/standardsInConstruction.asp.

ISO 4157 for standards on how to put together working drawings: http://www.trst.com/sustainable.htm.

12.2 Quality Management in Schematic Design

Edward R. Frenette, AIA

Any architect striving for success needs both a broad and long view of "quality." Such a perspective will view architectural quality as an aesthetic experience that includes the control of the craft of construction, as well as the creative services required. This article explores quality management in programming and schematic design.

We are constantly purging our organization of the bureaucracy, which interferes with creativity.

—Henry Cobb, FAIA

INTRODUCTION

Quality is the degree to which a set of inherent characteristics meets requirements—stated, implied, or expected. Thus, client, peer, user, and public expectations are combined with laws, codes, and regulations to form the requirements to be fulfilled by the quality of an architectural solution. Improving the degree to which schematic design fulfills such needs and expectations through a managed program is the focus of this article.

Two paths toward diffusing and democratizing authority over architectural quality have led to present practices. What are now referred to as peer reviews can be traced to the overseers of the British Admiralty in the first half of the last century, from there to the shop foreman during the Industrial Revolution, and again to the workers' guilds of the Middle Ages, and eventually back to the pharaohs of Egypt in 2500 B.C. (small caps for B.C.) Consistently along this course, authority over quality was personified, or embodied, by a person or expert. What changed was the way in which responsibility for quality was transferred from a sole authority with opinions to an appointed meritocracy based on evidence. This latter path toward quality has been objectified and embodied by physical objects throughout history. Today's electronic reference libraries for details, typology, and morphology precedent searches have their roots in the wood mock-ups for stone carving done in the Middle Ages. Change here has been from the physical to the ephemeral.

▶ Origins and Development of Quality Management (12.1) provides an overview of quality management as a system that supports and improves a firm's performance.

In the latter half of the twentieth century, the focus of quality management expanded from the objects of production to include processes of production. Total quality management (TQM) and the International Organization for Standardization (ISO) both take a comprehensive management approach to shaping organizations and production to meet published needs and expectations for quality. This steady progress toward quality in all production has accelerated, pulling architecture, the definitive cultural expression, with it. This expansive process has led to the adoption by much of the industry of an all-inclusive definition of quality management, "an organizational methodology for improving the effectiveness of products (architecture) and services (design)."

Most firms don't deal with issues of architectural quality and innovation at the organizational level. The common perception is that all a firm needs to do to produce architectural excellence is to employ the right designers.

—Cesar Pelli, FAIA

PERSPECTIVE

The perspective presented here is that of the architectural designer looking to bring quality management into the practice studio. In the past, building materials and systems were checked for conformance to requirements and were assumed to embody architecture. Such an approach worked as long as management and controls were constrained to building, contract documents, bidding, and construction, and not the quality

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of architecture itself. Reinterpreting quality management in architectural terms may mean expanding it to include quality inputs from the performing arts, for example, to illustrate how QM systems can embrace schematic design by starting with elements of pre-design.

Discussions of quality management applications to schematic design activities include:

- *Goals*. A key element of rigorous design practice is goal-setting, also key to developing a quality management system. The first step is to set quality goals comprehensively for schematic design processes and products. Following the ISO 9001 version of quality management, these are the firm's corporate standards, ideas of quality that may not be strictly measurable or tangible. It is the firm's broadly shared plan, toward which the practice is directed.
- *Objectives*. Each goal needs to be supported by objectives, the firm's specific efforts or actions intended to accomplish its quality goals. To be useful, they must be based on tangible fact and be measurable.
- *Monitoring*. In-house critiques and reviews, also a component of rigorous practice, are how architects traditionally monitor the quality of the pre-design and schematic design process and its products. Organizing the content of critiques and reviews, tying their schedule to the life of the firm or project, and documenting their results validate them as part of a quality management system.
- *Corrective action*. The final step in developing a quality management system is to connect the documented results of critiques and reviews to correct the "quality problem" and to prevent future recurrences.
- *Pre-design*. Auditions and rehearsals are well understood to be inextricably linked to quality performance in the fine arts. Similarly, quality management of schematic design is completed by adding to the firm's quality system the link between pre-design, staffing, knowledge management, programming, and schematic design.

▶ See the backgrounder Utilizing ISO 9001 in Architectural Practice, which accompanies Origins and Development of Quality Management (12.1).

STAFFING

No decision affects the quality of an architectural product more than the choice of who is to create it. Ideally it would be an architect with good communication skills, dedicated to research, expert in the building type, creative in design, and possessing an open mind and the intellectual capacity to avoid easy preconceptions. This is a tall order for any staffing decision. In small firms doing simple projects, the architect charged with design may assemble a library of architectural precedents and do the programming. In larger firms with sizable complex projects, tasks may be divided among in-house experts, the designer, programmer, and office librarian or information manager, if available.

You can't have great architecture without a great staff.

—Henry Cobb, FAIA

However, consolidating design, programming, and research assignments in one person has advantages. It assures that the knowledge captured will be focused on project-specific issues and that the program can be more convincingly validated as the threshold for design. It also gives staff the chance to "practice" prior to schematic design. Design precedents can be assimilated while searching the literature and building components graphically explored and programming in advance of schematic design.

Actions to maximize staff with quality design, programming, and research experience assigned to projects include the following:

- Establish a process of recording office-wide design, programming, and research time spent, including timesheet tracking.
- Initiate recruitment of architectural graduates and interns with quality design, programming, and research experience.
- Set up an in-house mentoring/training program to enable adoption of best-practice insights and strategies for design, programming, and research.
- Identify, through peer reviews, those individuals with unique skills for conceptual and schematic design; and make future assignments accordingly.

KNOWLEDGE MANAGEMENT

I have no taboos on where innovations come from: my staff, my colleagues, younger architects, competitors, technology, books, or magazines. A confident designer can accept ideas from anyone.

—Arata Isozaki

Without infusion of relevant knowledge, architectural practice makes "permanent," not perfect. For this reason, quality management of programming and schematic design requires a steady update of the knowledge base on which these phases are dependent. This comprises a range of strategies and practices used in the design firm to identify, create, represent, distribute, and adopt practice insights and experiences. Such insights and experiences comprise knowledge, either present in the literature, embodied in individuals, or embedded in the firm as standard procedures.

Pre-Project

Generally ignored in contracts defining professional services, pre-project knowledge management is the defining activity that separates architects who consistently produce designs of recognized quality from those turning out inconsistent or less-distinguished work. Virtually all architects program, design, document, bid, and administer construction contracts, but few prepare rigorously beforehand. Such preparation can include collecting typologies, precedents for the building types normally designed by the firm, and morphologies—examples of space, form, and detail that express the cultures within which the firm normally works. Content can result from independent research activities undertaken as practice for future projects, the accumulation of best practices from completed work, or both. Collections may be in analog or digital form, but are most often both. Precedents are assembled through a process that oscillates between independent research, repurposing, and archiving completed project files and notes from the field for easy access. Typically, the knowledge base of a young firm will consist of the work of others, but it is common for exemplary models of the firm's own work to subsume the collection over time.

A pre-project collection might include:

- *Typologies:* building type precedents
- *Morphologies:* architectural examples of space, form, and construction detail of built projects
- *Client typologies:* identification of client's organization, function, and culture as it may inform an architectural solution
- *Technologies:* representative elements and details of architecture and construction
- *Graphics:* example drawings and models that convey the design image intended by the firm
- *Space standards:* typical areas and relationships of functional spaces in buildings
- *Forms and formulas:* appropriate documents for collecting facility program information
- *Best practices:* "feedback" from construction and postoccupancy use of the building

Pre-Design

▶ Knowledge Management (5.11) discusses methods to foster, develop, and capitalize on an architecture firm's most valuable assets: creativity and invention.

Once commissioned to design a project, the firm's knowledge base is augmented with precedents possessing job-specific characteristics. For example, a morphological and typological literature search can now be conducted for buildings designed or built on sites of similar size, topography, climate, cultural milieu, or built context.

How the collection is assembled, represented, and distributed for any given project is dependent on the size, complexity, and audience appropriate to the specific commission. For a simple project with no contractual requirements for precedent documentation, relevant hard copies of the collection can be simply displayed in the work area for reference during programming and schematic design. Larger, more complex projects may require custom-formatted displays or electronic presentation.

Pre-design documentation of the building type contributes to the quality management process to the degree that it enables adoption of appropriate practice insights and experiences for programming and schematic design. The quality goal is to organize the pre-design collection so that the relation between the source and target for the knowledge being managed is clear, and the process of transferring information or meaning from precedent to the schematic design in progress is simplified.

Actions that enable adoption of profession-wide best-practice insights and experience include:

- Establish a process in the firm for knowledge management, including annual standards for content, growth editing, and monitoring.
- Conduct office meetings semiannually to train staff in the use of and contribution to the information collection and knowledge base of the firm.
- Monitor rework and editing time and positive peer reviews for pre-design and schematic design phases, and compare to pre-knowledge management history.
- Identify office time specific to the adoption of this knowledge base, and obtain comments and recommendations from peers within the office.

PROGRAMMING

Programming is the precursor to design and an essential quality management tool for the art and architectural qualities of schematic design. A wide variety of approaches to this phase and strategies within the task exist, which can be employed in varying combinations to match the size, complexity, and innovative characteristics of a client and project. At the same time, quality is managed by matching the appropriate approach and strategy, or combination of strategies, to the project.

▶ See the backgrounders Programming (10.5) and Validating Building Performance in Programming and Design Phases (10.5) for more on this foundation for the design process.

QM Actions in Programming

Programming and Reprogramming

Clients, independent consultants, and separate departments within some architecture firms do programming. When the architect charged with design is also responsible for this task, programming enhances quality by providing practice with the graphic and quantitative descriptions of building components prior to schematic design. This same quality practice for the design staff can be provided by reprogramming—strategically vetting and augmenting programs completed by others by bringing them into alignment with the firm's own quality management system. Such editing contributes to the firm's quality management process to the degree that it enhances the design product and facilitates the schematic design phase.

Program Planning

Planning is integral to any QM system. Programming is first planned based on a preliminary understanding of the scope and complexity of the project. If the assignment is small and simple, all that may be required is to schedule concise visits with the client and to the site. Larger, more complex projects require a comprehensive program planning effort. The first step is to assemble similar programs and precedents for space standards, typical program areas, and spatial relations. Next, the program is augmented with specific precedents gathered from the client and new searches of the literature. Program planning involves identification of the tasks and time necessary for completion of the effort.

Phasing

Client motivation and information overload for the design staff are the QM impetus for program phasing. In large organizations, it is not unusual for client representatives to fail to prioritize the assembly of detailed information, the need for which they view as remote in time or probability. It is also difficult for those charged with design to comprehend large amounts of information. Some program information changes so fast that programming such aspects of the project nearer to the move-in date is warranted.

Computer hardware and software; furniture, fixtures, and equipment; and some machinery fall into this category. For these reasons, it is often desirable to phase the programming effort. In all cases, it is advantageous to format the program information so that it can easily be understood and interpreted by the designer.

Priming

The QM goal is to prepare participants to be successfully involved in the programming effort, an activity that is outside their daily routine. It is often best done in work sessions involving small to medium-size groups. Priming more participants for this unfamiliar task can be accomplished by using questions rhetorically in a questionnaire. Both techniques are used to get people thinking about the subjects to be discussed in future interviews or work sessions.

Benchmarking Tours

Benchmarking is direct observation of state-of-the-art facilities similar to that being programmed, and is an invaluable tool for building consensus on a program for design. Although anything can be benchmarked—solar screens, brick color, architectural expression—normally, it is the functional organization of building elements critical to the success of a project that are visited and directly observed. The use of benchmarking is well-developed within the scientific community, where it is vital to the design of laboratories that match precise user expectations by observing the best designs available worldwide.

The QM value of benchmarking tours can be magnified by specifically organizing the travel required. For example, travelling and touring together as a client/designer team builds both an understanding and a consensus about the potential design directions observed.

Teaming

Information gathering, through client interviews, work sessions, and direct observation, is the core activity of programming, involving extensive interaction with the client and significant time commitments for the team. Its success is a primary factor in the ultimate design quality to emerge through schematic design. For most projects of moderate to larger size and complexity, it is an exhausting activity that places significant demands on speaking, memory, and documentation abilities. For this reason, such activities should be accomplished by teams of two or more. This allows one member of the team to be "on stage," actively interviewing, observing, or conducting a work session, and the other member to be documenting the outcomes. Pairing senior staff with younger interns can also satisfy mentoring requirements of a QM plan, making double use of this time commitment.

Vetting

Work sessions are also a good way to vet information gathered through individual interviews. For example, all the teachers in an elementary school could be called together to discuss the planning direction for classrooms suggested by previous consultations. Vetting programming progress through progressive work sessions can also control unwarranted growth of project area ("scope creep"). Quality is managed by assuring that the correct problem is sought to be solved by design.

Consensus

Before programming is complete, the participants should concur that the knowledge was accurately communicated. This is normally accomplished through a second series of interviews or work sessions, or by returning transcripts of such sessions to participants for review and comment. Having contributors actually sign appropriate pages of the final document strengthens their ownership of the process and product, one key to managing quality.

I have the design team leaders gather information and put it on the wall. Then the team assembles. That's how I direct design.

—Cesar Pelli, FAIA

Documentation

The QM value of the program is enhanced by the way information is presented to both the client and design team. Much of the analysis required for understanding, such as separating something into its constituent elements and defining its essential features and their relations, can be accomplished physically through the format of the program. Each division of the data collected also needs to function well as a reference, easily linking information to the design task at hand. This can be accomplished by packaging relevant information for each design task in a way that it is easily perceived—on facing pages of the program document, for example. This format allows two pages of information to be referenced at any time when the document is opened and arranged flat adjacent to a work area. The quality goal is to organize the program so that the relation between the information and design effort is clear, and the process of transferring programming input to the schematic design output is simplified.

Quantitative Controls of Quality

In most cases, the potential for design quality is created during programming by controlling four variables; net assignable area, grossing factor, construction cost per square foot, and budget. Such control allows creativity to be focused on the architectural issues of function, space, form, and detail, as distinct from, for example, budget and schedule. Failing to control the size of the project, a function of net assignable area and the grossing factor, may result in designing a building in excess of its budget. Using an incorrect grossing factor can result in creative effort being spent on designing circulation space at variance with the spaces to be served or connected. When variables affecting the size or cost of a project are not accurate or correctly identified, design energy must be spent in reconciliation rather than in achieving design quality.

In some novel cases it may be desirable to focus design effort on "impossible" tasks. For example, a tent is a creative solution for providing a large space on a small budget, and a scaffold is an imaginative way to access a stacked set of shipping containers used for offices. Most programming efforts focus on industry norms, however; and even in unique situations, it is best for both client and architect to know where the quality creative effort is being focused.

Net Assignable Area

The most direct method for managing the quality of a design solution during programming is to control the size of the program. This is done by assuring that the client's requirements for the building are met without excess or redundancies. Since the net assignable area is derived from the data collected during information gathering and the space standards assembled during program planning, this information and these standards should be checked carefully for accuracy by the client and the designer.

Grossing Factor

In addition to the functional space required by clients, support spaces must be allocated. This is done through the grossing factor, a multiplication factor applied to increase the net assignable area to accommodate internal circulation, walls, stairs, mechanical spaces, and similar areas. The quality of a design solution is managed by ensuring that this grossing factor is accurate. If it is too large, design quality may be sacrificed by designing too large a building. If it is too small, excess design may be required to link rooms due to inadequate circulation space.

Clients unaccustomed to the building process are often disappointed to learn that they must pay for space beyond what they need functionally. A first reaction is often to insist that design effort be spent on reducing support space unrealistically. One way to create understanding of the relationship between functional and support space is to analyze with the client the net to gross ratios of buildings the client knows and likes. Such an exercise can direct design effort toward realistic square foot goals, allowing creativity to be focused on quality.

Construction Cost and Budget

Obtaining accurate construction cost estimates of the building being designed is essential to quality management. Normally, the cost per square foot of precedent projects is analyzed to determine an appropriate value. Other sources are local independent cost estimators and nationwide cost-estimating services. The goal should be to obtain current cost information from two or more reliable sources on which to base the estimated cost of the planned facility. If the budget is derived during the programming phase, it is important that all costs of the project are accounted for.

Actions that maximize the art and architectural qualities of schematic design and minimize the rework associated with programming errors or omissions:

- Initiate an in-house training program to enable adoption of best programming practice insights and strategies used in the firm.
- Create procedures for vetting and augmenting programs completed by others, and compare performance to programs completed in-house.
- Monitor program revisions necessary to receive client sign-off. Determine causes and develop strategies to reduce client reviews and staff revisions.
- Monitor schematic design editing and rework associated with programming errors or omissions, determine causes, and develop strategies for reducing time committed to corrective actions.

SCHEMATIC DESIGN

The AIA owner-architect agreements define schematic design as the first phase of basic services. Design is a core competency of architects and sets the direction toward the ultimate quality of an architectural product—that is, built form. It also creates the path followed by every technical and managerial activity, including quality management. This critical phase affects all aspects of architectural services and the built work—that is, the architecture. Because of its position at the focal point of everything that is to come, care must be taken in how quality is managed. The quality goal is to derive a solution to the client's program that is of architectural merit, and the challenges to this are many. The process can be different for each client and may change during a project. It can start as an iterative process of applied creativity, evolve into a progression of incremental learning experiences, and devolve into trial-and-error searching.

The perspective presented here is that of the architectural designer looking to bring quality management into the design studio with the intent of focusing objectivity on the quality aspects of function, space, form, and detail. Of all the tasks being managed for quality, the creative acts required to generate these characteristics elude direct management because they result from unconscious activities of the mind. It is typically difficult to know when the design team has been exposed to sufficient information for understanding the problem which is to be solved by design. It is also difficult to predict when such synthesis will occur. The approach suggested here for managing these seemingly intractable tasks is the organization of activities that consolidate information and experience in the minds of the design team.

Understanding

Each of the pre-design activities discussed thus far, knowledge management and programming, is a conscious means to understanding the problem to be solved through schematic design. Reviewing and evaluating the design program, codes, regulations, schedule, budget, site, delivery method, design, and sustainability provide the resources on which understanding is built.

The goal of understanding, and how it affects design quality, is an unconscious activity that can be managed by consolidating the resources for comprehension in the mind(s) of the person or team charged with design. In a small firm or with simple projects, this is accomplished by assigning design staff to pre-design and preliminary schematic design tasks. In large firms, challenged with complex projects, such knowledge consolidation can be planned through specific activities. Examples include augmenting the literature searches completed during pre-design; illustrating the owner's program with ideograms; and prioritizing the code, budget, and site analysis, which may have been done by others. Management of the understanding necessary for a successful solution to a design problem can be completed by tasking the design team to establish goals to be achieved through the creative synthesis phase of schematic design.

Synthesis

The disarmingly simple statement "prepare and present preliminary designs" in the scope of architect's basic services involves a complex unconscious mental activity that can take many forms. Synthesis is the formation of connections in the mind between the problem and solution, exploration and discovery, information and learning. Quality is managed early on by organizing the activities that come before design as preparation for synthesis. The typological and morphological subjects of knowledge management, as well as the information gathering and graphic depictions completed during programming, provide both incubation time and content for synthesis to take place. When pre-design services are not contracted for by the owner, time can be allotted at the start of schematic design for assembling precedents and reformulating a given program with architectural graphics and ideograms. During the actual creative process of synthesis, quality is managed by increasing the potential quantity of problem-to-solution connections perceived in the mind(s) of the design team, and thus the probability that quality connections will emerge. Creating multiple solutions for the problem can be challenging, however. Designers, like everyone else, tend to stop searching once they have found a solution that appears to work.

Creating logic for the generation of design iterations is one approach to managing synthesis. In its simple form, design options are presented on a continuum of two extremes and a mean. Developing design alternatives for close functional fit to loose flexibility, harmony to contrast with physical context, or historic rediscovery to inventive expression are examples. The intent is to explore a full range of possible solutions through an iterative process.

Evaluation

The relative merit of each design alternative is next systematically determined using criteria developed during pre-design, programming, and the understanding phase of schematic design. Although the primary purpose of this evaluation is to select the highest-quality alternative, it is also a time for gaining insight into prior iterations, to enable reflection and assist in the identification of future design explorations. Evaluation can lead to additional research, programmatic changes, and the generation of more highly refined designs. As part of the scope of architect's basic services, it leads to the first presentation for the owner's approval of the schematic design and documents.

Optimization

Improving the quality and desirability of the approved schematic design, optimization can involve the consideration of alternative environmentally responsible strategies, building systems, materials, and equipment. It precedes the final presentation and approval of the schematic design phase. In addition to being the final phase dedicated to refinement, it is the last chance for corrective action. As such, the basic art and architecture concept of the design should be scrutinized and, if quality goals are met, refined. If not, corrective action needs to be taken before final client presentations or the start of the design development phase.

QM Actions in Schematic Design

Process Planning

What architects refer to as their approach to design is equivalent to the quality management activity of process planning. For schematic design, this is initiated with an in-depth plan for the work normally undertaken by the firm. It is concerned with determining the sequencing (and resequencing) of individual activities needed to produce the final design and documents. It must go beyond the AIA's description of the scope of architect's basic services and account for the real effort needed to produce architecture. For example, tasks for consolidation of information in the mind(s) of the design team, practice afforded by literature searches, and programming and activities for increasing the problem-to-solution connected pairs (synthesis) perceived by the design staff all need to be planned. The resulting document can express process planning as a preferred path to be followed by analogy or alternative plans for differing situations.

Kickoff Charrettes

Intense collaborative sessions organized to be unrestricted and conducive to creativity, kickoff charrettes are a good catalyst for quality management at the start of schematic design. During this time, the design team debates program and precedents while drafting multiple solutions to a design problem. Charrettes often are made up of design staff beyond the dedicated project team and take place in multiple sessions in which the expanded team divides into subgroups. Each subgroup then presents its ideas to the full team as impetus for future design direction. Such charrettes provide a time, place, and organization for the creative design process and its synthesis.

Sustainability Charrettes

▶ The backgrounder on The Integrated Design Process and Green Charrettes (10.2) describes a collaborative process to rapidly generate conceptual design ideas.

A technique for involving all project stakeholders, sustainability or "green" charrettes are intense, possibly multiday meetings, engaging clients, environmental experts, municipal officials, and residents. A successful charrette promotes the integration of sustainable materials and technology and the joint ownership of design solutions. Sometimes confrontational attitudes between client/architect teams and neighbors can be defused during charrettes.

I avoid dictating and instead persuade through a dialogue with my staff.

—Arata Isozaki

Critiques

The first level of peer review, critiques are conducted by those with technical knowledge or professional experience. An established process of systematic debate of design alternatives, critique is influenced by the scientific method of analysis. Often called "desk crits," they are typically one-on-one, informally organized, frequent sessions meant to evaluate design as the creative process progresses.

Reviews

The process by which architects or coworkers assess the work of their colleagues is a review. Such critical evaluations are normally timed to coincide with the completion of schematic design sub-tasks, at the end of a charrette, after concept development, or following alternative design explorations. They normally involve a small group of peers, and are less frequent and more formally planned than critiques.

Design Audits

Essentially a systematic and documented design review, design audits are an evidence gathering process intended to evaluate how well schematic design meets specified audit criteria. They begin with the specification of criteria and end with documented recommendations for revisions. They should be objective, impartial, and independent of the design team. Although there are internal and external audits, most architectural firms using the system use internal, first-party audits to assess their own design process.

Sustainability Audits

Much like design audits, sustainability audits are intended to evaluate how well a schematic design meets sustainability criteria. Normally such evaluations are done utilizing scoring developed for programs like the Leadership in Energy and Environmental Design (LEED) or the Collaborative for High Performance Schools (CHPS), which rate sustainable design decisions, adoption of specific building practices, the incorporation of materials and systems, and total building performance.

Remedial Charrettes

A process designed to correct quality problems, remedial charrettes often gather the original kickoff team in an additional intense collaborative session focused on corrective action identified during critiques, reviews, or audits. The objective is to infuse the dedicated project team with fresh, objective design staff capable of steering the design direction free of the quality problems. Once a new path is identified, the original team resumes the schematic design process.

Re-staffing

In some cases the corrective action identified during critiques, reviews, or audits includes a change in the design team in addition to charting a path free of the quality problems. No action affects the quality of architecture more than changing who is to create it.

Actions that help to maximize the number of positive peer reviews received for schematic design quality (from client, profession, and public) include:

- Establish a pre-schematic design quality management process, including assembling precedents and reformulating a given program.
- Institute a schematic design monitoring and corrective actions system, including, charrettes, critiques, review, and audits.
- Found an in-house training program to familiarize staff with the schematic design quality management system and process for seeking positive peer reviews.
- Institute a process of submitting schematic design work for client, professional, and public peer reviews.
- Record positive peer reviews for schematic design phases and constructed projects.

Actions that reduce design development phase rework caused by schematic design quality problems to a minimum include:

- Establish a process to document design development phase rework time spent associated with schematic design quality problems.
- Catalog and update lessons learned and best practices from design monitoring and corrective actions, charrettes, critiques, reviews, and audits, and make this information available at the start of schematic design.
- Monitor rework time during the design development phase and compare it with pre-quality management history.

POST-DESIGN

Completion of schematic design becomes preparation for the next project. All the knowledge managed, information gathered, and schematics synthesized are available to inform the next pre-design and schematic effort in a process of continuous improvement. Such a process is a set of activities that an organization carries out in order to enhance its ability to meet quality requirements in the future.

Many of my colleagues are currently modifying their studio systems to assure consistency of design between studios, communication between teams and the creation of a firm-wide architectural philosophy.

—Cesar Pelli, FAIA

Design Seminars

Bringing together groups of architects for recurring meetings, focusing each time on some project or topic of design, design seminars are used to propagate the firm's design approach and quality goals across the staff. The idea is to create an ongoing critical discussion among the design staff concerning the qualities of architecture, and to familiarize those less actively involved during schematic design with the products and processes of the firm's creative approach. It is essentially a forum where questions can be raised and debates can be conducted in a relatively informal setting.

Design Retreats

Awards programs have concrete architectural quality consequences.

—Robert Campbell, FAIA

The purpose of a design retreat is to break the daily project routine and encourage key architectural design staff to think outside the box. It provides an opportunity to bond, work on conflict resolutions, and come up with new quality goals for the practice. Successful retreats are made up of a collection of informed and articulate architects directly responsible for design. These are designers who are experienced, display a broad range of problem-solving ability, are open to addressing the firm's quality problem, and willing to pursue a course of action. A good use of design retreats is the setting and updating of quality goals and corresponding objectives for pre-design and schematic design.

Peer Reviews

▶ For more information on quality management in construction drawings, see Checklists (12.3) and Construction Drawings (10.6).

A peer review is the process of subjecting the firm's architectural work to the scrutiny of others who are experts in similar building types and noted for the design quality of their built work. Peer review methods are employed to maintain quality standards, improve design performance, and enhance credibility between design and non-design principals within the firm. They focus on the performance of design professionals with a view to upholding standards and improving quality. Some critics, however, believe that peer review has a built-in bias against highly original architecture.

Peer reviews are widespread in the fields of health care, research, medicine, law, and accounting. Within architecture, the General Services Administration (GSA) uses peer review in the selection and guidance of architects working within the GSA's Design Excellence Program.

Actions to improve overall firm effectiveness in schematic design include:

- Establish a post-schematic design quality management process, including design seminars, retreats, and peer reviews.
- Conduct office critiques weekly to review schematic design quality of work in progress.
- Schedule annual retreats with the senior design staff to monitor and update goals and objectives for schematic design.
- Invite professional peers to review the schematic design quality of the firm's work.
- Record recurrence of negative peer reviews and design development phase rework, and take appropriate action.

CONCLUSION

Three overarching ideas that are relevant to any architect striving for success have been discussed in this article. First of these is the similarity between the activities common to architectural practice and those of quality management, including the language and cultural divisions between design and management disciplines. The second is the genesis of schematic design quality in the pre-design tasks of staffing, knowledge management, and programming. The third point relevant to firm success is the development of methods for managing the quality of creative tasks. The thesis is that understanding of the problem to be solved by design and design creativity can itself be managed for quality by organizing activities that consolidate information and experience in the minds of the design team.

There is, of course, more to quality management of schematic design than maximizing the art and architectural qualities of architecture. Codes must be accounted for, drawings need guidelines, and documents need to be organized, filed, and retrieved. These later QM requirements, however, are parallel to those identified for design development and are discussed in detail in other Handbook articles, including Checklists (12.3) and Construction Drawings (10.6).

For More Information

Managing Quality in Architecture: A Handbook for Creators of the Built Environment (Architectural Press, 2006) by Charles Nelson, AIA.

Quality Out of Control, Standards for Measuring Architecture (Routledge, 2010), edited by Allison Dutoit, Juliet Odgers, and Adam Sharr.

Knowledge Architecture Connect (Christopher Parsons): http://ka-connect.com/index.php.

Design in Architecture: Architecture and the Human Sciences (Wiley, 1973) by Geoffrey Broadbent.

Understanding Design: 175 Reflections on Being a Designer (BIS Publishers, 2006) by Kees Dorst.

How Designers Think: The Design Process Demystified, 4th edition (Elsevier, 2006) by Bryan Lawson.

12.3 Checklists

Micheal J. Lough, AIA

Developing and formalizing a series of checklists as tools for architects to use in the performance of their services are important elements of a comprehensive quality management program.

INTRODUCTION

Merriam-Webster's Collegiate Dictionary defines a checklist as "a list of things to be checked or done such as a pilot's checklist before take-off; also: a 'comprehensive list'." In architectural practice, the simple acts of developing a drawing index, a cartoon set, a specifications table of contents, or editing a technical specification section with MasterSpec are examples of using checklists. For example, in editing a MasterSpec technical section for a particular project, the list of performance criteria, products, methods, etc., are all part of the section, and the task is to check off applicable choices. Developing and formalizing a series of checklists as tools that architects use in the performance of their services are important elements of a comprehensive quality management program.

Checklists can be short or long, can address project management tasks or technical tasks, and can be phase-specific or specific to a narrowly defined task. Checklists can take many forms. However, for a checklist to be effective, it needs to be perceived as a simple functional tool by the project team.

THE AIA AND CHECKLISTS

Checklists have been a staple of the AIA for the past century. The first edition of the architect's handbook, published in 1920 and entitled *The Handbook of Architectural Practice*, included a "Memoranda of Procedure." This was a group of checklists addressing contract execution, code review, preparation of drawings and specifications, and construction phase activities. Also included were a project directory and a checklist of

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principal transactions, which tracked project milestones from project inception through the start of the construction phase.

In the 4th edition of the *Handbook*, published in 1947, the checklist was changed to "Office Records of Completed Work"; and in the 8th edition, published in 1957, the checklist was called "Summary of Project Procedures." In the 9th edition, published in 1963, checklists were incorporated into the chapter entitled "Project Procedures." AIA Document D200, Project Checklist, was initially published in 1973, and the document remains available for use today in its 1995 revision format.

AIA Document D200™–1995, Project Checklist, is a convenient listing of tasks a practitioner may perform on a given project. The checklist can assist the architect in recognizing required tasks and in locating the data necessary to fulfill assigned responsibilities. The space provided for notes on actions taken, assignment of tasks, and time frames for completion allows D200™–1995 to serve as a permanent record of the owner's, contractor's, and architect's actions and decisions.

AIA Document D200™–1995 is useful to the experienced architect as well as to those starting out because, like the pilot's preflight checklist, it serves to remind the user of potential tasks that may apply to a particular project. Since D200™–1995 is broken down by phases of service, a checklist for a specific phase can be used independently of the whole document. Even the experienced architect should consult with AIA Document D200™–1995 to determine if all relevant tasks have been considered.

SPECIALIZED CHECKLISTS

In performing architectural services there are many opportunities where task-specific checklists can be utilized. There are situations where short checklists for often-repeatable tasks can be beneficial reminders, such as preparing a site observation report, reviewing an application for payment, or reviewing specific types of submittals. There are situations where longer checklists are appropriate, such as an overall project management checklist specific to a particular phase of the project. AIA Document D200™–1995 provides an excellent starting point for developing a specialized project management checklist. A checklist addressing exterior wall issues is another example of a task-specific checklist.

As in many other professions, repetitive tasks performed by architects can be more consistently managed through checklists. However, in order for checklists to be a desired and useful tool for architects, the length and complexity of the checklists should be tailored to the task at hand. For example, a checklist appropriate for a monthly payment application from the contractor during the construction phase should be simple and short, whereas a project manager's checklist for the design development phase, which may have a duration of a few months, can be manageable at six pages.

Some checklists can be very short and function as simple reminders of repeatable tasks, and once ingrained they can be useful tools. During construction phase services there are numerous repeatable tasks that can benefit from short reminder checklists, such as site visits, owner-architect-contractor (OAC) meetings, payment application reviews, and changes in the work.

DEVELOPING CHECKLISTS

Developing a checklist, while it may initially appear to be simple, can be a challenging task since it requires continual reassessment and verification of its utility. The first step is to acknowledge that there is an adequate need. For architectural firms, checklists can be especially applicable to (1) tasks performed repeatedly on every project, and (2) tasks performed by multiple staff members. Such tasks can be viable candidates for checklists, especially if inadequate performance of these tasks could have a significant detrimental effect on the project. For example, everything from preparing a contract to addressing technical detail issues will be necessary tasks on almost all projects.

The best practice for developing a checklist is to have the intended users develop the checklist and the protocol for its use themselves. Because checklists can address many project tasks that involve different people, there are opportunities for broad participation in their development.

The currently available baseline checklist for architectural tasks is AIA Document D200™–1995, Checklist. When developing a task-specific checklist, first check D200™–1995, and if it does not accommodate your needs it can serve as a starting point for specialized development. D200™–1995 has not been updated in almost two decades and may require revision.

Table 12.3, "Contractor Payment Certification Checklist," is a good example of a task-specific checklist. This simple monthly payment certification checklist has only six items and serves as a simple tracking tool and reminder. It includes simple procedural activities such as receiving pencil draft, distributing draft, inspecting project site, and determining percentage of work complete for each line item in a payment application. Simple adjustments can be made to the form, such as adding lines to address specific off-site reviews that are required for the particular month.

For each payment, a copy of this checklist could be attached and checked off as the various tasks are performed; and a note on it could serve as a reminder that, for example, a few waivers of lien are missing, or that a trip is required to check windows, which are stored off-site. In developing such a checklist, be short and simple, or it may fall out of favor and not be used. Ideally it should provide a simple means to note or track items requiring follow-up.

In developing a simple checklist such as the contractor payment certification checklist, there should first be confirmation of the need. This need may be due to errors made in the past on the part of project team members, or just the expediency of having a useful tool to help track the process. The checklist could first be implemented on a few projects, its effectiveness evaluated, and appropriate changes made.

More complex checklists can be developed by either an individual or a small team; however, they should be viewed as a work in progress. Such checklists should be tested in practice, adapted for specific project needs, and continually improved.

TABLE 12.3 Contractor Payment Certification Checklist

	Project Name: **Scheduled Payment Certification Checklist**	**Application # ______**	
		Date:	
	Project Number:		
	Prepared By:		
	Period from __________ to __________		
		Date:	Checked:
1.	Conduct site visit; review against pencil draft	_______	_______
2.	Pencil draft meeting/determine % of work complete	_______	_______
	Schedule of values reviewed for all trades	_______	_______
	Materials stored off-site—review if required	_______	_______
	Owner/consultant comments	_______	_______
3.	Receive hard copy application	_______	_______
4.	Review hard copy application	_______	_______
	Schedule of values	_______	_______
	Materials stored off-site/bonded warehouse	_______	_______
	Waivers of lien	_______	_______
5.	Certificate signed	_______	_______
6.	Certificate issued	_______	_______

PROJECT MANAGEMENT CHECKLISTS BY PROJECT PHASE

Although D200 addresses the project by phases, a series of specialized project checklists consistent with the project phases may be useful. Generally, these checklists are likely the responsibility of the project manager. Given that each phase can last several weeks or months, these checklists may be six to eight pages in length. At this size, plenty of topical issues can be addressed and the checklist is still very manageable. For smaller projects and shorter durations of phases, these checklists may be shorter.

The phase checklists can include:

- Pre-Design Services/Site Analysis
- Schematic Design
- Design Development
- Construction Documents
- Bidding and Negotiation
- Construction Phase Services
- Post-Construction

In order to keep the checklists more manageable, they should focus primarily on broad technical issues and will not be sufficient to serve as detailed technical task checklists. Other checklists can address the more technical and detailed tasks of the project as needed.

Project phase checklists can be organized in three parts: general phase objectives, phase task checklist, and phase deliverables. The phase task checklist is further organized by subgroup tasks. In developing a checklist for general applicability it is necessary to decide upon a project size reference; the sample checklist shown assumes a medium to large commercial project. It could be trimmed for smaller projects, expanded for larger projects, or revised to be applicable to particular building types or specific projects. It is effectively a general template.

General Phase Objectives

It is critical that project teams establish general objectives for a phase, as with schematic design (SD), shown in Table 12.4. The starting point should be the contract; refer to AIA Document B101™–2007 for general requirements and to the specifics of the project agreement. The general objectives are intended to be clear and concise and should be shared with the entire project team, including the client. The architect and the design team should be aware of how a client intends to utilize the schematic design documents. Schematic design documents may be part of approval processes such as zoning, local planning commission, or other regulatory groups. SD documents are also submitted for owner approval, which could include a board of directors, lending institutions, and others. A client may also be using the documents to confirm programming, building performance, design concerns, construction costs, project scheduling, project logistics, and other issues.

The general phase objectives also set the tone for the scope of services intended for the phase, which often provides greater clarity than the language within the agreement. These objectives should be reflective of the percentage of fee earned in the phase, and the labor needs and schedule implications, as well as the advances in the technology utilized in generating the documents. The sample checklist can set some high expectations, which may not be appropriate for a particular firm or for a specific project. For example, one of the checklist items is that a "representative plan element(s) is graphically complete." This may reference a typical plan for a high-rise office building or condominium, but for a school, laboratory, or hospital project it may reference a block of classrooms, laboratories, or patient rooms. Similarly, another checklist item is that "small-scale building elevations are graphically complete for typical areas." Both of these requirements establish reliable building blocks, which form the basis for design development.

TABLE 12.4 General Phase Objectives Checklist

	Project Name: **Project Phase: Schematic Design**
Project Number:	**Date:**
Prepared By:	**Updated:**
Action:	**Notes:**
General Objectives of Phase	
☐ Drawings and other documents indicating the scale and relationships of project components in conformance with program	
☐ Building areas and volumes demarcated	
☐ Project images/renderings clearly depicting design intent	
☐ Representative plan element(s) graphically complete	
☐ Structural grid and representative exterior modules fixed	
☐ Small-scale building elevations graphically complete for typical areas	
☐ Representative wall section graphically developed at a larger scale	
☐ Structural and MEP/FP systems defined	
☐ Project performance criteria established	
☐ Schematic design estimate of the cost of the work	

The body of the checklist is a more extensive tabulation of specific tasks organized under the following headings:

- Management/Quality Management/Schedules
- Program/Construction Costs/Regulatory Requirements
- Performance Criteria
- Civil/Site Design
- Design/Architecture
- Structural
- Mechanical, Plumbing, Electrical, and Fire Protection
- Other Consultants

► For related information, see Quality Management in Schematic Design (12.2) and Design Phases (10.5).

These tasks are somewhat general and focused primarily on tracking the completeness or status of specific project related tasks. The checklist is not sufficient to address very specific or technical tasks associated with a project, but rather it is a tool primarily designed to assist the project manager or project architect and associated team members for a project.

There are action items within the sample checklist shown in Table 12.5, suggesting a development of schematic design that is consistent with AIA Document B101™–2007; however, greater specificity is also associated with many action items. There are action items that recommend a certain quality and completeness that may exceed the scope of work defined in AIA B101™–2007. Examples include:

- **Performance Criteria** section suggests that the design team should provide performance criteria for the principal systems of the project within the schematic design documents; these can be narratives.
- **Design/Architecture** action items suggests that some representative portion of a plan be "graphically correct and coordinated with structural and MEP." This task item is primarily a function of development of the documents in an efficient manner, and addresses issues of quality management.

A firm or project team can easily modify this template to be consistent with the firm's standard of practice and to address project-specific requirements. These tasks are meant to be general suggestions.

TABLE 12.5 Phase Tasks Checklist

Phase Task Checklist

Management/Quality Management/Schedules

- ☐ Update project area and use summaries.
- ☐ Maintain binder and check set of all work prepared during this phase.
- ☐ Conduct brief weekly team meeting.
- ☐ Obtain authorization to proceed with schematic design phase.
- ☐ Confirm owner's budget.
- ☐ Finalize Owner/Architect agreement if not already done.
- ☐ Finalize selection of consultants.
- ☐ Draft Consultant agreements. Review Owner /Consultant agreements.
- ☐ Confirm compliance with insurance requirements for the project including General Liability, Automobile Liability, Workers' Compensation and Professional Liability B101-2007 - 2.5.
- ☐ Establish and review the role of project team members.
- ☐ Establish communication protocol between team members; who, methods of communication, project meetings and minutes, filing structure, etc. B101-2007 - 3.1.1.
- ☐ Prepare a preliminary evaluation to the Owner and discuss alternative approaches to the Owner's intended project delivery method B101-2007 - 3.2.2.
- ☐ Develop mock-up set and drawing index for the Construction Documents. Provide the drawing scale and a reasonable block-out of referenced details as much as possible. Submit for Peer Review.
- ☐ Confirm/update project data and requirements of Owner/Architect agreement.
- ☐ Monitor design firm's fees and labor needs versus actual progress.
- ☐ Monitor design team's billings.
- ☐ Prepare or update the project schedule; review with Owner. B101-2007 - 3.1.3 & B101-2007 - 3.2.2.
- ☐ Confirm peer review schedule for this phase.
- ☐ Submit Schematic Design package for Peer Review. B101-2007 - 3.2.7.
- ☐ Prepare approval letter for Schematic Design phase completion. B101-2007 - 3.2.7.
- ☐ Modify the checklist for the next phase per the project's particular needs.

Program/Construction Costs/Regulatory Requirements

- ☐ Review program/prepare preliminary evaluation of program/program requirements agreed upon with the Owner. B101-2007- 3.2.1/3.2.2/3.2.4.
- ☐ Determine and obtain data on any Owner special building equipment and fixtures; distribute to design team.
- ☐ Prepare a preliminary evaluation of owner's budget for the cost of the Work B101-2007- 3.2.2.
- ☐ Submit an estimate of the Cost of the Work. B101-2007- 3.2.6.
- ☐ Determine applicable zoning, codes and other regulations applicable to the architect's services. B101-2007- 3.1.5 & 3.2.1.
- ☐ Prepare or update zoning analysis. Follow up as necessary with governing authorities. B101-2007- 3.1.5/3.2.1.
- ☐ Prepare preliminary building code review; as complete as possible. Follow up as necessary with governing authorities. B101-2007- 3.1.5/3.2.1.
- ☐ Review project drawings for compliance with accessibility codes and regulations. Prepare the Accessibility Plan. B101-2007 - 3.1.5/3.2.1.
- ☐ Draft a schedule for code reviews and submissions with the appropriate agencies and assist the Owner in connection with filing documents required for the approval of governmental authorities. B101-2007 - 3.1.6.

Performance Criteria

- ☐ Establish with the Owner the performance requirements of the project B101-2007 - B3.2.3.
- ☐ Define structural design criteria.
- ☐ Define MEP/FP performance criteria.
- ☐ Define building envelope performance criteria.

- ☐ Define acoustical performance criteria.
- ☐ Define building system durability/maintainability performance criteria.
- ☐ Define sustainability performance criteria.

Civil/Site Design

- ☐ Contact entities providing utility services to the project. B101-2007 - 3.1.5.
- ☐ Develop schematic site plan B101-2007 - 3.2.5.
- ☐ Prepare drawings and outline specification showing technical site engineering and storm water detention.
- ☐ Identify site features with focus on hardscape.
- ☐ Prepare preliminary site grading.
- ☐ Start preliminary coordination with MEP/FP consultant.
- ☐ Confirm site utilities and prepare underground utilities plan.
- ☐ Confirm that survey and existing conditions information provided by the Owner is sufficient and/or determine if additional information is required (i.e., additional or new surveys).
- ☐ Address the design requirements for site access (tenant, loading, fire, etc.), site landscaping, sidewalks and/or driveways and site utility areas.
- ☐ Review site landscaping with local code officials. Site features and grading should be approximately shown.
- ☐ Determine the need for and if required prepare a request for site soil borings. Review with the Owner, structural engineer and civil engineer.

Design/Architecture

- ☐ Discuss with the Owner alternative approaches to design and construction of the project B101-2007 - B3.2.3.
- ☐ Discuss with the Owner the feasibility of incorporating environmentally responsible design approaches B101-2007 - B3.2.3.
- ☐ Prepare a geometry plan for the building.
- ☐ Prepare all major plan elements of the building for all floors, with approximate accommodations for structure and MEP. B101-2007 - 3.2.5.
- ☐ Develop typical project functional components (i.e., a typical office plan, a residential floor or a function component of a floor such as hotel room types. Components should be graphically correct and coordinated with structural and MEP. Representative dimensions shown and representative partitions tagged. Show schematic furniture layouts to confirm spatial and program requirements of unit types.
- ☐ Develop typical project components and core elements including elevators, stairs and MEP risers, public toilet rooms. Components should be graphically correct and dimensioned. Minor or atypical elements should be reflected in the plans and building sections. Confirm that all circulation elements conform to building and accessibility codes as well as market requirements.
- ☐ Verify that all program requirements are incorporated in the plans including support areas such as staffs break rooms/toilets, building storage areas, janitor closets, and trash rooms and recycling.
- ☐ Develop building elevations and note exterior materials. Indicate the extent of their use. Confirm alternatives with the Owner. B101-2007 - 3.2.5.
- ☐ Develop building sections including typical foundation details. Indicate floor to floor dimensions, ceiling heights, major structural elements and major MEP transfer or horizontal distribution zones. B101-2007 - 3.2.5.
- ☐ Prepare study models, perspective sketches, or digital modeling. B101-2007 - 3.2.5.
- ☐ Develop preliminary selections of major building systems with construction materials noted on the drawings or described in writing. B101-2007 - 3.2.5.
- ☐ Consider environmentally responsible design alternatives. B101-2007 - 3.2.5.1.
- ☐ Consider the value of alternative materials, building systems, and equipment… B101-2007 - 3.2.5.2.
- ☐ Develop typical exterior wall sections, typical exterior details and typical exterior wall types with sufficient detail delineated in the drawings and adequately described in the Basis of Design Documents so that initial system pricing can be obtained.
- ☐ Prepare general description of atypical and high finish spaces such as lobbies, public corridors, and amenities. Describe in the form of narratives and/or freehand or digital sketches.
- ☐ Prepare general description of typical toilet room and kitchen in plan and interior room elevations.

(continued)

PART 3: PROJECT DELIVERY

TABLE 12.5 *(Continued)*

	Design/Architecture ***(Continued)***
☐	Establish ceiling heights on a preliminary typical or representative reflected ceiling plan(s) as the basis to initiate project coordination. If possible layout a small representative portion to establish design intent.
☐	Establish preliminary ceiling heights for all typical and principal spaces; indicate on the floor plans and building sections.
☐	Prepare partition type sheet for typical floor only. All types of partitions should be accurately shown, noted, and dimensioned.
☐	Prepare an Outline Specification with Project Description, general and regulatory requirements, preliminary building code, preliminary accessibility analysis, structural requirements, acoustical requirements, outline basic interior and exterior construction and materials, include preliminary elevator study, and include MEP outline specification.
☐	Issue The Schematic Design Package for preliminary line item pricing to the Owner's Consultant.
	Structural
☐	Determine structural system.
☐	Establish major grid lines, columns, shear walls, and other vertical elements. Determine dimensional requirements and size structural components.
☐	Address Major slab openings on typical floor(s), size major beams and spandrel beams.
☐	Address unique foundation conditions.
☐	Prepare Slab loading diagrams.
☐	Provide general descriptive information sufficient for schematic pricing such as estimates of pounds of rebar per square foot, etc.
☐	Review pertinent portions of the outline specifications.
	Mechanical, Plumbing, Electrical, and Fire Protection
☐	Develop design criteria including indoor and outdoor conditions, ventilation, air circulation, minimum exhaust, sound levels, system diversities, and building envelope thermal characteristics.
☐	Prepare outline specification, including detailed system descriptions. For ductwork, provide maximum air velocity criteria and duct insulation requirements.
☐	Prepare preliminary fixture selections—general space requirements and types of plumbing fixtures, general criteria for light fixture types.
☐	Prepare riser diagrams for all mechanical, fire protection, and electrical systems, including information on number of risers and general sizes.
☐	Develop preliminary layout of major mechanical rooms.
☐	Develop typical floor space requirements, including electrical rooms, any mechanical rooms, major risers, chase requirements, etc. Include weights of equipment, and major horizontal and vertical penetrations.
☐	Determine typical floor MEP & FP distribution systems and other mechanical, fire protection, and electrical systems that can impact structural, architectural plans, and reflected ceiling plans. Examples include: HVAC supply duct loop (office buildings), criteria for typical fan coil units and horizontal ductwork (residential), sprinkler main routing.
☐	Prepare energy code analysis.
☐	Coordinate utility requirements.
	Other Consultants
☐	Coordination with owner's consultants. B101-2007 3.1.2.
☐	For high-rise buildings: prepare wind analysis for building structure.
☐	Prepare elevator study to determine configuration, number of cars, capacities, and speeds of elevators.
☐	Prepare preliminary acoustical report sufficient to establish typical wall types and to provide general guidelines in the outline specification.
☐	Prepare concept scheme for building maintenance.
☐	Prepare outline specification for security system.
☐	Prepare landscape design drawing sufficient for zoning and/or other governing body approvals.
☐	Establish LEED certification level, if applicable.

TABLE 12.6 Phase Deliverables Checklist	
Phase Deliverables	
	Drawings
☐	Drawings indicate the general scale and relationship of project components
☐	All plans have spaces generally defined
☐	Representative area plans generally graphically fixed
☐	Full building elevations generally graphically fixed for typical areas
☐	Representative wall sections drawn
☐	Typical floor elevator and stair plans with preliminary sections
☐	Representative area partition types defined
☐	Preliminary civil and landscape drawings
☐	Structural plans, foundation defined, columns sized and located, lateral design defined
☐	MEP/FP systems defined, major mechanical spaces fixed in plans, representative plan area coordinated, initial riser diagrams
	Outline Specifications
☐	General statement of purpose of schematic design package
☐	Project description
☐	Outline specifications, including general description of systems and finishes sufficient to meet the **General Phase Objectives**
☐	Project performance criteria established
☐	Attachments and additional information as project requires

Phase Deliverables

Clients may not always have a clear understanding of what the schematic design documents format will consist of until they are delivered. Architects can be in a similar position of not being fully aware of what they will receive from consultants until after the documents arrive from the printer. This is to be avoided if possible. Soon after the schematic design phase commences, there should be clearly established deliverables that are consistent with the general phase objectives and with the specific phase tasks established for the phase. This checklist (see Table 12.6) is designed to outline deliverables and should be shared with the owner and appropriate members of the design team so that expectations are clearly articulated.

THE COMMISSIONING PROCESS

The foreword to the ASHRAE Guideline 0-2005 states, "The Commissioning Process is a quality-oriented process for achieving, verifying, and documenting that the performance of facilities, systems, and assemblies meets defined objectives and criteria." The commissioning process is increasingly becoming a requirement of the project/facility process. Two of the key commissioning references are ASHRAE Guideline 0-2005, The Commissioning Process, and ASHRAE Guideline 3-2006, Exterior Enclosure Technical Requirements for the Commissioning Process. Fundamental commissioning of the building energy systems is a prerequisite for LEED, the ASHRAE Guideline 0-2005 is a reference, and the General Services Administration (GSA) is incorporating building enclosure commissioning referencing ASHRAE Guideline 3-2006.

Requirements include commissioning-focused reviews of design documents and the creation of construction checklists. There are sample checklists within the National Institute of Building Sciences (NIBS) Guideline 3-2006 that are for verification of construction in the field. No less important are checklists to assist the design team in the preparation of the technical aspects of the construction documents.

CHECKLISTS FOR TECHNICAL ASPECTS OF BUILDING DESIGN

Table 12.7 is an outline for an exterior wall checklist in two parts. In the general objectives/deliverables section, the checklist focuses on the extent of the development of the exterior envelope detailing at each phase of the project. For example, this checklists requires typical or representative sections be drawn in schematic design, complete typical wall sections in design development, and final detailing in construction documents.

The second portion of this checklist focuses on exterior wall performance issues and design criteria. In this portion, the checklist addresses issues such as rainwater penetration and acoustical performance.

TABLE 12.7 Exterior Wall Checklist

	Name of Project Exterior Wall Checklist			
Project Number:	**Date:**			
Prepared By:	**Updated:**			
Action:	**Notes:**			
	C	**SD**	**DD**	**CD**
General Objectives/Deliverables				
☐ Narrative addresses building envelope; state alternatives being explored				
☐ Study several massing and form schemes				
☐ 3D concept sketches or conceptual computer renderings of exterior envelopes of building				
☐ **Owner's Project Requirements** (OPR) developed; architect reviews				
☐ Small-scale building elevations should be complete for typical areas of the project				
☐ Note exterior materials and indicate the extent of their use				
☐ Primary building envelope systems determined				
☐ Typical or representative wall sections drawn				
☐ Outline specification should describe systems, performance criteria, and finishes				
☐ **Basis of Design** (BOD) developed; commissioning review				

PART 3: PROJECT DELIVERY

- ☐ Exterior elevations are graphically complete
- ☐ Complete typical wall sections
- ☐ Representative larger scale partial details
- ☐ Foundation/basement sections complete
- ☐ Confirm **OPR/BOD**; commissioning review
- ☐ All exterior wall sections complete
- ☐ All larger scale details complete
- ☐ Coordination with all trades
- ☐ Finalize specifications
- ☐ Systems manual finalized; commissioning review

Exterior Wall Performance and Design Criteria

- ☐ Structural/support:
  Exterior walls need to withstand the various forces applied to them and their components including dynamic variables:
  Gravity loads—live loads and dead loads
  Lateral loads—wind including special hurricanes forces
  Seismic loads
  Blast loads
  Various movement forces such as thermal movements, building pressurization forces, concrete creep
- ☐ Barrier issues:
  Rain penetration
  Vapor
  Air infiltration/building pressurization
  Thermal performance
  Dew point calculation
  Fire-resistive/smoke control
  Acoustic
- ☐ Openings/control:
  Natural light control
  Natural ventilation
  Visual—looking out and looking in
  Fixed and variable elements—windows
- ☐ Material/finish durability:
  Enclosure systems (curtain wall, masonry cavity, doors, etc.)
  Materials/components (aluminum, glass, brick, etc.)
  Finish—color, reflectivity, texture
  Durability
  Sustainability
  Maintainability
- ☐ Joints:
  System interface—dimensional/modular interfaces
  Materials—compatibility
- ☐ Construction considerations:
  Material and installation costs
  Schedule implications—lead time
  Sustainability (LEED implications)
  Constructability

Given the importance of properly detailing exterior walls, there could be sub-checklists. Table 12.8 is a sample checklist addressing water penetration. This checklist could be specific to a particular project system, and a checklist could be prepared for each primary exterior wall system.

TABLE 12.8 Water Penetration Checklist	
	Name of Project **Short Wall System Water Penetration Checklist**
Project Number:	**Date:**
Prepared By:	**Updated:**
Action:	**Notes:**
	C SD DD CD
Water Penetration—system short form System: ______________	
☐ Water penetration control strategy: Face-sealed system Mass barrier Traditional cavity wall Drained/screen types Pressure-moderated rain screen system	
☐ Systems and materials: Aluminum/glass systems—curtain wall, window wall, storefront, windows Opaque wall systems Manufacturers/models/units Materials and material properties	
☐ Elements of the wall system: Exterior cladding system Cavity Drainage plane Waterproofing membrane/air & vapor barrier Substrate system Flashing/joint/end dams	
☐ Performance criteria: ASTM/AAMA Test performance requirements Empirical design criteria—masonry tech notes/PCI criteria Mock-up testing Field testing Warranty requirements	
☐ Joint and system interface: Continuity of water penetration at system interfaces Joint detailing Within a system, joints may have a different water penetration control strategy than the primary system materials (Precast panels may be a mass barrier, whereas double line joints with weeps would be a rain screen)	

Another approach to sub-checklists for exterior walls could be to create checklists tailored to specific systems; Table 12.9 is a checklist for glazed curtain wall systems. Note that this checklist applies to the conceptual phase, schematic design, design development, and construction documents. Dividing the checklists into phases will allow the checklist to be shorter and more easily manageable.

▶ Project Completion and Post-Construction (10.10) covers the final stage of construction contract administration as well as services to assist the owner during the one-year warranty period.

CLOSEOUT CHECKLISTS

A particularly beneficial use of checklists is in project closeout. There are realities that make closing out projects more challenging. These include major team members moving on to the next project, expended fees, and the perception that closeout is difficult. However, closeout is typically contractually required, and its importance cannot be disregarded. If warranties, record drawings, and operations and maintenance manuals

TABLE 12.9 Glazed Curtain Wall Systems

	Name of Project Glazed Curtain Wall System Checklist
Project Number:	**Date:**
Prepared By:	**Updated:**
Action:	**Notes:**
	C SD DD CD
Glazed Curtain Wall System	
☐ Narrative addresses building envelope; state alternatives being explored (stick-built vs. unitized vs. structural)	
☐ Conceptual Design considerations: Profiles Building geometry Modules—mullion spacing Connection requirements Glass characteristics Views/spandrels	
☐ **Owner's Project Requirements** (OPR) Costs: Regulatory requirements—building code Fire-resistive requirements Structural Movement/deflection Sustainability Thermal performance Water penetration requirements Air/vapor infiltration Condensation control Acoustical performance Durability Glare/visibility Maintenance	
☐ Typical wall sections reviewed for compliance with rainwater control strategies	
☐ Visual mock-ups	
☐ **Basis of Design Documents** (BOD): conformance with **OPR**—document any differences and review with owner and commissioning authority Natural light compliance matrix Natural ventilation compliance matrix	
☐ **Technical Drawing Review Checklist** (This applies to some extent to the SD and CD documents, but we put this checklist in the DD section) Review profiles, vertical/horizontal mullion details Anchorage to building structure details Acoustical rated floor and demising wall details Balcony door details Spandrel/louver/metal panel details Intermittent stabilization pins and lanyards for window washing and building maintenance system Thermal insulation at spandrels Safing insulation and smoke seal at floor and roof edges	

(continued)

TABLE 12.9 ***(Continued)***

☐ **Technical Specification Checklist** (This relates to the OPR and BOD and has implications in every phase)
- Single firm engaged for undivided responsibility
- System description
- Movement—fabrication and field tolerances, thermal movement, story drift (wind and/or seismic), floor and live load deflection, concrete creep—joint movement capacities
- Thermal performance—condensation control
- Air infiltration—performance criteria, ASTM test
- Water leakage—static test/dynamic test
- Loads—wind tunnel tests/seismic design
- Structural criteria—structural design method
- Component design and performance—framing members, fasteners, weatherproofing, structural silicone, glass, operable windows, thermal breaks, louvers
- Preconstruction testing
- Performance mock-ups—preload/air infiltration and exfiltration/water infiltration under static pressure/water infiltration under dynamic pressure/structural tests
- Warranty requirements—defective materials and workmanship, special material warranties, finish warranties
- Material properties—steel, aluminum, glass, gaskets, anchors, fasteners, shims, weep hole fillers, sealants, thermal breaks, thermal insulation, safing insulation and smoke seals, acoustic insulation
- Tolerances
- Aluminum finish
- Field quality control—field water tests, adhesion tests of sealants, internal gutter tests

are not complete, correct, or in order, this can have a detrimental impact on facilities management and operations.

Determining that the contractor has provided all the required closeout documents required by the contract documents can be a challenging task. Once these checklists are compiled, the process of managing closeout becomes much easier.

CONCLUSION

Checklists have been an integral part of the Handbook and the architect's project delivery process for more than a century. Checklists should be part of an overall quality management process developed by an architectural firm with the intent of meeting the requirements of the services agreement. Checklists help meet the needs and expectations of the firm and client in delivering timely services within the fee. Quality management requires establishing prerequisite policy and objectives of the execution of services relative to the project, as well as determining the necessary processes, responsibilities, and the required resources to execute the objectives. Checklists are a tool that can articulate these standards and objectives for use in effectively delivering projects.

For More Information

The Checklist Manifesto: How to Get Things Right (Picador, 2011) by Atul Gawande.

"Schematic Design Quality Management Phase Checklist"; "Design Development Quality Management Phase Checklist"; and "Construction Documents Quality Management Phase Checklist" (AIA Best Practices, Chapter 14): www.aia.org/practicing/bestpractices/.

AIA Document D200™–1995, Project Checklist: http://www.aia.org/contractdocs/AIAS076750.

ASHRAE Guideline 0-2005: The Commissioning Process.

NIBS Guideline 3-2012: Building Enclosure Commissioning Process BECx.

12.4 Quality Management in Construction Procurement, Contract Administration, and Post-Construction

James B. Atkins, FAIA

Quality management is the process of maintaining, measuring, and improving the quality of your professional services. It requires 100 percent firm ownership and participation, it must be continuously applied to your services delivery process, and it is a way of thinking as much as it is a management activity.

QUALITY MANAGEMENT IN CONSTRUCTION PROCUREMENT

Importance of QM in Construction Procurement

The selection of the contractor generally marks the end of documents preparation and the beginning of design interpretation. All of the evaluation activities that are applied in construction procurement are predicated on how effectively and accurately the selected contractor will interpret, plan, price, and construct in accordance with the design intent expressed in the documents. Accordingly, the level of quality with which the procurement process is managed and executed can influence the level of quality that is ultimately realized in the completed project.

The ultimate success of the procurement process depends on well-prepared documents and the quality of the contractor selection process. To make an informed contractor selection, it is important that the procurement process be unbiased, well organized, and properly executed.

Quality is everyone's responsibility.

—W. Edward Deming

A good contractor can make you look good regardless of how bad your documents are, and a bad contractor can make you look bad regardless of how good [your documents] are.

—James B. Atkins, 1981

PART 3: PROJECT DELIVERY

Benefits of QM in Construction Procurement

A well-defined and efficiently organized and managed quality management program can improve and strengthen your construction procurement services, help manage your risks, and provide benefits for all team participants.

Owner

The construction procurement process is often the owner's first encounter with the tangible realities of the construction process. Up until this time building costs have been budget-based, and now the owner is faced with more realistic cost numbers that may turn out to be in excess of the original budget. A well-organized and executed procurement process can guide the owner through each step of the selection process and assist them in understanding how the costs are applied and how they measure against the selection process. Owners retain architects for their expertise and experience, and the construction procurement process should flow as smoothly as the design process, and with the same controlled and managed quality.

James B. Atkins provides project management and litigation support services. As a senior principal in an international design firm for over 30 years, he was responsible for construction phase services supporting the delivery of over $20 billion of construction.

Contractors

A well-organized and managed procurement process can give contractors a comfort level that the bidding and negotiation process is fair and equitable and that time spent preparing a bid will be worthwhile. Well-organized and complete documents, along with fair and open management of the pre-bid meeting and bid package variables, such as addenda, contingencies, and alternates, can generate interest and result in meaningful and populated bid lists.

Architect

▶ Bidding and Negotiation (10.8) provides an overview of the processes involved in contractor selection.

An effective in-house construction procurement program that is administered consistently not only provides meaningful assistance to the owner and results in the selection of a competent qualified contractor but can also meaningfully benefit the architect's services delivery. A well-defined QM program can assist and educate project managers, develop consistency and reliability in services, and help establish the reputation of the firm as one that is fair and in touch with the construction market.

Elements of QM in Construction Procurement

The elements of an effective internal QM construction procurement program should be designed to provide the following:

- Effective in-house procurement protocol
- Beneficial support resources
- Constant monitoring and documentation
- Feedback for program improvement

In-House Procedures: Procurement Resources

Procurement Procedures Manual

In-house procurement guidelines could be a comprehensive manual, as typical in large firms, or it may consist of only a checklist for the sole proprietor. The objective for all practitioners is the same—to provide consistent, quality services the same way on each project, and continually improve the quality of services over time.

AIA Support Documents

AIA Contract Administration, G612TM–2001, Owner's Instructions to the Architect, is a questionnaire intended to obtain information from the owner regarding the nature of the construction contract. The form is divided into three parts, and Part C deals with bidding procedures. Typically, Part C information is obtained as the construction documents are developed.

AIA Document G804TM–2001, Register of Bid Documents, serves as a log for bid documents while they are in the possession of contractors, subcontractors, and suppliers during the bidding process. The form allows tracking by bidder of documents issued, deposits received, and documents and deposits returned. It is particularly useful as a single point of reference when interested parties call for information during the bidding process.

AIA Document G806TM–2001, Project Parameters Worksheet, is an administrative form intended to help maintain a single standard list of project parameters, including project objectives, owner's program, project delivery method, legal parameters, and financial parameters. AIA Document G806TM–2001 is included in the AIA contract documents software.

Procurement Support Database

If information is retained on each contractor selection, the procurement database will grow more robust with time. If the collection of information is large, data can be separately categorized according to project delivery method, building type, or any category that is complementary to your firm's services. The database can contain industry publications, whitepapers, continuing education materials; anything that can educate, support, or assist in maintaining consistency in the selection process.

Perhaps the most valuable information may be your historical data on past project procurements, such as bid tabs, alternates, and contingencies. This information can prove useful in adjusting your internal protocols as more experience is gained. Be careful with information regarding contractor pricing and takeoff sheets, as such information is often proprietary.

Owner Issues

The owner is the key participant in the procurement process and will make the final decision on selection. It is important that the owner understand and participate in each step of the process. This can be facilitated by a task checklist, a schedule of required meetings, or any other management tool that will demonstrate and communicate the actions to be taken and decisions to be made.

A good way to begin is with the AIA administrative documents described above. The construction procurement process is seldom if ever burdened by overcommunication.

Data Retention and Feedback

The sophistication and scope of data retention may vary with firm size, but the purpose and objectives are the same. A sole practitioner may jot down a few notes when a project's procurement is completed and use it as a guide for the next projects, while a large firm may conduct a scheduled post-procurement review where actions and events are analyzed and discussed, and a large amount of data is sorted and retained in the resource file. Regardless of the amount of information retained or the sophistication of the format, it is important that this vital step be taken so that the process quality can be maintained and the procurement process improved over time.

Basic requirements for an effective post-procurement evaluation in a firm may include a meeting attended by firm management as well as all project team members. This meeting should be listed on the architect's design delivery schedule and is a critical evaluation of lessons learned, as well as an opportunity for formal recordkeeping and reporting.

QUALITY MANAGEMENT SUMMARY

Basic elements of an effective quality management program include:

- Championed and supported by top management
- Ownership and participation by everyone
- Clearly defined
- Simple and uncomplicated
- Consistently managed
- Applied systemically to services and work product
- Complementary to a firm's way of doing business
- Perpetually evaluated and measured
- Feedback distributed to entire firm
- Competitive and consistent with industry initiatives
- Strictly enforced

Although construction procurement may be the shortest phase of the architect's services with the smallest fee allocation, it is an important step in project delivery because the quality and expertise of the contractor will determine the ultimate quality of the completed work. It is a segment of a firm's QM program that should receive as much care and attention as any other effort.

QUALITY MANAGEMENT IN CONTRACT ADMINISTRATION

Since the construction phase relies heavily on the timely exchange of information, the key to quality management in CA is based on accuracy and efficiency. Well-defined construction phase procedures enable the CA and the team to provide timely and consistent quality services.

I hate vacations. If you can build buildings, why sit on the beach?

—Philip Johnson, FAIA

Importance of QM in CA

An architect's most useful tools are an eraser at the drafting board, and a wrecking bar at the site.

—Frank Lloyd Wright

An important objective in contract administration is to maintain design quality, and this can best be accomplished through an organized and well-executed CA program. The activities and processes that make up CA are essentially the same on all projects, and they can therefore be systematically managed through a QM process.

Another important objective in CA is to discover and correct discrepancies in the contract documents before the related work is constructed. The reality that the cost of change increases significantly after the work is in place has remained unchanged. Contract documents typically require the contractor to verify products, systems, and the assembly process in advance. Well-organized and well-managed CA services can be effective in monitoring and enforcing these required activities.

Managing these objectives equates to sound risk management, which is another important aspect of a quality CA program. When the CA process is consistently managed and improved over time, errors and omissions can be better controlled, and the risk of losing profits through inefficient service delivery can be minimized or avoided altogether.

Elements of QM in CA

Applications, Control, and Management

▶ Construction Phase Services (10.9) addresses the architect's role in evaluating the progress and quality of the work as well as its conformance to the design intent expressed in the contract documents.

Construction documents (CDs) are the vehicle with which design services are delivered during construction. The objective of CDs is to sufficiently describe the design concept so that the contractor can build the project in substantial conformance to the design. The more effectively CDs can deliver the design message to the contractor, the less traumatic and more successful the contract administration phase will be.

QM elements related to the construction documents during the construction phase include the following.

Document Access and Control

Strict control of access to the documents must be maintained in order to manage quality and minimize risk. This involves security passwords and protocols in-house, and control of document manipulation through using formats such as PDFs outside the office. Consultants must have controlled access to the documents for backgrounds and other necessary data, but strict control and management is necessary to keep the most current information available and accessible.

If the project is delivered using building information modeling (BIM), where a virtual information model is passed to the contractor and ultimately to the building owner, it is important that shared-access passwords and protocols be managed and controlled. If a BIM manager has been appointed, the QM program should include a structured BIM manager communications interface so that continuity can be maintained.

Document Management

Since the construction documents are continually subject to change as a result of scope changes and supplemental instructions by the architect until the final change order is approved, the architect when on site may need to access proposed change support documents to determine their impact to the work that is being observed. Real-time data access can be beneficial for maintaining control during construction, and computer tablets are proving useful for this purpose. Not only can tablets provide complete access to the project documents, but also problem-solving tasks such as web-conferencing, image capture and transmission, and even document changes and updates can also be done from any location.

Effective management of the documents includes posting protocols and document status reports. Outdated documents must be identified as easily as current files. Although the days of dragging a document tube through the airport may be gone, the convenience of storing the entire project set on a laptop, tablet, or other mobile device carries with it the increased danger of accessing the wrong file. On a small screen, proposed, current, and outdated documents can look very much alike. Accordingly, it is important that standardized file naming conventions are established. Some basic rules to follow for electronic file naming are:

- Use a succinct name to the extent possible.
- Avoid special characters.
- Avoid periods or spaces—use underscores instead.
- Include all required descriptive information.
- Include consistently formatted dates.
- Include at least two digits for version or phase numbers.

For example, since there are typically multiple projects in an office, the file name should begin with the project to distinguish it from other projects, followed by the contents, general to specific, followed by the date, YYYYMMDD.

For instance, a "leaning" project document created on August 12, 2011, could have this file name: leaning_twr_II\corres\contractor\20110812. In this example, the contents have been abbreviated as much as possible. "Contractor" is spelled out because "cont" could be confused with contracts. The title assumes multiple files under the project name, multiple files under correspondence, and date sorting by the year.

Project Procedures Manual

Since project conditions and requirements vary and no two projects are exactly the same, construction phase procedures must be clearly established based on contract requirements. Regardless of the size of the project or the size of the team, an effective project management tool is a project procedures manual that identifies and describes construction phase events and procedures.

The large firm and the sole practitioner alike must be able to administer each project based on the specific requirements of the owner-contractor agreement, the general conditions of the contract, and Division 1 in the specifications; and these can vary significantly from project to project.

For example, a sole practitioner has only two projects in the office. One project is a church where only AIA documents are being used, and the other is a project for a developer that has its own version of general conditions and Division 1 specifications. If the architect's work is essentially based on AIA documents, then he or she must be aware of the "atypical conditions" of the proprietary documents so that the project can be appropriately managed and delivered. A helpful tool is a list of atypical contract conditions filed with the contract to remind and assist with the differing services, as illustrated in the accompanying sidebar.

► See Owner-Generated Agreements (17.3) for a systematic approach to evaluating the terms in agreements provided by owners.

Meeting Control and Documentation

Activities such as scheduled project meetings and other project-related activities must be controlled either by conducting the meeting and generating the meeting minutes or by a timely rebuttal of meeting minutes by others with appropriate clarifications. It may take as much time to answer and clarify meeting minutes as it does to generate them.

Submittal Review

A labor-intensive activity during construction is submittal review. This is a very important part of the construction process because it is where it is determined whether the contractor's interpretation of the design is acceptable. The most effective management tool for submittals is a well-prepared submittal schedule, but enforcement of this schedule varies from project to project. It is advisable to start early and strictly enforce its use. If no schedule is provided, it may be difficult to control the labor demands required for submittal review.

ATYPICAL CONTRACT CONDITIONS LIST

Project Name: **Pantheon, Phase 16, Christian Church Conversion Piazza della Rotonda I 00186 Rome, Italy**
Project Number: XXXIV
Prepared: June 13, 607
Document: Owner-Architect Agreement dated February 7, 607
Owner: Pope Boniface IV
Contractor: Byzantine Contractors, LLC

TABLE 12.10

Reference	Requirement	Variation from B101
§ 3.6.1.1	Project construction governed by owner's proprietary general conditions (see gen. cond. atypical conditions list)	AIA A201, General Conditions of the Contract for Construction used
§ 3.6.4	Review submittals within no more than 10 working days	No set review time limitation
§ 4.3.3	Site visits minimum of once per week	Appropriate intervals as determined by architect
§ 4.4.10	Value analysis is included in basic services for no additional fee	Value analysis is an additional service
§ 4.1.16	Postoccupancy evaluation is included in basic services for no additional fee	Postoccupancy evaluation is an additional service
§ 5.10	Owner communicates directly with the contractor	Owner communicates through the architect
§ 7.2	Owner owns copyright of drawings and specifications	Architect and consultants own copyright of respective instruments of service
§ 9.7	Architect receives no profit if terminated	Architect receives reasonable profit if terminated

▶ For more information on RFIs as a metric of quality, see Origins and Development of Quality Management (12.1).

Request for Information (RFI) Responses

Another potentially time-consuming activity during construction is RFI responses. A contractor who has a weak work plan or who is intent on sending a high number of RFIs can greatly increase scheduled administrative time, while hastily answered RFIs are risky and can adversely affect CA services quality.

If contractor RFIs are numerous, or if the RFI quality is low, try to work with the contractor to reduce the number of RFIs by scheduling a review session. If frivolous RFIs are prevalent, it may be time to discuss an additional fee for the extra review time.

Owner Issues

A satisfied owner is perhaps the best risk management asset that one can have on a project, especially during the construction phase. Owners don't like surprises, and they like to keep up with the current work status. Accordingly, it is important to observe the work in accordance with the professional services agreement and report findings in a nicely prepared site observation report.

A few things to remember about quality owner services are:

- Perform all your contracted services.
- Be accessible.
- Document thoroughly.
- Check the owner satisfaction meter frequently.
- Always find an answer.
- Personalize project closeout.
- Leave a good impression.

The construction phase is often a stressful time for owners, because budgets don't always remain stable and surprises are most often disappointing. If a relationship with a trusted advisor can be established and the owner is appropriately updated and understands the project issues, then problems and surprises can be more easily mitigated, often leaving the owner with pleasant memories of an otherwise challenging time.

Retention and Feedback

As with any quality management program, improvement is possible when lessons learned along the way can be applied to the delivery process. It is important to keep track of lessons learned, but use caution in documenting potential claims to guard against the inadvertent creation of damaging documentation.

When a legal claim is brought, project files are surrendered for review; and critical or negative references in the documents to a nonperforming detail or suspect condition may be viewed as an admission of fault or evidence of wrongdoing. Documentation created in resolution should be objective and non-editorial. When these issues are passed along within the firm in the form of lessons learned, likewise they should be non-project-specific, for at this point it is the condition and not the project that matters.

Therefore, when keeping track of sensitive and potentially incriminating issues and events, record them generically. The overall objective is to retain enough information to adequately describe the issue or event and get it back into your process where it can do some good on the next project. As much as mistakes need to be recognized and acknowledged, a specific record of an error can provide incriminating documentation should a claim be made.

QM IN POST-CONSTRUCTION

The time immediately following the construction phase is filled with opportunity. For the owner it is a time of new ownership, new occupancy and facility familiarization and management. For the architect it is a time when issues are finalized, lessons learned are documented, and files are closed. It is the last opportunity for the architect to document the experience gained from a project, and effective quality management can efficiently and routinely provide this benefit with each completed project.

The physician can bury his mistakes, but the architect can only advise his client to plant vines.

—Frank Lloyd Wright

► Project Completion and Post-Construction Services (10.10) further discusses the final stage of construction contract administration and the opportunities to provide additional services to the owner.

Importance of QM in Post-Construction

QM in post-construction is important because it is the last opportunity to leave the owner with a good impression while still in frequent contact. During this time owners are often assessing the value of services received, and a last impression is usually the most memorable.

For developer clients, a good impression can result in being listed on the "preferred list" with future opportunities for work. As an owner becomes acclimated to the new building, a good impression may be tied to responding to an urgent need to correct the things that don't work, and to add things that are needed or missing.

Benefits of QM in Post-Construction

Post-construction can provide benefits for the architect as well as the owner. The owner usually has needs that arise from a new building with unanticipated demands, and the architect has the knowledge and resources to satisfy them. Although not always fee-producing, it is nonetheless an investment that can be fruitful later on. It is a time and an opportunity to pursue the following goals:

- Quality services that leave a good impression
- Intense personal assistance
- A more meaningful extended client relationship
- Consideration for future work

For the owner, an effective architect's QM program can assist in providing peace of mind as the challenges of a new project are resolved while the typical surprises and warranty issues are managed.

Elements of QM in Post-Construction

The elements of an effective internal QM post-construction program are the same as in construction procurement, and they should be designed to pursue the following objectives:

- Established in-house procurement protocol.
- Beneficial support resources.
- Constant monitoring and documentation.
- Feedback for program improvement.
- The need for required additional services can be discussed in a post-construction evaluation, or in its absence a meeting can be scheduled to review the closeout checklist and delivery of the contractor's obligated closeout documents. This can occur either before or after final completion, but some services such as commissioning must be planned well in advance of project completion, preferably at the start of design.

AVAILABLE POST-CONSTRUCTION ADDITIONAL SERVICES

- Conformed construction documents: documents that reflect all addenda adds or changes after initial document publication
- As-designed construction documents: documents that reflect the approved changes made during the construction phase
- As-constructed construction documents: documents that reflect the contractor's as-built conditions
- Postoccupancy evaluation: a review to measure how well a building meets the needs of the people who use it and identify ways to improve building performance and fitness for purpose
- Facility support services: can include energy audits and customized maintenance programs
- Tenant-related services: tenant build-out or existing tenant renovations
- Retro-commissioning: not to be confused with third-party team-led post-construction commissioning

Retention and Feedback

Data collected through a post-construction QM program is especially valuable because the construction phase has ended and the data is more complete. As a result, collections can benefit firm-wide QM initiatives so that each phase of services can benefit from how well they performed in delivering the completed project.

For example, a review of contractor RFIs can reveal how well the documents conveyed the design concept to the contractor. Details that required revision, products that were not available or were too costly, and building components that required additional details can be beneficial to CAD technicians and specifications writers when they work on their next project. AIA Document G809, Project Abstract, can be used to collect data for marketing purposes and internal project information data files.

Data retention and feedback initiatives can be effectively administered by checklists, as essentially the same information is collected on all projects. The information can be communicated back to firm members through project review meetings, technical bulletins, seminars, CAD detail libraries, and any other internal communications format.

▶ Checklists (12.3) discusses the function of checklists as important quality management tools.

CONCLUSION

It is natural for architects to strive for improvements in services, but measurable systemic quality improvement will require a directed effort. A sound quality management program requires careful and diligent planning, organization and execution. A structured and well-managed QM program, if properly designed and implemented, can increase the efficiency and effectiveness of all services in the architect's project delivery process.

For More Information

RIBA Quality Management Toolkit (Royal Institute of British Architects, updated September 10, 2012): www.architecture.com.

"Quality Control: A Working Drawings Preparation Checklist" (chapter 11); "Quality Control: A Specifications Preparation Checklist" (chapter 11); and "Quality Control: Managing the Top 5 Risks" (chapter 14), AIA Best Practices: www.aia.org/practicing/bestpractices.

Total Quality Project Management for the Design Firm: How to Improve Quality, Increase Sales, and Reduce Costs (Wiley, 1994) by Frank A. Stasiowski, AIA, and David Burstein, PE.

Managing Quality in Architecture (Elsevier-Architectural Press, 2006) by Charles Nelson.

AIA Document D200™–1995, Project Checklist: http://www.aia.org/contractdocs/AIAS076750.

BACKGROUNDER

THE ONE-YEAR WALK-THROUGH

Micheal J. Lough, AIA

Architects and their clients can benefit from a walk-through of the facility prior to one year from the date of substantial completion, and a subsequent meeting to review the facility operations and performance.

Micheal J. Lough is principal of Integral Consulting, which strives to achieve certainty in building technologies and the way buildings work. He is an Advisory Board member of the AIA Technical Design for Building Performance Knowledge Community.

Architects and contractors would do well to follow up with their projects to see how the completed facilities are fulfilling the requirements, what is working as intended, and what could be better. Without feedback, the architect will not know if the decisions made, from space planning to the selection of door hardware, are yielding the intended results.

The AIA Standard Form of Agreement Between Owner and Architect, AIA Document B101™–2007, paragraph 3.6.6.5, states that, if requested by the owner, "the Architect shall, without additional compensation, conduct a meeting with the Owner to review the facility operations and performance." This meeting is to be held prior to the expiration of one year from the date of substantial completion. Projects that pursue LEED Enhanced Commissioning credits and/or otherwise comply with ASHRAE Guideline 0-2005, The Commissioning Process, are required to review building operations prior to one year after substantial completion. This review requires verification of owner's project requirements. Commissioning is also expanding in its scope, trending toward total building commissioning, and is no longer limited to mechanical systems.

Whether or not total commissioning in undertaken, the owner, contractor, architect, facilities management team, and potentially others would benefit from a one-year walk-through of the facility. The purpose of this walk-through is that all participants can voice their impressions of how the facility is meeting the owner's project requirements, and each participant gains insights from the other participants. Goals of a one-year walk-through can include the following:

- Assess programmatic and general design planning of the facility.
- Verify building performance aspects of owner's project requirements.
- Address any warranty issues.
- Review facility maintenance and operations.
- Review any defects or deterioration of systems or finishes.
- Review any recurring maintenance call-back issues.
- Attempt to ascertain user perceptions of the facility.

PROCEDURES/REPORTING

Ideally there should be participation or support by representatives of the architect, other members of the design team, the contractor, owner, facility manager, building engineer, and users. If the project included total project commissioning, the commissioning authority should participate. At minimum, the architect or commissioning authority should conduct the walk-through with the building engineer.

The walk-through, meetings with facility staff, and reporting should address the following:

- Functionality of primary user program spaces—office spaces, classrooms, residential units, hospital beds
- Functionality of supporting and auxiliary program spaces—lobbies, amenities, meeting rooms, etc.
- Regulatory requirements—building code, accessibility
- Site elements—landscaping, hardscape, parking
- Finish durability and performance
- Exterior wall performance—rainwater penetration, condensation, weathering, defects
- Window washing/exterior wall maintenance system
- Roof and waterproof areas—any leaking failures, ponding, drainage issues, equipment access, review of penetrations and flashing
- HVAC equipment, mechanical equipment rooms—performance and operations of systems, maintenance schedules, equipment access, acoustical isolation

(continued)

PART 3: PROJECT DELIVERY

- Plumbing equipment, fixtures—performance and operations, maintenance schedules, fixture finish
- Electrical and low-voltage equipment, including light fixtures and devices—performance and operations, maintenance schedules, finishes
- Fire protection and fire alarm systems—fire pump room, sprinkler risers, annunciator
- Loading, trash, trash chute equipment, and similar back-of-house spaces
- Warranty or potential issues
- Maintenance schedules and logs for all systems
- Construction defects and nonconforming work
- Durability of materials and finishes

FORM OF REPORT DOCUMENT

The report should be an organized document, which serves as a tool and checklist allowing action items to be tracked. The report should be prepared by the architect and/or commissioning authority and include the following elements:

- An index and listing of attachments.
- A brief description of the facility.
- An executive summary.
- Review process/contacts—a summary of how the walk-through was conducted and list of the participating parties.
- A summary of the facility staff, their roles, and the roles of third-party vendors.
- Report on compliance with LEED and/or commissioning requirements.
- A summary of routine, regular, and on-call maintenance programs.
- An organized summary of the observations made which can be by types of spaces (mechanical rooms, function spaces by floor, roof areas, site elements, etc.). This could take a tabular form, including photos, descriptions, and space for remarks to track the follow-up.
- Attachments, including maintenance and repair logs, warranty call-backs, inspection reports, and related documents

FOLLOW-UP/LESSONS LEARNED

Once the report has been prepared and distributed, a set of action items should follow, including:

- Contractor addressing warranty items if within one-year warranty.
- Address any project deficiencies or repair items that may not be warranty items.
- Contractor to address any deficiencies in the record drawings, operations & maintenance manuals, or other close-out materials provided at substantial completion.
- Address any additional training requirements.
- User may opt to make suggested upgrades to improve the facility.
- Conduct a lessons-learned workshop for participants.
- Utilize this opportunity to connect or reconnect project team members and facility team members.

CHAPTER 13

Building Codes, Standards, and Regulations

13.1 Building Codes and Standards

David S. Collins, FAIA

To provide for the public welfare, government at all levels establishes and enforces building codes and regulations. The design of buildings must comply with applicable codes and regulations unless variances or alternative solutions are allowed.

As part of the police powers granted to the states by the U.S. Constitution, each jurisdiction has the legal option to establish minimum standards for safety and health in that community. States either take the authority or permit local communities to take responsibility for the adoption and enforcement of codes, and for years a variety of codes were used around the country. Today, the United States is close to having a single set of adopted codes.

As with many laws, communities have the opportunity to create their own codes or to choose a model code. Generally, a package of model codes provides guidance for communities seeking to comprehensively address how the design and construction of buildings and other facilities affect the health and safety of occupants. Model codes and

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standards are based on the broadest thinking about how an acceptable level of safety can be achieved and how regulations should be applied. However, in adopting model codes, a community must understand what is expected in administering the codes.

Architects, engineers, designers, and contractors in many communities are part of the effort to regulate construction by establishing minimum levels of performance and practice. The National Council of Architectural Registration Boards (NCARB) includes several items associated with building code compliance in the Architect Registration Examination. State laws often include criteria for licensure such as preparing construction documents that conform to local law.

Many states use these types of requirements to reinforce the need for architects to be aware that local laws and regulations are an integral part of building design. In the first decade of the twenty-first century, the process of maintaining a library of regulations and standards has become increasingly difficult, as the number of regulations—not to mention their complexity—increases each year. This volume is magnified by the continuous evolution of codes and standards, many of which are expanded and/or modified on a three-year cycle.

▶ The backgrounder Mandatory Continuing Education (3.1) further discusses the education requirements of licensing jurisdictions.

Today registration boards are adding minimum continuing education in the area of health, safety, and welfare (HSW) as a requirement of licensure renewal. AIA also requires minimum continuing education in courses identified as HSW for membership renewal.

HISTORY OF U.S. CODE DOCUMENTS

Development of modern building codes began around the turn of the twentieth century, and model codes began to appear soon thereafter. The rise of industrial cities in the United States brought many people to urban areas, resulting in the construction of housing in close proximity to industries. Responding to the hazards that could result from this juxtaposition, communities and insurance companies began writing building codes. Later, communities began sharing their knowledge and understanding of construction regulations and created regional codes.

Standards for building systems began to undergo significant changes in tandem with the development of building codes. The National Fire Protection Association (NFPA) traces the beginnings of NFPA 13, Standard for Installation of Sprinkler Systems, to 1895, when a group of insurers and sprinkler system installers began the process of systematizing the installation of these systems.

Organizations focusing on the development of standards typically include industry interests that are close to, and have financial interests in, the materials or systems controlled by the standard. As part of their participation, these industry representatives vote for criteria to encourage appropriate use of those materials or systems. Most model building codes, on the other hand, were developed with input from industry interests, although those representing such interests are not allowed to vote on provisions included in the codes. Limiting industry involvement is intended to prevent undue influence on the codes from those with a financial interest in them.

Prior to 1994, model building codes were published in the United States by the Building Officials and Code Administrators International (BOCA), Southern Building Code Congress International (SBCCI), and the International Conference of Building Officials (ICBO). These organizations generated parallel documents, and each endorsed a "common code format" that allowed users of the codes who worked in multiple jurisdictions to easily find criteria on the same subject in the same part of the three codes. The common format also facilitated comparisons and identification of commonalities and differences in the text of the three documents.

In 1975 the AIA Codes and Standards Committee published a white paper titled "One Code: A Program of Regulatory Reform for the United States." This document was the impetus for the consolidation of the three model codes (see Table 13.1); and in 1994, BOCA, SBCCI, and ICBO officially joined together to create the International Code Council (ICC), which began drafting and producing the International family of building codes. In 1995 the new code family began with the first edition of the mechanical and plumbing codes. The 2000 edition of the *International Building Code* was the first publication to include all of the major ICC codes.

The International Code Council (ICC) publishes the only family of model building codes used in the United States, as of 2012. The complete package of codes published by the ICC includes the following:

- International Building Code (IBC)
- International Residential Code for One- and Two-Family Dwellings (IRC)
- International Mechanical Code (IMC)
- International Plumbing Code (IPC)
- International Fire Code (IFC)
- International Fuel Gas Code (IFGC)
- International Energy Conservation Code (IECC)
- International Existing Building Code (IEBC)
- International Private Sewage Disposal Code (IPSC)
- International Wildland-Urban Interface Code (IWUIC)
- ICC Performance Code for Buildings and Facilities (ICCPC)
- International Property Maintenance Code (IPMC)
- International Zoning Code (IZC)
- ICC Electrical Code Administrative Provisions (IEC)
- International Green Construction Code (IgCC)

These ICC codes, along with the NFPA National Electrical Code, provide a complete bookshelf of codes appropriate for adoption and enforcement in communities throughout the United States.

In 1999 the National Fire Protection Association announced its intent to develop a model building code despite objections from many groups in the construction industry. Although the NFPA has long published several documents, including codes and standards, none included limitations on structural loads and materials specifications. The NFPA product closest to a building code was NFPA 101, Life Safety Code, and NFPA chose that document as a model for its development of NFPA 5000, Building Construction and Safety Code™. NFPA 5000 was published in 2003 and has since undergone revision cycles every three years.

The IBC has become the single model building code adopted in the United States, but no state has adopted the NFPA building code. However, virtually all of the ICC codes reference NFPA standards, such as NFPA 13 for sprinkler systems, as well as the National Electrical Code, which is used internationally as the standard for design and installation of electrical equipment.

Most government agencies also use the IBC on projects that use government funding. There are also federal requirements for building code construction affecting most privately and publicly owned buildings and facilities. A prime example is the Americans with Disabilities Act. Federal legislation established that rules were to be created to afford access to buildings by the disabled, and granted to the U.S. Access Board the authority to write guidelines, and to the Department of Justice (DOJ) the authority to adopt and enforce them.

The Department of Justice adopted the 2004 guidelines issued by the Access Board. Careful analysis of the

▶ See the backgrounder accompanying this article, The International Building Code, for more detailed information on the IBC.

▶ The backgrounder accompanying this article, The International Residential Code, covers the codes that can be used to design and detail one- and two-family homes.

▶ See the backgrounder Energy Codes, accompanying this article, for an introduction to the energy conservation codes.

▶ The International Green Construction Code, a backgrounder accompanying this article, has more detail on codes relating to sustainable design.

TABLE 13.1 AIA Policy on Building Codes

Policy Statement	Regulation of the construction industry shapes the built environment. As stakeholders, architects must participate in the development and application of appropriate regulations and standards.
Supporting Position Statements	**22. Building Codes and Standards** The AIA supports regulation by a single set of comprehensive, coordinated, and contemporary codes and standards, which establish sound threshold values of health, safety, and the protection of the public welfare throughout the United States. To that end, the AIA espouses the development and adoption of model building codes that: • Include participation by architects and the public in a consensus process • Are the product of informed education and research • Are without favoritism or bias to any special interest • Include provision for a prompt appeals procedure for all that might be aggrieved • Are cost effective in relation to public benefit • Promote building code provisions that set performance rather than prescriptive criteria **23. Building Permits** The AIA supports governmental policies, regulatory procedures, and administration that eliminate unnecessary time delays in the construction permitting process.

rules by DOJ is necessary, as they do modify the Access Board's guidelines. New rules became effective March 15, 2012.

▶ It is incumbent upon architects to know and understand the breadth of regulations that apply to their projects.

The ICC and NFPA have taken different approaches to building accessibility. The ICC tries to mainstream accessible features into the general requirements of the IBC. The NFPA, on the other hand, has simply incorporated the "ADA and ABA Accessibility Guidelines for Buildings and Facilities, 2007," and "ICC/ANSI A117.1, Standard on Accessible and Usable Buildings and Facilities, 2009."

The Access Board guidelines and A117.1 are prime examples of specification requirements. The family of ICC codes and NFPA 5000 and NFPA 101 include both specification-oriented (minimum requirements and maximum limitations) and performance options. Generally, the specification-oriented codes provide a direct response to the majority of design issues and safety concerns. However, both code groups are aware that despite efforts to be comprehensive in their documents, issues may arise that are not currently addressed or that are so far from the scope of a typical building that they require a different approach to determine what is appropriate for life safety. The performance options within the codes are intended to provide guidelines for designers and their clients looking for a means to resolve a particular problem.

While sections of NFPA 5000 are titled "performance," they actually provide very specific limits for what is to be done in the process. For example, Section 5.3 is titled "retained prescriptive requirements" and covers means of egress and all prescriptive requirements for fire protection systems and features. The ICC Performance Code provides a format for how to take a project through the performance code and indicates what considerations must be followed, but it does not establish any specific prescriptive limits. The ICC's prescriptive codes serve as the measuring stick for the performance of a design, but they do not establish absolute limits for performance. Performance code provisions were developed to allow innovative solutions that do not fall within the typical design. The fact that the performance approach has been formalized is recognition that the codes are not able to anticipate every circumstance and every possible solution.

Choosing whether to use a prescriptive code or a performance code is a decision that must be made carefully and with the input of the client. In particular, the code choice must be supported by the authorities having jurisdiction (AHJs) that will approve the project. This may mean officials representing virtually every enforcement agency within a community who will regulate the project. According to the ICC documents, this group at least includes building and fire enforcement officials.

IBC AND IFC CODE FUNDAMENTALS

A common thread in both ICC and NFPA documents is the true integration of the building and fire codes and the standards they reference. In previous codes, the approach to code enforcement was often insulated by the document in which the requirements were located. In current codes, the fire and building requirements are totally integrated, so the full understanding of what is required can only be ascertained by going to multiple documents. Reference to at least the building and fire codes is necessary to find minimum design requirements, and most often several additional referenced documents (e.g., mechanical and plumbing codes) must be checked to grasp the full impact of the codes on a given building design.

The architect, in conjunction with the client, typically makes the initial decision on occupancy or construction type appropriate for a project, while code officials (AHJs) analyze documents presented for their review. Thus, the following overview of code fundamentals, based on the 2012 edition of the International Building Code, approaches code analysis from the designer's perspective.

To determine the minimum type of construction needed to meet the code, several pieces of information are required. These include the use for the space (occupancy), the combined need for space (height and area), and, because of its occupancy classification, whether the building requires a sprinkler system (fire protection). The code also contains requirements for means of egress with respect to travel distances, paths of travel, and the design of stairs, corridors, and exit doors.

Occupancy

Every structure must be classified in a specific occupancy type, and some buildings will require more than one occupancy classification. For example, a conference room or cafeteria within a business facility may be designated as an "assembly" occupancy, depending upon the size. Small uses may be classified as accessory or incidental to the main use. In the same type of structure, some supply and storage areas may be appropriately classified as "storage" use occupancies. The IBC requires identification of all the different occupancies in a space or building as part of the design process.

Because the IBC is structured to address the characteristics of the activities in a building, it is critical to understand the various occupancy categories in the code and how to distinguish among them. The categories are as follows:

- Assembly: Groups A-1, A-2, A-3, A-4, and A-5
- Business: Group B
- Educational: Group E
- Factory and Industrial: Groups F-1 and F-2
- High Hazard: Groups H-1, H-2, H-3, H-4, and H-5
- Institutional: Groups I-1, I-2, I-3, and I-4
- Mercantile: Group M
- Residential: Groups R-1, R-2, R-3, and R-4
- Storage: Groups S-1 and S-2
- Utility and Miscellaneous: Group U

Note that several of the categories are divided into subgroups to more clearly differentiate among them. For example, the "assembly" occupancy is subdivided into five different subgroups. Traditional stage theaters and motion picture theaters are classified as A-1, while an outdoor athletic stadium is classified as A-5. Although these facilities share the purpose of accommodating large groups of people watching a common demonstration, they are divided into subgroups because their needs are sufficiently different to require different approaches in a code.

NFPA 5000 has similar occupancy classifications, which are described in Chapter 6 of that code. The differences between the occupancy classifications in the IBC and NFPA 5000 are significant in some details associated with how specific conditions are to be addressed, but the major categories remain the same.

Fire Protection

Chapter 9 of both the IBC and the IFC includes limits, or thresholds, for the size and type of building that must have a sprinkler system. These limits are based on the building size or the area of an occupancy (fire area) that is enclosed by exterior walls, firewalls, or fire barriers. If the threshold for fire suppression for an occupancy classification is based on the building area, a fire area would not be part of the consideration for fire suppression. If the threshold is limited to the area of the occupancy, then the building can be subdivided into fire areas that are less than the specified threshold and not be required to have a sprinkler system.

A fire area is defined by the encompassing walls, roof, and floor that are either exterior walls, fire walls, or fire barriers. Any floor area within such enclosure is part of the fire area. For example, if a building is of Type IIB (2-B) construction, the floors have zero fire resistance. If the building were three floors, all three floors would be added into the calculation of the fire area.

The ICC codes require one- and two-family dwellings to have residential sprinklers. All hospitals, nursing homes, and other institutional occupancies, as well as hotels, motels, apartments, and townhouses, are required to be protected with an automatic sprinkler system under all circumstances. Each of the other occupancies included in the IBC has a threshold after which sprinklers are mandatory; these figures are based on the size of the building, the area of the occupancy, or the number of persons the space accommodates.

Two additional conditions, which do not depend on the building occupancy classification, determine whether a structure must have a sprinkler system. Floors with no openings (the IBC sets up minimum size and spacing for openings), as well as any building with an occupied floor more than 55 feet above the lowest level that fire apparatus responding to the building can reach, must have a sprinkler system, no matter what the occupancy classification.

In NFPA 5000, thresholds for fire suppression are established in the occupancy chapter criteria. For example, an "assembly" occupancy classification in the IBC is required to have fire suppression when the occupant load exceeds 300 or the threshold of a specific occupancy area.

The same 300-occupant threshold is found in NFPA 5000. Additional fire protection thresholds for installation of automatic detection and alarm notification devices are also part of the IBC and NFPA 5000. Requirements for smoke detectors in dwelling units, the installation of pull boxes, and the sound level of fire alarms are also repeated in each code.

Height and Area

The means for determining limits on height and area for a building are tied to several factors. Particularly critical are building occupancies and whether the building will be fully protected with sprinklers. Once the building height has been estimated and a concept for the layout of the floors and the location of the building on the site has been determined, the architect can easily determine the minimum type of construction for the project.

Table 503 of the IBC prescribes the base area for calculating the maximum area of a building. The IBC limits the total area of the building to one times the allowable area for a one-story building, two times for a two-story building, and three times the allowable area calculated from this formula for any building with three or more stories above grade. The formula for determining the maximum area of a building per the IBC is as follows:

$$A_t \geq \left[\frac{A}{(1 + I_f + I_s) \times n}\right]$$

where:
A is the actual total area of the building
n is the number of stories ($n \leq 3$)
A_t is the base area in Table 503
I_f is the increase permitted for frontage
I_s is the increase for fire suppression

Although architects may begin designing a building without knowing what construction type is required, they will have a good idea of what the building configuration will be based on the program, the site and its limits, and site factors such as development and zoning requirements, drainage retention, utility easements, and so on. Given that information, a designer would be able to use the formula to solve the problem in reverse, with the actual area being known and the minimum type of construction being calculated. For example, if the program for an office building calls for 300,000 square feet of office space and supporting areas, the formula can be used to solve for the area required for the construction type.

As long as the type of construction in Table 503 has a larger area than that required for A_t, the building would be permitted for that occupancy. For example, assume a three-story office building without a sprinkler system, and frontage around the building providing the minimum separation allowed to consider the building 100 percent open. The area permitted by Table 503 (A_t) would be determined by dividing the actual area (300,000 square feet) by the number of stories, and the frontage increase would be 75 percent. Thus, the formula would be:

$$A_t = \left[\frac{100{,}000}{1 + 0.75 + 0}\right] = 57{,}143$$

It is then a simple matter to go to Table 503 and determine that the type of construction would have to be either Type IA or IB. However, if it was determined that installation of a sprinkler system was appropriate, the calculation would change to include the 200 percent factor and the formula would be:

$$A_t = \left[\frac{100{,}000}{1 + 0.75 + 2}\right] = 26{,}600$$

The difference between the results of the two calculations indicates the effect the presence of a sprinkler system has on the construction type. The 57,143 square feet of the original required tabular area would limit the building to Type IA or IB, which is a rather unusual construction type for a low-rise business; with sprinklers, however, Type IIA or IIIA would be permitted.

Note that this example uses a building with a single occupancy (business) with accessory areas of other occupancies (assembly or storage) typically found in office buildings. A mixed-use building (one with more than one principal occupancy) would require further analysis.

Additional considerations that affect the determination of construction type are requirements for fire alarms, standpipes, and means of egress. Thresholds for the installation of fire alarms are based on the use of sprinklers in the building and on the occupancy. For example, the office building just discussed would require a fire alarm if there were 100 occupants above the lowest level of exit discharge. With a total area per floor of 100,000 square feet, the occupant load would exceed 100 (100,000 SF ÷ 100 SF/occupant = 1,000 occupants). However, if the building has a sprinkler system and the alarm is activated by sprinkler flow, the manual pull boxes that would otherwise be a part of an alarm system are not required.

Means of Egress

Exiting, or the means of egress, is one of the major code criteria that directly affect all building designs. Limitations are established in the code for how far a person must travel to reach an exit within a given space in a particular occupancy. These limitations include the distance when only a single path to an exit is available (common path of travel), dead-end corridor distances, and the total distance from any occupied location within the building to the exit or stairway or exit enclosure (exit access travel distance).

The allowed distance for each of these limitations is based on the specific occupancy the means of egress is serving. The common path of travel is the initial concern for any space or layout of spaces within a building. This distance is based on the risk of not being able to access an area. The typical distance limit is 75 feet before occupants must be able to access a second route. In a suite of rooms that all discharge through a common lobby or corridor, this would apply to every space within the suite.

For example, a dead-end corridor in the area of a hospital where patients are sleeping is limited to 20 feet of travel in a direction where there is no exit. In the same building, but in areas where administrative offices are located, the dead-end corridor is limited to 50 feet of travel, assuming the entire building is protected by a sprinkler system. This difference in the dead-end limits reflects the difference in hazard to the occupants. The difference is calculated by comparing the potential response times of patients who are asleep or somehow incapacitated and people in an office area who presumably are awake and alert to an emergency.

The required overall travel distance will prescribe the location of the exits from a floor or the building. The typical distance to an exit for most occupancy classifications is 250 feet, which means that from any given point the distance to any exit cannot exceed that distance. Discounting any distance that would be required to travel to a central exit corridor, the exits would have to be located no more than 500 feet apart. However, the reality is that occupants would have to travel an additional distance from within a space to any such central corridor. Thus, the actual distance between the exits would have to be shorter than the optimum distance.

THE RELATIONSHIP BETWEEN STANDARDS AND CODES

Model building codes have always incorporated standards, and within the construction industry different types of standards serve various purposes in relation to how a building is designed. (See Figure 13.1.) Some standards regulate specific types of systems or processes. Some provide methods for testing a product in a particular application. Standards for a particular product or material include criteria as a minimum level of quality. Typically, standards are expected to parallel the building or fire code that references them and to be written in language that can easily be incorporated as an enforceable part of a code. Standards that are simply advisory, which are not written in mandatory language, are not included in model building codes.

Most NFPA standards are regulatory, the classic example being NFPA 13 for sprinklers. This standard explains the means and methods necessary to design and install a sprinkler system in a building. Its requirements are based on an industry-wide understanding of the level of hazard in various occupancies and the means needed to actively prevent the spread of a fire. NFPA 13 is considered a consensus standard because there is broad representation of interests on the committee that reviews it and votes on revisions to its content. The group reaches consensus by balancing conflicting interests.

Standards for testing such as those promulgated by ASTM International or Underwriters Laboratories are used to describe ways in which a material or an assembly of materials can be tested to determine a relative level of performance. ASTM E119, for example, is the fire test for floors and walls that is used to determine their ability to limit the spread of fire. The test prescribes the methods for construction of the test sample, the process of exposing it to the "standard time-temperature curve," and the levels of performance and how they are to be measured and reported. The classic measurement for a wall or floor assembly being tested using ASTM E119 is the length of time an assembly will remain in place before smoke or hot gases on the unexposed side will ignite cotton waste when exposed to these gases. The time duration is reported in hours, although the performance of an assembly in an actual fire is likely to be different from the text in the listing. The curves for various "standard fires" rise in temperature very quickly. The ASTM E119 test goes up to almost 800°C in less than 30 minutes. At that point, a fire no longer increases at the same rate, although it does continue to increase in intensity until the test has been completed. A real fire may grow as rapidly as shown on these curves and may become even higher in intensity if the materials support rapid rates of combustion. However, a real fire typically dies down after the initial growth. This decrease is caused by either exhaustion of fuel or insufficient oxygen to feed the fire.

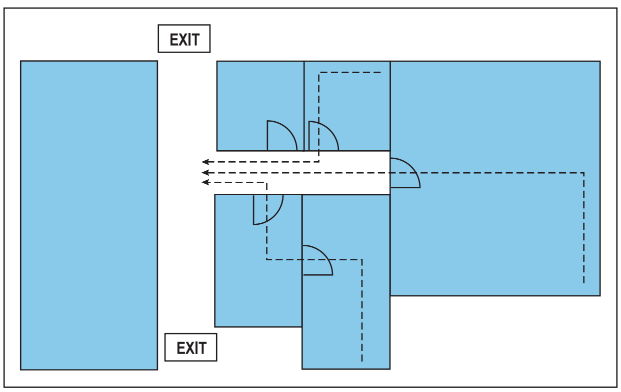


FIGURE 13.1 **Travel Distance to Exits**

The purpose of standards like ASTM E119 is to establish a constant level of performance against which all tested materials can be measured. The use of the "hourly" rating is unfortunate because, as people become familiar with these ratings, the measurements become part of the lexicon of construction and an expected measure of the performance in a real fire.

There are industry standards for the production of various materials that are similar to NFPA standards and are developed using ASTM procedures. Wood, steel, concrete, and similar building products are brought to the marketplace under conventions developed using these types of standards. The American Lumber Standard for wood, ACI 318 for concrete, and AISC 360 for steel are the standards for these major building materials; they are used in combination with building codes and various engineering standards such as ASCE 7, Minimum Design Loads for Buildings and Other Structures, for the design of structures using these particular materials.

When a standard is not developed so it can be used to regulate or enforce a minimum or dictate a means and method for construction, it is considered to be advisory. Such standards may be useful to a designer dealing with a special application, but they are not required and often are not written in a way that allows their use as law.

Performance Codes

The ICC family of codes includes a performance code that offers an option to the standard specification codes that have been used for years. This code is designed to address special needs for a limited number of projects that do not fit within the norm of a typical construction and may require a level of design, investigation, and controls beyond the scope of current model codes. The concept behind a performance code is to support development of unique solutions with the acceptance of the entire project team, which could include as many players as the owner, designer, developer, and contractor, as well as building, fire, and local regulators and development officials, bankers, and so on.

This team sets the goals and objectives for the project within the parameters established in accordance with the performance code. The parameters for a particular project are determined based on the potential risk associated with the activities and an assessment of the needs of the owner and the community in which the facility will be constructed. By encouraging evaluation of risk and the effect the facility will have on identified risks, the performance code permits alternative methods for compliance.

Often, special testing or modeling tools to analyze specific risks are needed to more accurately define project parameters. For example, computer models can be used to determine egress times based on occupancy conditions. Similarly, there are models for determining how smoke would develop within a space given a specific type of fire. The type of fire is based on detailed analysis of the fire loading likely to be found in the space and includes consideration of factors such as the natural and mechanical ventilation available. By combining these two models, the time associated with evacuation of a given occupancy and the time associated with loss of a tenable environment can be compared and the risks evaluated.

The ICC codes include the risk of tenability for a typical environment, but often have been caught short of addressing special conditions. For instance, at one time, the IBC did not have specific criteria for a covered mall building; the use of a performance code would have been appropriate in that circumstance. In addition, the performance codes are designed to facilitate solutions beyond those prescribed by the model codes. Typically, the codes are written as specifications and use performance options to achieve specified goals. Performance codes do not specify goals, but allow stakeholders to establish the methods and means to achieve the desired level of safety.

Evaluating risk and probable effect is key to developing appropriate performance solutions, as is being able to identify an appropriate means of testing and justifying the solutions. Often, technical specialists will be added to the design team to bring needed resources to bear on the subject.

Testing and Verification

The National Institute for Standards and Technology has developed many computer software programs for evaluating building performance. Such programs are useful for determining design methods that may fall out of the standard specification for compliance. Following is a list of such programs:

- ALOFT-FT™—A Large Outdoor Fire-Plume Trajectory Model—Flat Terrain
- ASCOS—Analysis of Smoke Control Systems
- ASET-B—Available Safe Egress Time-Basic
- ASMET—Atria Smoke Management Engineering Tools
- BREAK1—Berkeley Algorithm for Breaking Window Glass in a Compartment
- Fire CCFM—Consolidated Compartment Fire Model version VENTS
- CFAST—Consolidated Fire and Smoke Transport Model
- DETACT-QS—Detector Actuation—Quasi Steady
- DETACT-T2—Detector Actuation—Time Squared
- ELVAC—Elevator Evacuation
- FASTLite—A collection of procedures that builds on the core routines of FIREFORM and the computer model CFAST to provide engineering calculations of various fire phenomena
- FIRDEMND—Handheld Hosestream Suppression Model
- FIRST—FIRe Simulation Technique
- FPETool—Fire Protection Engineering Tools (equations and fire simulation scenarios)
- JET—A model for the prediction of detector activation and gas temperature in the presence of a smoke layer
- LAVENT—Response of sprinkler links in compartment fires with curtains and ceiling vents
- NIST Fire Dynamics Simulator and Smokeview—The Fire Dynamics Simulator predicts smoke and/or airflow movement caused by fire, wind, ventilation systems, etc.; Smokeview visualizes the predictions generated by NIST FDS

These programs are free and are available at the NIST website at www.bfrl.nist.gov/info/software.html. Used alone, they cannot ensure that the designed level of performance will be acceptable, but the information will provide additional guidance for designs that do not fall within the specifications in the codes. Additional sources of information for performance designs are included in the reference sections of the performance codes.

Practice Issues

As a fundamental part of any design, building codes form an important framework for developing a program to achieve the owner's objectives. Consideration of the code criteria for a particular occupancy is critical to preliminary design decisions that will affect the health, safety, and welfare of building occupants.

Checklists

For many years, model code groups produced code checklists intended to aid in the determination of code compliance. Although these were relatively useful tools for reviewing plans from an AHJ plan examiner's point of view, they did not provide enough information for those making design decisions.

Local Adoption of Current Codes

Building codes adopted by the vast majority of jurisdictions in the United States are now based on the ICC family of codes. While many communities make changes to portions of the building code they have adopted for local political or geographic reasons, the use of a single national code appears to be the way of the future. A list of jurisdictions and the codes they have adopted can be obtained from either the National Conference of States on Building Codes and Standards (NCSBCS) or the ICC. Both organizations publish lists of communities and the codes that have been adopted. NCSBCS information is available only to members, but the ICC lists are available to anyone on the ICC webpage.

Each of the ICC model codes includes basic directions on how to use them in the form of a sample ordinance for adoption. The ICC identifies sections that must be modified because of local conditions in the sample ordinance. However, most states that adopt the model codes delete the requirements in Chapter 1 and replace them with their own legislatively mandated administrative criteria. This can work well if careful consideration is given to the requirements in Chapter 1 of each code during the adoption process. If care is not taken, however, some unfortunate conflicts can be created either between different codes or between various code enforcing agencies within a jurisdiction.

One of the most important features of the new ICC codes is the level of coordination among them. These codes are meant to be used together to comprehensively address the various elements of construction that affect life safety, health, and welfare. Without appropriate integration of the code enforcement package these codes provide, a community may miss some important features.

For example, as parallel documents, the IBC, IMC, IPC, IECC, and IFC codes are intended to be used in a coordinated fashion. Nonetheless, the IBC and IFC include duplicate criteria for such requirements as sprinklers, means of egress, and occupancies. This duplication is meant to reduce confusion among community enforcement officials. However, the IFC establishes minimum standards for existing buildings whether or not work is being performed or occupancies are being changed. These minimum standards are only enforceable through the IFC. If a community expects to apply such standards to all buildings, adoption of the fire code and a mechanism for enforcement is critical. Similarly, requirements for alterations to an existing structure are found in two documents—the IBC and the IEBC. Although these codes are parallel in many ways, the IBC lacks several specification requirements included in the IEBC. Both codes, however, include an alternative compliance method for evaluating the safety of an existing building.

Property maintenance issues involving handrails and guardrails, addressed in the International Property Maintenance Code, are intended to be applied through adoption of the IPMC. Mechanical and plumbing requirements are referenced in the IBC, and the code includes specific designs for ventilation of an atrium or an open mall. IBC references and the IMC both include general requirements for HVAC systems, including required amounts of fresh air. The IPC and IMC provide specific criteria for plumbing and mechanical systems, which the IBC includes many of the minimum design requirements. For example, the minimum number of plumbing fixtures for an occupancy classification is described in Chapter 29 of the IBC, while the details on materials and installation of the plumbing systems are in the IPC.

The lack of coordination between code documents in the past resulted in disjointed enforcement. To address this confusion, the ICC codes were designed to be applied uniformly by any part of an enforcement team. The building and fire codes are both applicable to the design of new structures, and projects should be designed and reviewed using both documents, thus preventing subsequent conflicts. This arrangement can fall apart, however, when communities fail to recognize this structure within the model codes and adopt different codes for different aspects of code enforcement. This saddles the owner with conflicts that the designer will be forced to resolve.

Green Codes

As part of the 2012 ICC set of codes, work on the first green building code, the International Green Construction Code (IgCC) was completed. Following the precedents set by the LEED voluntary rating system and the desire by many communities to establish higher levels of performance in unique ways, the IgCC creates a system for a community to establish higher standards for the conservation of water, construction materials, energy, the indoor environment, etc., in buildings and building sites.

There are several unique features in the IgCC, including options for a community to customize the code for its particular needs, with provisions for existing buildings and building sites. In addition, the IgCC includes reference to ASHRAE's Standard 189, allowing it to be a complete substitution for the IgCC but retaining the administrative provisions in Chapter 1. Similarly, use of the residential green scoring system ICC/NAHB Standard 700 is also referenced, but its use is only allowed when the jurisdiction specifically indicates that it wishes to make that an option for design.

CODE ENFORCEMENT

Building code enforcement typically includes review of construction plans for proposed projects, followed by inspection of the built work to see that it conforms to the approved plans. State or local building departments operate within legislated authority to determine the acceptable means of designing and constructing the buildings submitted to them. Most often it is illegal to begin construction of a building without approvals or permits from the responsible AHJs. Completion of the construction process is typically marked by the issuance of a certificate of occupancy, which means the project can be used for the purpose intended.

Some communities have a mandatory certification process that requires the design professional to take responsibility for substantial completion in accordance with the codes. This additional level of responsibility for the designer is unusual and may lead to unnecessary liability if not handled properly. Consultation with an attorney is encouraged before signing any form of certification.

Planning and Zoning

Planning and zoning regulations are generally found in more developed areas of the country where the land available to be developed is limited. These types of regulations are also part of a model code process, but they are not generally adopted very widely. The ICC has a model zoning code that outlines the major subjects commonly included in zoning codes, such as use districts, limitations on activities and density, location on a lot, and so on. Generally, zoning is strictly local, although planning often can be regional. It is critical during the early stages of any design project to examine the zoning limitations for the site to determine if the use is allowed and what additional requirements, such as height and setback, might affect the design.

▶ Planning, Urban Design, and the Regulatory Environment (13.2) further discusses planning and zoning.

Water/Plumbing Codes

Criteria for water supply to a building and the plumbing fixtures required for it are established in local plumbing codes. The International Plumbing Code is designed to work closely with the IBC and IMC to specify the proper type of water supply and appropriate number of fixtures for a particular type of facility compatible with those described in the ICC codes. Some local jurisdictions maintain a local plumbing and mechanical code, and the International Association of Plumbers and Mechanical Officials (IAPMO) continues to produce the Uniform Plumbing and Mechanical Code, still in wide use in the western United States.

Controls for the design of storm and sanitary drainage systems are tied to the methods used to design and locate a structure and its site features (e.g., parking lots, sidewalks, etc.). Sites where storm drainage systems are overtaxed commonly retain storm water.

Code Appeals

When the inevitable disagreement occurs about how a code applies, or should apply, to a particular design, the dispute can be resolved through an appeal process. Although most legal disputes are resolved in the courts, the planning and zoning and construction processes require additional opportunities for administrative review in which specific expertise can be employed to resolve a dispute. Most communities establish a board of appeals to facilitate these reviews or hearings.

Variances or equivalent means of achieving compliance to codes are usually allowed under local regulations. However, the ICC codes establish limits on its appeals board, as their rules state they have no authority to "waive requirements of this code." Various state laws may or may not permit adjustments through appeals to codes. For example, under the Ohio Revised Code, the State's Board of Building Appeals and certified local appeals boards are given the following specific authority:

> 112.4 Powers, local boards of building appeals. Certified municipal and county boards of building appeals shall hear and decide the adjudication hearings referred to in section
>
> 113.1 Within the jurisdiction of and arising from orders of the local building official in the enforcement of Chapters 3781 and 3791 of the Revised Code and rules adopted thereunder. The orders may be reversed or modified by the board if it finds:
>
> The order contrary to such laws or rules:
>
> The order contrary to a fair interpretation or application thereof; or,
>
> That a variance from the provisions of such laws or rules, in a specific case, will not be contrary to the public interest where literal enforcement of such provisions will result in unnecessary hardship.

Specific laws that allow variances may exist in other jurisdictions as well.

PARTICIPATION IN CODE DEVELOPMENT

Code development is a process that depends on people who take the time and make the effort to participate. Participation does not necessarily mean serving on a committee or even attending hearings on a subject. It means simply being aware of the codes and being able and willing to suggest ways in which they can better address technical issues. Websites include forms for proposing changes to the codes, but often no more than a phone call to a staff person at the model code agency responsible for the code will begin the process of change. Many local building officials are part of a local ICC chapter that develops changes to the code, and architects can approach them about ways to fix problems or discrepancies in the model code.

Associations such as the National Association of Home Builders (NAHB), Building Owners and Managers Association (BOMA), and the AIA have resources available to help forward changes to the codes as well, and interested architects should approach them about promoting development of needed changes. In addition, staff members of the code organizations can be an invaluable resource in preparing material to enact a code change. Architects are typically the first to realize a problem with a particular provision, or to develop a unique solution to a problem not recognized in the code. By bringing forward changes that reflect a heightened awareness of what is in the code and what can work within the framework of the codes, an architect can have a profound effect on design and construction throughout the country.

For More Information

International Code Council list of jurisdictions and ICC building codes adopted: www.iccsafe.org/government/adoption.html.

2009 Building Code Handbook (McGraw-Hill, 2010) by Terry L. Patterson.

Building Codes Illustrated: A Guide to Understanding the 2012 International Building Code, 4th edition (Wiley, 2012) by Francis D. K. Ching and Steven R. Winkel.

BACKGROUNDER

THE INTERNATIONAL BUILDING CODE

David S. Collins, FAIA

Working with a client to solve a particular design problem is the fundamental essence of what an architect does. Critical to the process of solving the problem is understanding the client's needs and the constraints under which the designer will be working to meet them. These constraints include the resources available for a project, such as the means available to cover the costs of construction, fees, and other expenses. The application of building regulations is simply one more constraint on the development of a solution that must be at the forefront of the designer's mind.

STEP 1: DETERMINE OCCUPANCY

Codes require establishment of one or more occupancy categories for a building. The terminology used in the various model codes to describe these building uses has evolved in the IBC format to titles such as "Group A-1 Occupancy" for a theater or "Group B Occupancy" for an office building. Since most buildings have more than one occupancy classification, it is important to understand how the code treats different configurations and the relationship between different occupancies.

The IBC treats the relationship between two or more occupancies in three ways—as incidental, accessory, or mixed. The mixed category is further divided into separated and unseparated areas. Areas within a building classified as incidental or accessory are not controlling factors on the building height and area, but they are still considered separately for purposes of specific characteristics, such as egress. For example, although a storeroom in an office building is considered incidental to a Group B business occupancy, the floor loading must still conform to the requirements for storage.

Incidental Accessory Use Areas

Earlier model codes contained a set of requirements for "specific occupancies." Most of these requirements were developed specifically for institutional occupancies and reflected the requirements for separation originally created in the *Life Safety Code*. The IBC requires that a limited number of specific areas treated as incidental accessory uses must be separated by one-hour fire barriers that have self-closing doors with no air transfer openings and/or have a fire suppression system installed.

Accessory Use Areas

To be considered accessory to another occupancy, an area cannot exceed 10 percent of the total floor area or the allowed tabular values for height and area for the accessory occupancy, as determined by the height and area table.

Mixed Occupancy

If the occupancies in a building are too large to be considered either incidental or accessory, the building is considered to have mixed occupancies. The distinction between separated and unseparated mixed occupancy affects only how the code is applied to the height and area limits for the type of construction; all other aspects of the code are applied to each occupancy separately.

An unseparated mixed-use building is controlled in height and area by the more restrictive of the occupancies it houses. For a separated mixed occupancy, a comparative ratio can be used to address the limits established by each occupancy classification compared to the actual area. As long as the sum of the ratios of the fractions is equal to or less than 1.0, the areas are permitted to be of that type of construction, as determined in Chapter 6 of the IBC.

However, to determine whether a building should be considered separated or unseparated mixed use, the occupancies must be identified and their characteristics understood. The occupancies listed in the IBC are as follows:

- Assembly: Groups A-1, A-2, A-3, A-4, and A-5
- Business: Group B
- Educational: Group E
- Factory and Industrial: Groups F-1 and F-2
- High Hazard: Groups H-1, H-2, H-3, H-4, and H-5
- Institutional: Groups I-1, I-2, I-3, and I-4
- Mercantile: Group M
- Residential: Groups R-1, R-2, R-3, and R-4
- Storage: Groups S-1 and S-2
- Utility and Miscellaneous: Group U

The subdivisions within the A, F, H, I, R, and S groups are used to differentiate between different hazards within these general classifications. For example, the assembly groups are subdivided into these categories:

- A-1: Traditional stage theaters and motion picture theaters
- A-2: Restaurants and nightclubs
- A-3: Churches, dance halls, and small gymnasiums that do not have spectator seating
- A-4: Arenas and gymnasiums with spectator seating
- A-5: Outdoor places of assembly

Any assembly occupancy that is not an accessory space and has an occupant load of less than 50 is classified in the B group.

STEP 2: IDENTIFY THRESHOLDS AND FIRE AREAS

Because of the importance the model codes place on the installation of an automatic fire suppression system, once the occupancy of a building is known, it is fairly simple to determine whether the code will require it to be protected by a sprinkler system. The threshold limits for fire suppression are based on one or more of the following:

- The fire area or building area in which the occupancy is located
- Where the occupancy is located in the building
- The number of occupants in a building or fire area

Fire areas are enclosures that provide a particular fire resistance based on the risk associated with the occupancy (Table 13.2):

TABLE 13.2

H-1, H-2	4 hrs.
F-1, H-3, S-1	3 hrs.
A, B, E, F-2, H-4, H-5, I, M, R, S-2	2 hrs.
U	1 hr.

Each fire area must be surrounded by firewalls, fire barriers (floors or walls), or exterior walls or roof. Only portions of the enclosure inside the structure are required to provide the fire resistance rating.

In the IBC, threshold limits for fire suppression of a building or fire area are as shown in the Table 13.3.

To avoid having to install fire suppression within a space, a fire area separation can be used to subdivide a single occupancy. As long as all the fire areas within a building individually fall below the limits, no fire suppression system is required.

In addition to spaces above the area thresholds for a fire area, sprinkler systems are required throughout any windowless stories, any building with a height exceeding 55 feet, and underground structures more than 30 feet below the lowest level of exit discharge.

TABLE 13.3

Use Group	Threshold
Assembly	
A-1	Fire area > 12,000 SF, or > 299 occupants, or not on level of exit discharge, or contains a multi-theater complex
A-2	Fire area > 5,000 SF, or > 99 occupants, or not on level of exit discharge
A-3	Fire area > 12,000 SF, or > 299 occupants, or not on level of exit discharge
A-4	Fire area > 12,000 SF, or > 299 occupants, or not on level of exit discharge
A-5	Concession stands, retail, press boxes > 1,000 SF in area
Business	
B	Ambulatory health care: > 3 care recipients incapable of self-preservation, or 1 or more care recipients incapable of self-preservation not on level of exit discharge
Educational	
E	Fire area > 12,000 SF, or located below the level of exit discharge
Factory and Industrial	
F-1	Fire area > 12,000 SF, or > three stories above grade plane, or combined areas on all floors > 24,000 SF, or manufacturing of upholstered furniture or mattresses > 2,500 SF, or woodworking areas > 2,500 SF
High Hazard	
H	All
Institutional	
I	All
Mercantile	
M	Fire area > 12,000 SF, or > three stories above grade plane, or combined areas of all floors > 24,000 SF, or display or sale of upholstered furniture or mattresses > 5,000 SF
Residential	
R	All
Storage	
S-1	Fire area > 12,000 SF, or > three stories above grade plane, or combined areas of all floors > 24,000 SF, or storage of commercial trucks or buses > 5,000 SF
S-2	Enclosed garages w/ fire area > 12,000 SF, or where beneath other occupancies
Utility and Miscellaneous	
U	No threshold

(continued)

TABLE 13.4 Comparison of Types of Construction by Building Code

International Building Code (IBC)	National Building Code (BOCA)	Standard Building Code (SBCCI)	Uniform Building Code (UBC)
	1A	1	
IA	1B	II	I FR
IB	2A	—	II FR
IIA	2B	IV 1-hr.	II 1 hr.
IIB	2C	IV unpro.	III N
IIIA	3A	V 1-hr	III 1-hr.
IIIB	3B	V unpro.	III N
IV	4	III	IV HT
VA	5A	VI 1-hr.	V 1 hr.
VB	5B	VI unpro.	V N

STEP 3: IDENTIFY TYPE OF CONSTRUCTION PERMITTED

Table 13.4 compares the types of construction listed in the IBC to those included in previous model codes.

Reductions

Tables 601 and 602 in the IBC prescribe minimum fire resistance requirements for building elements based on their function and their location in a building. Significant exceptions are located in the sections regarding use of various materials, in both the text and in footnotes outlining permitted reductions in the required fire resistance.

The UBC had allowed a reduction in the fire resistance of building elements if the building was sprinklered. However, that reduction was permitted only if the fire sprinklers were not required for any other reason in the code. The IBC includes this identical provision.

The means to determine the limits on building height and area are tied to several factors (Table 13.5). As noted, the occupancy and whether or not the building is fully sprinklered are critical. Given some idea of what the building height needs to be and a concept for the layout of the floors and the location of the building, the type of construction can be easily determined.

Height Modifications

Buildings are permitted to have a one-story and 20′-0″ height increase if the building is protected throughout by a sprinkler system. This increase applies to both NFPA 13 and 13R sprinkler systems (13R is limited to a maximum of four stories and can be used only on residential structures). Group H hazardous occupancies are not permitted to have the increase. Group I-2 occupancies are not permitted the height modification when in buildings of Type IIB, III, IV, or V construction.

Area Determination

The overall area of a building is not permitted to exceed three different limits: A one-story building cannot exceed the maximum allowable area, a two-story building cannot exceed the maximum allowable area multiplied by two, and a building with three stories or more is limited to a maximum of three times the allowable area. In addition, the largest

TABLE 13.5 Allowable Height and Building Areas from Table 503, International Building Code

Type of Construction										
		I	II	III	IV	V				
		A	B	A	B	A	B	HT	A	B
	Feet Stories	UL	160	65	55	65	55	65	50	40
A-2	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
B	S	UL	11	5	4	5	4	5	3	2
	A	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
E	A	UL	5	3	2	3	2	3	1	1
	S	UL	UL	26,500	14,500	23,500	14,500	25,500	18,500	9,500
R-1	S	UL	11	4	4	4	4	4	3	2
	A	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000

Notes:
1. Height limitations shown as stories and feet above grade plane.
2. Area limitations as determined by the definition of "Area, building," per floor.

floor in any building may not exceed the maximum allowable area per floor. This means that when you calculate the maximum allowable floor for the occupancies, the total building is only permitted to be three times that amount. As a building design gets taller, the maximum area for the occupancy and type of construction does not change, nor does the formula of three times the allowable area change. So, a four-story building would only be permitted to have floors that were three-quarters of the allowable area. A five-story building would only be allowed three-fifths. These conclusions are based on the assumption that all floors remain the same size.

The code will permit a bit more creativity as long as the total does not exceed three times the allowable area. For example, a five-story building can have one floor that is equal to one allowable area, with the other four floors only having one-half an allowable area $(1 + [4 \times ½]) = 3$. Other combinations are also permitted as long as the total does not exceed the maximum number of three times the allowable area.

Allowable Area

The formula for determining allowable area involves three variables: the tabular area (A_t) from Table 503 for the type of construction, an increase for frontage (I_f), and an increase for fire suppression (I_s). As noted earlier, a designer should know what the actual area of the building is going to be and be able to solve for the minimum tabular area. Thus, the formula is revised to solve for A_t.

Frontage Increase

The building code provides up to 75 percent credit for additional open space around a building, allowing additional protection from spread of fire and allowing access for firefighting. Most buildings will not be allowed a frontage increase of more than 75 percent. The minimum distance between a building and a property line, or the imaginary line between two buildings on the same lot, in order to gain any credit is 20′-0″. Once that distance is achieved, there are two factors: W/30 and a 1 percent increase in building area for each 1 percent of building perimeter that faces on such open space around the building that exceeds a minimum of 25 percent of the building perimeter. W/30 uses the space around the building of between 20 and 60 feet, so a 20-foot frontage would have a two-thirds factor and a 30-foot frontage would have a factor of one. For example, if a building has 20 feet of open space around the entire building, the maximum frontage increase would be 50 percent [(1 × 100 percent) − 25 percent = 75 percent × 20/30]. If the same building had 10 feet of open space around 50 percent of the building and 20 feet of open space around 50 percent of the building, the increase would be 16.7 percent [(1 × 50 percent) − 25 percent × 20/30].

An additional consideration for frontage design is the code requirement for fire department vehicular access to the building. An approved route to within 150 feet of the entire perimeter of the first floor of all buildings is required.

Sprinkler Increases

A one-story building is permitted a 300 percent increase, and a building of two stories or more is permitted a 200 percent increase when the building has an NFPA 13 sprinkler installed throughout. A building with an NFPA 13R system will add one story and 20 feet to the allowable height of a residential building. NFPA 13D systems, which are permitted in limited residential applications, do not provide area or height increases.

Basement

As long as the area of a single basement does not exceed the area permitted for a single-story building, it is not included in the determination of the overall area of the building.

Buildings on Same Lot

Multiple buildings on the same lot can be considered as a single building as long as the cumulative floor areas and their heights do not exceed the limitations that would be allowed if they were one building.

Unlimited Area Buildings

Table 503 includes combinations of building types and occupancies that are not limited in height or area. These are different from an unlimited-area building that is controlled by occupancy, a minimum open frontage around the building, fire suppression, and the use of the building. Both one- and two-story buildings can be unlimited in area.

For example, a single-story building that is not Type V construction and is used for low-hazard storage or manufacturing can be unlimited in area as long as there is a 60-foot open space completely around the building. Fire suppression is not required in that type of building, despite the size of it. A two-story building is allowed to be of any construction type and is considered an unlimited area building if it is protected by an NFPA 13 sprinkler system throughout, has a 60-foot open space around the building, and is used for any combination of B, M, F, or S occupancies. Other occupancies are also permitted in some variations of these extremes and using different combinations of open space, suppression, and types of construction. Even hazardous materials are permitted in unlimited-area buildings with the proper location and separation.

STEP 4: MEANS OF EGRESS

The means of egress from a space and subsequently from a building will be very influential in determining the building configuration. Means of egress includes the path from any occupied space in a building to the public way. It is broken down into three elements—exit access, exit, and exit discharge.

Fundamentally, exit access is the path from within any occupied space in the building to the entrance to an exit. The exit is either a door that opens directly to the outside or a protected stair or ramp, and the exit discharge is the path between the exit door and the public way.

(continued)

The constraints for exit access and exit will be important to the final configuration of a building. There are two fundamental aspects of exit access—travel distance within a space and travel distance to an exit.

For most occupancies, the travel distance within a space will be limited to 75 feet before two distinct paths to leave the space are required. In some instances, the maximum travel distance may be shorter due to high occupant loads. In others, if sprinklers are installed, the distance can be increased. Determination of the required travel distance is highly dependent upon the occupancy of the space.

Once out of a space, the exit access continues to the exit. The travel distance to an exit overlaps the travel distance allowed within a space. For example, in an office environment, a suite of offices is not required to have more than one means of egress until the travel distance within the space exceeds 75 feet. However, the overall travel distance from any space within the suite of offices to an exit is 250 feet. The 75 feet of travel is part of the 250 feet of travel; it is not permitted to be added to the overall travel distance to an exit.

When a building requires two exits, the travel distance is only measured to one of the exits, not both. In the office example above, all the spaces within the office would be required to have at least one exit within the 250-foot distance. If the office building is protected by an NFPA 13 sprinkler system, the travel distance is allowed to increase to 300 feet.

Exit access stairs and ramps are allowed to be included as part of the exit access travel distance. A maximum of 50 percent of the required exit is permitted to be measured from the most remote point within a building to an exit using unenclosed exit access stairways or ramps when connecting a maximum of two stories.

Exits

Generally, an exit is a door opening directly to the outside or an enclosed exit stair. There are several exceptions for specific occupancies, and there are some general ones that allow an exit stair to be either an enclosed or unenclosed exit. Unenclosed exits are limited to two-story buildings or to a stair serving only two floors.

Exit access travel distance is measured to the entrance of the enclosed stair, outside door, or, if an unenclosed stair or ramp is part of the exit access, the distance continues along the stair until the point where an exit door is reached. Enclosed stairs are required to provide a fire-rated enclosure of either one hour or two hours. Two-hour stair enclosures are required when the stair connects four or more floors.

There is no limit on the distance traveled within an enclosed exit. Exits are typically required to discharge directly to the outside. Up to 50 percent of the exits can discharge through a lobby space on the level of exit discharge as long as the lobby space affords protection from any levels below and has a sprinkler system.

Exit Discharge

Exit discharge is the aspect of the means of egress that is most often overlooked. With the recommended guidelines for accessibility issued by the Access Board, designing exterior elements to conform to the codes will become even more critical. There are no dimensional limits on the travel distance once outside the building, except if exits discharge onto an exit balcony.

STEP 5: SYSTEMS

Once the building configuration is generally understood, other elements of the code will have additional influence on the design of a building. These include the ventilation systems, plumbing systems, the structural design, materials used, and so on.

Ventilation

HVAC limits are established first in the IBC with minimum natural ventilation criteria based on the operating features of the windows and openings between spaces. Mechanical ventilation is not required in any building except when the requirements for natural ventilation are not met. For buildings using a mechanical system, the IMC establishes the standard based on the occupancy of the space for the amount of air and the required fresh air. This includes limits on the ability to recirculate the air from various locations within a building, which reduces problems with unhealthy air in large occupant areas but may increase costs for management of the air within a building.

Environmental issues such as mold are not specifically addressed in the building code or mechanical code. The IMC and IBC require either mechanical or natural ventilation of crawl spaces and attic spaces to prevent unwanted stagnation of air, which can promote unacceptable conditions in such spaces. Criteria in the IgCC establish limitations for indoor environmental quality that address many potential issues of air quality that go beyond the IMC.

Energy Conservation

Energy conservation has taken significant strides toward increased reduction in use of energy in buildings. Using either ASHARE 90.1 or the IECC, the design for consumption of energy in buildings since the original ASHRAE standard has been reduced by approximately 50 percent. The IgCC goes even further by mandating an additional 10 percent reduction, with options for the AHJ to determine even more reductions.

Structural Design

The structural design requirements prescribe the minimum loads under various construction and load conditions. Obviously, the structure must support itself and the load of the building materials that depend on it to remain in place. Occupancy loads are based on the activity within the space, and they determine the "live loads." Environmental loads account for the wind, snow, rain, earthquake, and flood loads that may impact a building.

Special Local Conditions

The building codes are designed to include the most up-to-date information from the best resources available; however, there may be local conditions so specialized they cannot be included in any standard set of building safety guidelines. In developing a building design, it is important to understand any such conditions, whether they are known and part of local regulations or unknown and discovered as part of a soils investigation or by other means.

Material Limits

The code includes specifications for materials, including minimum quality standards, as well as various means for determining the strength of a member to resist a given load. In particular, standards for concrete, masonry, steel, wood, glass, aluminum, and gypsum are specified in the building code. Other materials are permitted by the code if their ability to perform to a level equivalent to those referenced in the code can be demonstrated. This is often a difficult process for new materials, but the level of assurance required to determine conformance with safety standards is very high.

The IgCC adds limitations to the selection of building materials seeking use of indigenous, recycled, or recyclable materials.

Plumbing Fixtures

Sanitation is fundamental to the first element of the "health, safety, and welfare" mantra. The IBC references the International Plumbing Code, which mandates the types and number of fixtures and the systems necessary to support minimum sanitary conditions within buildings.

Limitations on the flow rate for specific fixtures in the IgCC are designed to increase conservation of water. Reclaimed water and other limitations on the use of potable water are also included for acceptance by the AHJ.

PART 3: PROJECT DELIVERY

BACKGROUNDER

THE INTERNATIONAL GREEN CONSTRUCTION CODE

Christopher J. Green, FAIA

The United States now has a comprehensive resource conservation code: the International Green Construction Code (IgCC). Building aspects including materials, energy performance, water consumption, site development, and commissioning are part of the code. The IgCC affects architects, owners, contractors, and communities, increasing the efficiency of buildings and resource consumption.

Christopher J. Green is the founding principal of Ago Studios Inc. in Eagle, Colorado, a regionally based strategic architecture firm. He led the AIA's effort to help develop the IgCC. Green focuses his remodel and alteration expertise on design and resource conservation strategies for commercial, hospitality, and residential clients.

The International Green Construction Code (IgCC) is the first comprehensive code in the United States that provides local communities with the ability to govern the resources consumed in the construction and operation of a commercial building. The code incorporates requirements for site development, materials use and construction waste stream issues, energy, carbon emission calculations, water, indoor environmental quality, commissioning, and existing buildings and sites.

When adopted, this code becomes the base building development standard within that community. It is an overlay to the I-Code family intended to seamlessly coordinate with the International Building Code (IBC), International Energy Conservation Code (IECC), International Plumbing Code (IPC), and other codes architects work with on a daily basis. It begins to focus on the health and welfare of the building user, the site, and the community as new building stock is developed.

Significantly, within the code are specific aspects that focus on:

- Modeled building performance in energy as a creative alternative to a prescriptive compliance path
- Jurisdictional electives allowing communities to select levels of code compliance that are appropriate for their specific resource conservation objectives
- Rainwater, reclaimed water, and graywater use guidelines
- Daylighting requirements, building owner operations documents, commissioning reports and procedures
- Requirements for adding on to or altering existing buildings, historic buildings, and their sites

A jurisdiction may also elect to adopt Appendix A. This offers the community additional opportunities to increase the conservation of resources by requiring the owner and design team to select additional achievable project options that may

(continued)

include increased energy efficiency, greater diversion of the construction waste stream from landfills, and reduced water consumption, as well as other achievable project and site-specific issues important to the community and design team.

The impact of this code on the practice of architecture will be to affect the way owners view the development of a project and how architects deliver those projects. The team will more purposefully define materials, their performance, service life, and source. Greater documentation of site conditions, plant materials, and their development, waterways, and use will be a part of the work required under this code. Comprehensive and collaborative efforts will become important to assure the integration of systems, building orientation, appropriate construction processes, and an understanding by the building official of the strategies and technical approaches being employed in code compliance.

The IgCC provides creative design options when the modeled performance path for energy consumption is selected. This is emphasized by the implication of increasingly stringent and restrictive prescriptive compliance path requirements, reducing creative options available to an owner and their design team. Additionally, the owner, designer, and construction team will find it advantageous to collaborate early in a project to clearly understand roles, responsibilities, and project objectives to address commissioning requirements and the needs and requirements for documenting building performance.

This code is a paradigm shift for owners, architects, construction teams, and the communities to whom we deliver buildings. The code responds to progressing market conditions and ultimately codifies the practices that are becoming standard in delivering efficient, healthy, and resource-conscious buildings.

BACKGROUNDER

THE INTERNATIONAL RESIDENTIAL CODE

Jim W. Sealy, FAIA

The International Residential Code (IRC) is the only code in the family of I-codes that can be used to design and detail all homes, whether they are small compact homes or mega homes that contain thousands of square feet of living space and are up to three stories in height.

Jim W. Sealy has been a consultant to the design, codes, construction, and legal professions since 1989, and his work with building codes began in 1972. He is an AIA Fellow, an honorary member of ICC, and a recipient of the Bobby J. Fowler Award, the highest honor given by ICC.

GENERAL

The International Residential Code (IRC) is a mandatory document that is a part of the family of international codes (I-codes) promulgated by the International Code Council. It differs from the other I-codes in that it is intended to be a stand-alone document and can be applied to design and construction without the designer or builder ever having to use or research any other code (unless a specific code or standard is incorporated by reference in the IRC). Like the other codes, the IRC is intended to be user-friendly and portable. In other words, it is not a cumbersome document and it can be easily carried to a job site.

The IRC is prescriptive and can be used by anyone who has a general understanding of construction. Unless a jurisdiction mandates that design professionals must be employed in a project, this document will allow a nonprofessional to prepare the design and construction documents for one- and two-family dwellings and townhouses that do not exceed three stories. The dwelling units must also have compliant independent means of egress.

It is always wise to check with the local authorities having jurisdiction and get clarification before using the IRC in a project. It is not uncommon for a jurisdiction to adopt a code but then amend or add to it—so, words to the wise: check and verify.

EARLY HISTORY

The IRC had its early history in the founding of a new code organization, the Council of American Building Officials (CABO) that came on the scene in the late 1960s or early 1970s. CABO was an inspiration of the three model code groups, the Building Officials and Code Administrators International (BOCAI), the International Conference of Building Officials (ICBO), and the Southern Building Code Congress International (SBCCI). As the basis for a new code, CABO asked the National Association of Home Builders (NAHB) if they could take the NAHB "Minimum Property Standards," enhance them, and produce a new code to be called the CABO "One-and-Two Family Dwelling Code" (OTFDC). NAHB had previously developed the Minimum Standards for Fannie Mae, Freddie Mac, and the U.S. Department of Housing and Urban Development, which dealt primarily with the structural systems and building envelope.

Once NAHB agreed to CABO's request, a team was put in place to refine the standards and to add sections dealing with plumbing and mechanical systems. NAHB and the NAHB Research Center assisted greatly in this process, especially with the new sections. After that, CABO seated a 12-person Code Development Committee and charged it with changing and updating the code.

The intention of the early CABO code was that it be applied to every aspect of detached one- and two-family dwellings and one-family townhouses. The code did not set limitations on floor areas, but height was limited to three stories (with no definition of or any limitations on the height of a story). Those definitions were, and still are, generally found in local zoning regulations.

RECENT HISTORY

In 1994, BOCAI, ICBO, and SBCCI reached an agreement to merge the three organizations and form the International Code Council (ICC). ICC became an entity in 1995, and there was then a rush to determine the technical content of the new family of International Codes. Instead of designating the existing codes as I-codes to be modified through an established process, ICC formed a team of code writers for each code and started the process of writing new codes.

For reasons not shared outside the leadership of ICC and NAHB, the drafting of the new IRC did not occur concurrently with the drafting of the other I-codes. Not until September of 1997 did the actual drafting begin. Collectively, ICC and NAHB agreed upon a nine-person drafting committee. The committee included three building officials (one from each model code group), three homebuilders (from diverse geographic locations), and three architects. Rose Grant, AIA, worked for a major insurance company and represented the interests of that industry; Soy Williams, AIA, represented both the design and disability communities; and this author represented the design industries. The meetings of the committee were held monthly in locations across the country (to permit diverse, local participation). Like all of the other drafting committees, the meetings were open forums and the public was invited to attend and participate.

When the three code groups merged, the CABO OTFDC was renamed the ICC OTFDC and was used as a beginning, or base, document. Each of the nine members of the drafting committee was assigned various parts of the code, to review and submit proposed changes. The committee then met to discuss and formally accept or change the proposals that were received.

In addition to taking action on the various committee submittals, the committee also received verbal and written comments from private individuals, agencies, and institutions that were representative of the entire built environment. To make sure that the code was as comprehensive as possible, the committee asked that subcommittees be formed to lead or even write certain aspects of the code (such as seismic design and wind loading).

ADOPTION AND USE

The IRC has been adopted as the state residential code by many jurisdictions and states. Prior to the creation of the IRC, small jurisdictions across the United States often did not have the expertise to deal with the model building codes and therefore did not enforce them. This resulted in houses being built that were actually substandard and almost uninhabitable. The IRC's ease of use and comprehensibility allows those jurisdictions to mandate the IRC and see that good-quality, safe housing is available to the citizens of their communities.

Some states adopt codes and mandate them as "the state code"; others deem the codes optional and rely upon the local jurisdictions to make their own adoptions. It should also be noted that not all jurisdictions will permit the use of the IRC, so checking with the authorities having jurisdiction is absolutely necessary.

Currently, the IRC is being maintained through the public forum process. The maintenance process has been divided into two parts, resulting in two committees. One committee deals with the "building and energy" portions of the code and the other committee takes on the maintenance of the provisions dealing with the mechanical, electrical, and plumbing sections of the code. Provisions for electrical were outside the scope of the IRC drafting committee, so all electrical provisions are developed and furnished by the National Fire Protection Association (NFPA).

Not only does the IRC cover all aspects of design and construction, it clearly details acceptable methods and techniques of construction. The IRC is very thorough in its coverage of wind and seismic design and includes adequate graphics to make the use of the code very easy. More detailed graphics and explanations (reasoning) of the various aspects of design and construction are included in the commentary to the IRC. All of the I-codes are produced in commentary form that includes the full body of the code as well and written and graphic interpretations of the content of the code.

Another practical use of the graphics (and commentary) in the IRC is the availability to recognize serious construction errors when in the field. For example, the IRC has an excellent section that details the allowable methods of cutting and/or notching structural members. It's very easy to use, and a great tool to be able to show the contractor a drawing that is in the code rather than having a debate over whether or not the structural member has been compromised. As with other commentaries to the I-codes, the IRC commentary has expanded information and additional drawings.

BACKGROUNDER

ENERGY CODES

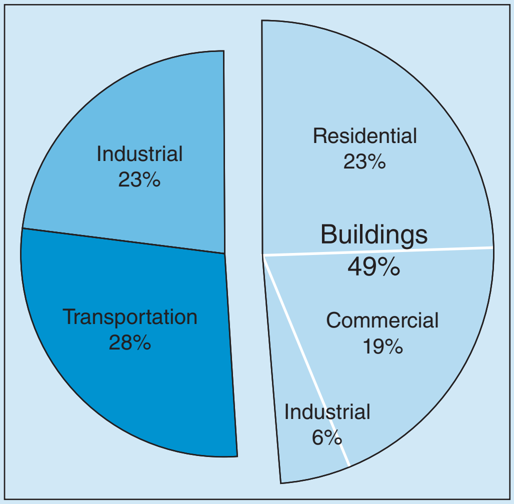
Maureen Guttman, AIA

Maureen Guttman is executive director of the Building Codes Assistance Project in Washington, D.C. She served on the AIA board of directors from 2006–2008 and is member of the AIA Codes and Standards Committee. Guttman was a member of the drafting and development committees for the International Green Construction Code.

WHAT ARE ENERGY CODES?

Energy codes are a subset of a broader collection of written legal requirements known as building codes, which govern the design and construction of residential and commercial structures. Building codes protect individuals from substandard living and working conditions by setting minimum standards for acceptable practice. Energy codes address the minimum energy efficiency standards that building systems are required to meet.

Energy efficiency is widely acknowledged as the quickest, cheapest, and cleanest way to reduce energy use and lower greenhouse gas emissions, and nowhere is this more true than in the building sector. In the United States, buildings account for 70 percent of electricity use and almost 50 percent of total energy use. (See Figure 13.2.) Moreover, the average life span of a building is roughly 50 years (and many last two or three times that), meaning that building energy policies today will affect building energy usage well into the middle of the twenty-first century. *Simply put, building energy codes are the quickest, cheapest, and cleanest way to improve energy efficiency in the building sector and should be a critical component of any comprehensive national or international policy to achieve a sustainable future.*



U.S. Energy Information Administration,
Annual Energy Review

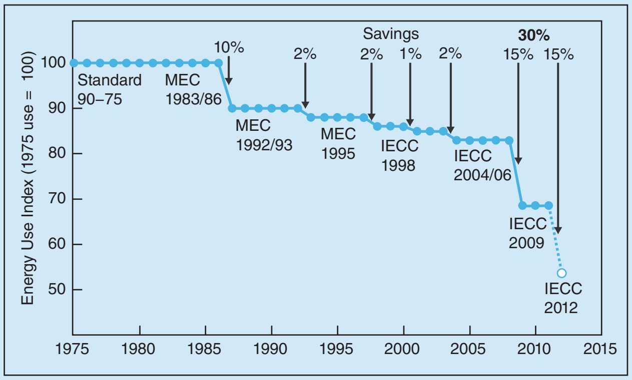
FIGURE 13.2 Energy Consumption by Sector (2011)

History and Drivers

In the United States, national model energy codes were created in response to the energy and economic crises of the 1970s. In 1978, Congress amended the Energy Policy and Conservation Act (EPCA) of 1975, requiring states receiving federal financial assistance to initiate energy efficiency standards for new buildings. A further amendment in 1992 (the Energy Policy Act, or EPAct) required states to certify that their energy efficiency standards meet or exceed the most efficient model energy codes as determined by the U.S. Department of Energy.

The most significant driver for energy code adoption prior to 2012 was the provision in the American Recovery and Reinvestment Act of 2009 that tied federal energy program funding for the states to the states' performance in adopting and implementing the model energy codes.

The first national model codes were the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 90-77 and the Code Administrators and Building Officials *Model Energy Code* (MEC) of 1983. Since then, energy codes have undergone significant improvements in the levels of energy use permitted, particularly in the last decade (see Figure 13.3).



Building Energy Codes Program, U.S. Department of Energy

FIGURE 13.3 Changes in Energy Consumption Permitted by Model Codes

Benefits of Energy Codes

Stringent building energy codes offer considerable benefits that can be felt far into the future. Research in building science indicates that the adoption and enforcement of modern energy codes could save upward of 330 trillion BTUs by 2030—the equivalent of the power generated by 260 medium (450 MW) power plants.

The primary function of energy codes, of course, is to limit building energy consumption, which reduces global greenhouse gas emissions and pollution from the burning of fossil fuels. However, energy code deployment also lessens national peak energy demand and dependency on imported energy sources, which increases utility system reliability and national energy security, respectively. Moreover, energy codes create a more comfortable living and working environment through improved indoor air quality, and they help occupants save money by reducing energy bills, which stimulates the economy.

IECC, ASHRAE, AND BEYOND

Baseline Codes: IECC and ASHRAE

The ASHRAE 90.1 Standard and the International Energy Conservation Code (IECC) are national model energy efficiency standards and codes (respectively) for buildings. Both are developed by national nonprofit organizations in transparent, consensus-based forums that include any and all interested stakeholders. Today, ASHRAE Standard 90.1-2010 and the 2012 IECC are the current national model codes, and each is updated on a three-year cycle.

- ASHRAE Standard 90.1 addresses energy efficiency for commercial buildings, defined as buildings other than single-family dwellings and multifamily buildings three stories or less above grade.
- The IECC covers all residential and commercial buildings, and also adopts ASHRAE 90.1 by reference, which means that compliance with ASHRAE 90.1 qualifies as compliance with IECC for commercial buildings.

Beyond-Code Programs

Progressive states and local jurisdictions focused on energy efficiency and sustainability are increasingly adopting beyond-code programs, either as their minimum codes or in conjunction with various incentive programs. Most beyond-code programs use the IECC and/or ASHRAE 90.1 as a baseline, with more rigorous energy provisions and other non-energy standards for high-performance buildings included.

Initially serving as a proving ground, beyond-code programs are used to make efficiency improvements in the residential and commercial building marketplace, which, over time, become acceptable as standard practice. Market transformation allows today's beyond-code program to become the baseline for tomorrow.

WHY ENERGY CODES ARE IMPORTANT FOR ARCHITECTS

Relationship to AIA Policy

The AIA has very clear policies on the importance of codes to the practice of architecture. The "Public Policy: Construction Industry Regulation" calls for the active participation by architects in the development and application of codes and standards, but the "Public Policy: Architects Are Environmentally Responsible" (and supporting position statements) uses much stronger language to articulate the role that architects hold as primary stakeholders in environmental stewardship:

- "The creation and operation of the built environment require an investment of the earth's resources. Architects must be environmentally responsible and advocate for the sustainable use of those resources."
- "Architects are encouraged to promote energy efficiency and waste reduction in the built environment, encourage energy-conscious design and technology, plus support a national program for more efficient use and recycling of nonrenewable resources and carbon-neutral design strategies."
- "Architects, as the leaders in design of the built environment, are responsible to act as stewards of the Earth. Consequently, we encourage communities to join with us to take the leadership to change the course of the planet's future and support legislative and regulatory strategies that implement sustainable design practices to advance the goal of achieving carbon-neutral buildings by the year 2030."
- "The AIA supports the development, evaluation, and use of codes, standards, and evidence-based rating systems that promote the design, preservation, and construction of sustainable communities and high-performance buildings."

Responsibility for Energy-Efficient Building Design

While the responsibility to *enforce* the building energy code falls upon state and/or local jurisdictions, the responsibility to *comply* with the code rests on the shoulders of the building owners, design professionals, and contractors.

Architects are obligated to design buildings that meet all the adopted local building codes within the building owner's budget. Complying with a building energy code affects the design of all building systems (e.g., building envelope; heating, ventilation, and air conditioning (HVAC); lighting; and materials selected for the building).

To optimize efficiencies and to minimize the first cost for the project, the building design team must work collaboratively with the owner, the contractor, and one another. For example, a decision to incorporate increased insulation levels, highly efficient windows, and an automated lighting system will reduce the heat loss from the building envelope and heat gain from the lighting system. With such efficiencies in place, the HVAC systems can be downsized, offsetting the higher first costs of the building's increased efficiencies. The benefit to the building owner is reduced utility bills for the life of the building.

CONCLUSION

There has never been a better time for architects to capture a preeminent leadership position in the design and construction industry than the present. The confluence of increased attention to energy conservation, U.S. energy independence,

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regulation of greenhouse gas emissions, and rising costs of energy has created a global demand for unbiased expertise to design and implement solutions to the challenges of building energy consumption. There are few professions better trained and equipped to provide these solutions and leadership than the members of the American Institute of Architects.

Forward-thinking architects will see the "challenges" of energy code compliance and advocacy as an opportunity to create the expanded and responsive profession that the future will demand of us.

For More Information

Building Energy Codes Program (BECP), U.S. Department of Energy Building Technologies Program: www.energycodes.gov.

Building Codes Assistance Project (BCAP), Alliance to Save Energy: www.energycodesOCEAN.org.

Regional Energy Efficiency Organizations (REEOs): www.energycodes.gov/resource-center/related-links.

New Buildings Institute (NBI), Core Performance Guide: www.newbuildings.org.

13.2 Planning, Urban Design, and the Regulatory Environment

Glen S. LeRoy, FAIA, FAICP

Many architects interface with the realm of urban planning or urban design in their careers—advocating for a client's zoning, through multidisciplinary teamwork involving planners, or through a career specialization. Under any of these circumstances, knowledge and skills that exceed those of traditional architectural practice are required.

URBAN PLANNING AND URBAN DESIGN

In its broadest sense, "urban planning" refers to a wide range of technical, political, economic, and social activities by which communities define and implement their future. The term "urban" may even be a misnomer, since many planning efforts often involve not only urban but suburban and rural settings as well. Plans come in many varieties, such as strategic plans, comprehensive plans, urban design plans, downtown plans, corridor plans, transportation plans, neighborhood plans, preservation plans, coastal management plans, environmental plans, and regional plans.

A twentieth-century term, "urban design" has a long and well-established lineage from the spatial decisions involving ancient cities, colonial settlements, Garden Cities, and the British Town Planning movement, to name a few. Urban design ultimately involves the form-making of settlements in a variety of scales and contexts. Like urban planning, it is interdisciplinary in nature, reconciling economic, social, and political forces with physical form decisions.

Architecture, at its core, is centered on the design and production of buildings, spaces, and places in the built environment. Sound architectural practice, however, must engage both the urban planning and urban design context, since the buildings and spaces designed by architects literally implement larger-scale urban planning or design strategies. Most architects are well-educated in their understanding of urban form and context. Some architects have even developed career specializations in planning or urban design.

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Planning and Organizations and Associations

Myriad professional societies and organizations serve the broader interests of planning and urban design. Their missions encompass advocacy, education, public awareness, and professional interchange in both the public and private sectors. Some of the prominent organizations include those described below.

The American Institute of Architects

The American Institute of Architects (AIA) represents approximately 80,000 members nationally and internationally. Early in its history, the organization and its members had a keen interest in the nation's burgeoning city planning movement.

Since 1967, the AIA's Regional/Urban Design Assistance Team (R/UDAT) Program has led numerous communities across the United States through an interdisciplinary, collaborative, and objective public process to improve their quality of life through public and private development, more effective organizations, and improved public policies. In 2005, the Institute expanded these efforts with the development of Sustainable Design Assistance Teams (SDAT), a program to assist the efforts of communities to improve their sustainability.

Additionally, The Institute Honor Awards for Regional and Urban Design recognize distinguished achievements that involve the expanding role of the architect in urban design, city planning, and community development. The awards identify projects and programs that contribute to the quality of the urban environment. (Source: American Institute of Architects)

Make no little plans. They have no magic to stir men's blood and probably themselves will not be realized. Make big plans. Aim high in hope and work. Remembering that a noble, logical diagram once recorded will not die.

—Daniel Burnham

The American Planning Association

The American Planning Association (APA) is arguably the nation's most significant planning organization, serving over 40,000 members. It was formed in 1978 through a merger of two separate organizations: the American Institute of Planners, formerly the American Planning Institute, founded in 1917; and the American Society of Planning Officials, founded in 1934. Accordingly, the merged association was "organized exclusively for charitable, educational, literary, and scientific purposes to advance the art and science of planning and the activity of planning—physical, economic, and social—at the local, regional, state, and national levels." (Source: American Planning Association)

The American Society of Landscape Architects

The American Society of Landscape Architects (ASLA), founded in 1899, represents nearly 20,000 members. Its mission is "to lead, to educate, and to participate in the careful stewardship, wise planning, and artful design of our cultural and natural environments." The Society's planning and urban design interests include conservation, historic preservation and restoration, land planning, parks and recreation, streetscapes and public spaces, transportation corridors and facilities, and water resources, among others. (Source: American Society of Landscape Architects)

Planning Education and Certification

Unlike architecture, the planning profession has no licensure requirements, although some jurisdictions do require some form of certification. The American Planning Association has established the American Institute of Certified Planners (AICP), a nationally recognized planning

OTHER ORGANIZATIONS RELEVANT TO PLANNING

- American Public Works Association (APWA)
- Association of Metropolitan Planning Organizations (AMPO)
- Congress for the New Urbanism (CNU)
- Environmental Design Research Association (EDRA)
- International City/County Management Association (ICMA)
- International Downtown Association (IDA)
- International Economic Development Council (IEDC)
- Institute for Urban Design (IfUD)
- National Association of Counties (NACo)
- National Association of Development Organizations (NADO)
- National Association of Regional Councils (NARC)
- National Association of State Development Agencies (NASDA)
- National League of Cities (NLC)
- Urban Land Institute (ULI)

See Appendix A for a complete listing of professional organizations in architecture and related fields.

certification program. To qualify for this certification, a candidate must meet a combination of education and/or professional experience and pass the nationally administered AICP examination. Education may include an accredited planning degree from a program recognized by the Planning Accreditation Board (PAB). A degree in planning is not an essential requirement, however, and an architectural degree accompanied by appropriate professional experience can provide a path to planning certification. More recently, Advanced Specialty Certification (ASC) has been offered for transportation and environmental planning.

In 2007, the AICP Commission approved the establishment of the Certification Maintenance (CM) program in order to maintain planning certification. Under this program, AICP members must achieve 32 CM continuing education credits (hours) within a two-year period. This program includes mandatory credits in ethics and planning law.

In 1999, the AICP initiated a fellowship program. Similar in structure to AIA fellowship, fellows in the AICP (FAICP) are recognized as "model planners, who have made significant contributions to planning and society." (Source: American Planning Association)

THE PLANNING TEAM AND PROCESS

The Planning Team

Much of contemporary planning practice is undertaken by multidisciplinary teams. The issues and problems that confront communities are complex and interdependent; thus, they require the active collaboration of a variety of professionals, who often practice as specialists. It is common for planning teams on a single project to consist of professionals with expertise in public facilitation, design, economics, transportation, infrastructure, environment, public policy, and other disciplines.

Urban planning and urban design projects are sometimes undertaken by a public sector planning staff. Larger jurisdictions may have all of the required expertise in-house. A public agency may also retain consultants to supplement its staff's skills.

Public, private, or not-for-profit clients may choose to retain the services of a planning consultant team. Many larger consulting firms maintain the required expertise to address a variety of planning issues. Both larger and smaller firms frequently create planning teams consisting of a primary consultant and a range of subconsultants. The composition of the planning team is uniquely assembled to meet the specific nature of the project.

In terms of knowledge and skills, many architects are ideally suited to participate in the planning and urban design process. They typically have the ability to visualize and graphically present concepts that few other disciplines possess. Architects are also educated to be team leaders and process facilitators. These skills are critical to the creation of an effective planning team. It is essential, however, to recognize that urban planning and urban design are quite different in scale, process, and complexity from a building design project.

The Planning Processes

Two Distinct Planning Methodologies: Rational and Normative Planning Processes

There are two distinct approaches to the urban planning and design process that merit elaboration: the rational planning model and the normative planning model. They are quite different in their time requirements and data needs, as well as in the way that the planning client or the public interacts with the process.

The Rational Planning Model

The heritage of planning certainly aligns with the processes of architecture and design inspiration. In the early twentieth century, however, urban planning movements became infused with social scientists, a striving for greater efficiency, and more data-driven processes. This, coupled with methodologies used in transportation modeling later in the century, led to what is recognized as the rational planning model. The planner's role was thus transitioned from the role of an imaginative designer and form-maker to the role of a scientific researcher and analyst.

The rational planning model (see Figure 13.4) initially emphasizes problem recognition and definition, which is a data-intensive process. Then, planning goals are established, along with evaluation criteria for making planning decisions. A wide range of planning alternatives is generated, and quantifiable methods are used for analyzing and selecting among the alternatives. Detailed implementation strategies are devised, and implementation progress is monitored. This monitoring contributes an important "feedback loop" to support the theories and knowledge base required for future planning endeavors.

Several ramifications in utilizing a rational planning methodology include:

- The time and cost required for intensive data collection and quantitative analysis
- An agreement on the type and nature of the data to be collected, as well as the alternatives that are generated
- The recognition that, as a rational process, it does not relate well to political decision making, which is often less than rationally based

The Normative Planning Model

Much has been written about normative judgment and decision making. In the social sciences, the normative process is closely related to the study of cultural norms and

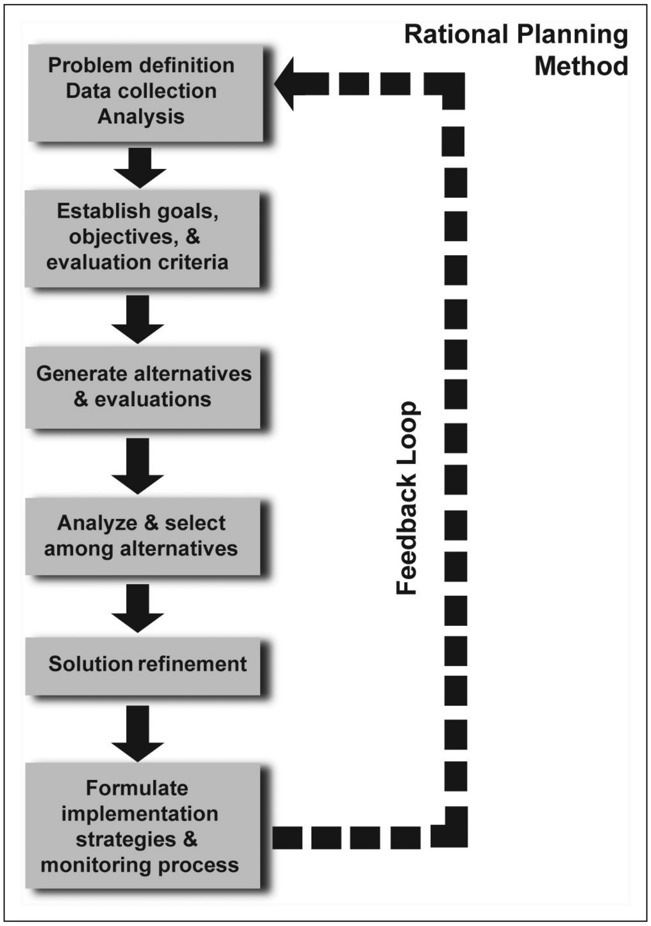

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FIGURE 13.4 Rational Method Diagram

group processes. There is also a body of research on the group dynamics involved in normative decision making in the business setting. Over time, the normative process has been appropriated into planning practice. In the rational process, the planner is a skilled technician. In the normative process, planners are facilitators, communicators, and "political" strategists.

In the evolution of planning practice, the application of normative methods is manifested in collaboration, community engagement, and consensus-building. The thoughts, beliefs, and emotions of stakeholders are driving forces in planning decision making and action. In this process, the planner works with the community to define their "vision" for the future or what they want their community to be. Implementation strategies frequently involve the best actions to take as defined by the planning stakeholders.

The ramifications of the normative planning model (see Figure 13.5) include:

- The ability to plan with relatively limited data, quantification, or information-processing capability, thus lowering the time and cost of the process.
- The necessity of having a highly skilled facilitator to successfully lead the community-based process.
- The ability to base planning decisions on political opinions, rather than a rational data-based defense.
- As a wide range of stakeholders are integral to defining planning directions in a public process, they are often more likely to dismiss status-quo solutions in favor of more creative solutions that involve greater risk.

The Public Participation Process

Urban planning and urban design processes have become increasingly participatory in nature. Communities are sometimes polarized or express divided opinions along economic, political, geographical, educational, or ethnic lines. Community discussions may include difficult issues like crime, general discord, lack of trust, controversial land

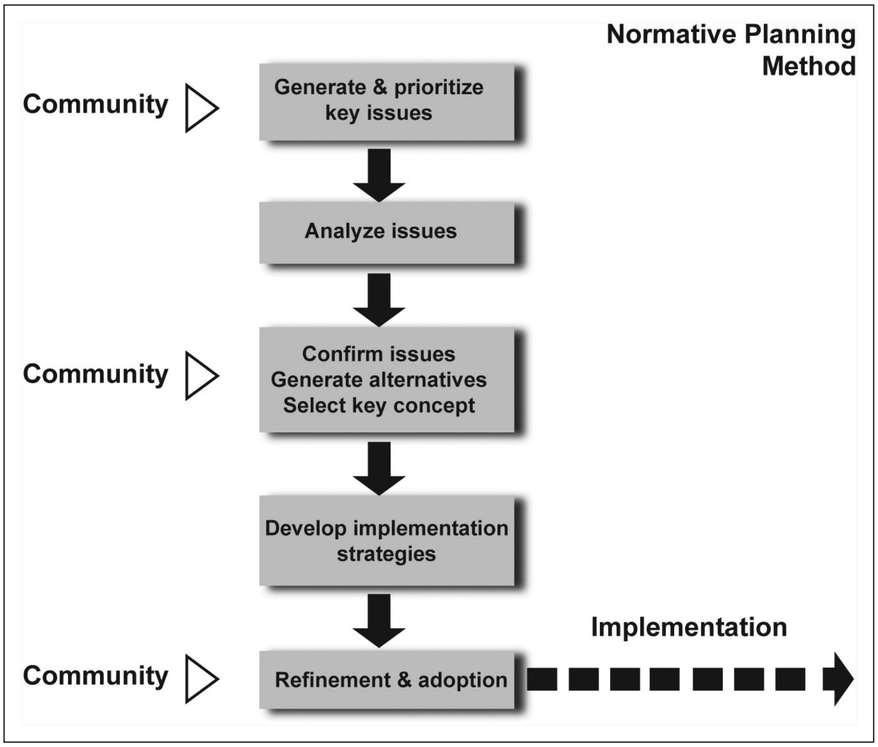

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FIGURE 13.5 Normative Method Diagram development projects, NIMBYism (Not in My Back Yard), and gentrification. This inherently political context requires a facilitator or facilitation team that has substantial leadership capabilities, as well as an acute understanding of the unique context in which they are operating. There are techniques that have a proven track record of success, but the interactions of the public with the facilitator or with each other cannot always be predicted. Some issues for facilitators to consider are:

- The necessity for the facilitator to be perceived as objective and trustworthy. Stating personal or professional opinions too early in the process can undermine credibility. Also, one cannot easily be a facilitator if regarded by the community as part of the problem, such as a public staff member facilitating a discussion on a controversial public issue.
- Obtaining active participation of elected officials, key business leaders, or community leaders in a public process. They often like to avoid the public limelight and prefer to exert influence behind the scene.
- Developing an appropriate and inclusive approach to public relations and media communications that engages a broad spectrum of the community.
- Accommodating participants with disabilities or language issues.
- Selecting appropriate techniques for eliciting community dialogue and decisions, community forums, workshops, charrettes, focus groups, interviews, or a combination of techniques.
- Knowing how to diffuse outbursts or problem situations.
- Dressing appropriately for the audience, neither too much above or below the participants' style of dress.
- Staying flexible; being able to change or adapt the meeting on a moment's notice. Things *will* go wrong!

SAMPLE PUBLIC PARTICIPATION TECHNIQUES

A range of public participation techniques are used in the planning, adoption, and implementation process across the United States. Some of the most popular practices taken from case studies include:

- **Initial Research:** In developing a new plan or updating an existing one, planners frequently conduct an initial review of relevant data and literature, undertake public surveys, identify initial issues, strengths, problems and opportunities, and research potential goals and objectives.
- **Advisory Committees:** Planning advisory committees are chosen to assist in plan preparation. They may be technical advisory committees, represented by individuals with expertise in areas like transportation, engineering, public infrastructure, policy formation, and other technical issues. An advisory committee may also represent specific community constituencies, such as civic leaders, neighborhood leaders, or business leaders. Sometimes, committees are formed for oversight of the plan preparation by elected or appointed public officials, who will be engaged in the ultimate adoption of the plan.
- **Focus Groups:** Planners meet with local stakeholders through small focus groups with established community organizations or individuals to facilitate discussion of the plan. These meetings assist in identifying the community's goals, setting priorities, determining objectives, and giving insight and direction on the community's vision. Later in the planning process, focus groups can be used in testing and narrowing planning concepts.
- **Individual Constituent Meetings:** Planners may meet with individual community leaders in private meetings. Such meetings are useful in gaining insight from people who may have great influence on the future direction of a plan.
- **Public Workshops:** In conjunction with participation and input by focus groups and advisory committees, a series of public workshops are frequently held to showcase planning ideas, as well as solicit additional opinions from the citizenry.
- **Charrettes:** A "Charrette" occurs in a concentrated time period, sometimes taking place over a number of days, where planners meet with the public and advisory committees, review data and analysis, generate planning alternatives, or generate consensus for an overall planning direction.
- **Preliminary Plan:** Preliminary or draft plans are prepared to elicit comments from advisory committees, focus groups, and public workshops, as well as for formal presentations to public bodies.

(continued)

- **Open house:** Open Houses are conducted to present a Preliminary Plan to the public and to elicit questions and discussion. Frequently, open houses are established to garner comments for an official public record.
- **Public Hearing:** A Public Hearing is conducted to present the plan and allow the citizens to give testimony regarding the Preliminary Plan in either verbal or written form.
- **Planning Commission Hearing:** A Proposed Plan is prepared and presented to a Planning Commission for review and recommendation to the governing body in most jurisdictions. These hearings are typically open to the public, and public comments are taken into consideration by the Commission.
- **Governing Body Hearing:** The Proposed Plan, as recommended by the Planning Commission, is presented to the governing body for approval or adoption. Public comments are taken during the hearing, and the plan may be adopted, modified, or remanded back to the planning commission for further consideration.

THE ROLE OF GOVERNMENT IN PLANNING

State and Federal Government

In the United States, planning is an authority that is granted to local jurisdictions by an individual state. The states vary greatly in their approach to planning, which is governed by legislation and administrative enactments. Some states have detailed requirements for plans and processes, while others may merely suggest general guidelines for plans. Plans and planning regulations frequently influence individual property rights or other community or individual interests. Therefore, they are subject to extensive lobbying at the state government level by property owners, development interests, community organizations, and advocacy groups.

Planning, even at the local level, is influenced by federal programs, laws, and administrative policies. From funding for specific programs, such as public housing development, to taxation policies, such as tax credits for historic preservation, the role of the federal government is well established. The federal government has adopted planning requirements or regulations for environmental protection, land management, transportation aviation facilities, and a variety of issues that influence planning practice decision making at all levels.

Ultimately, when plans, administrative guidelines, or planning decisions are challenged legally, they typically enter the trial court system at the local or county level. Cases may then proceed through the state appellate system until a decision is ultimately affirmed by the state's highest court. Some planning cases may raise U.S. constitutional issues and progress through the federal judiciary. There are many landmark cases that have profoundly influenced the development of American communities, such as the right to zone property in 1924 or the right to acquire private property through eminent domain for a public purpose in 1954.

Regional Planning Councils and MPOs

A regional planning council or regional council of governments provides a variety of planning services within a defined regional area. It can prepare regional plans and provide technical planning assistance to participating local governments. It can also build consensus for action and assist in creating effective regional partnerships.

Regional councils were conceived in the 1960s in recognition of the importance of regional cooperation and decision making in expanding metropolitan areas. In some jurisdictions, they address a diversity of issues, such as comprehensive and transportation planning, economic development, workforce development, environmental issues, services for the elderly, and "clearinghouse" functions. There are over 700 regional councils in the United States.

The Federal Highway Administration has identified nearly 400 metropolitan planning organizations (MPOs) to provide local input for urban transportation planning and the allocation of federal transportation funds for cities over 50,000 in population. Many MPOs exist as a part of a regional council. Through the long-range transportation plan process and its link to the related transportation improvement program (TIP), MPOs are responsible for approving a substantial expenditure of federal transportation funding. (Source: National Association of Regional Councils)

Local Governing Bodies

There are several levels of local government that engage in planning and urban design practice. They may directly prepare plans or retain consultants to prepare plans. They also influence planning and development through regulation or the use of incentives.

Counties (or parishes, in Louisiana) are creations of their state. All states have counties, although not all counties have an established governing body. Some counties are consolidated with a city and operate under a single government. A number of counties do not provide vital services, such as police and fire protection, to their population. In those cases, state or local governments frequently provide those services. Many counties engage in planning, regulation, and incentives for land use, transportation and public works, parks and recreation, environmental issues, historic preservation, and other issues.

Another level of local government is at the municipal level, which may be organized as a city, borough, town, township, or village. Like counties, these local governments frequently engage in planning for a variety of issues. Their powers, however, may be influenced by their classification under state law. Classifications and powers are typically related to the population or type of the jurisdiction.

Another level of local government that engages in planning and influences the development of a community is the special-purpose district. These districts come in the form of boards, authorities and commissions, such as school boards, sewage and water boards, library boards, port authorities, or representing other specific functions. These entities may operate as a part of a single local government, be shared by multiple local governments, or be an independent entity. In some instances, they may be governed by an interstate compact and address broader regional issues that cross state boundaries, such as public transit.

Planning Commissions

In the early twentieth century in the United States, planning and zoning became well established as a local government function. It was also an era of reform in local government. There was a belief that decisions regarding planning and zoning should be made with a degree of independence from politics. The solution was to create independent boards and commissions that could render objective decisions on these important matters.

Depending on the jurisdiction, these operate under a variety of names, such as planning commission, planning and zoning board, or zoning board. Their purpose as defined by state and local laws, however, is similar. They are designed to promote the general well-being of their community by proposing plans for future land use and development. They also render independent opinions regarding planning implementation, particularly for zoning and other regulations, as well as for development incentives. Although created to render independent judgments, planning commissions are normally advisory to the governing body (city council, city commission, board of supervisors, etc.), which renders the final opinion. (See Figure 13.6.)

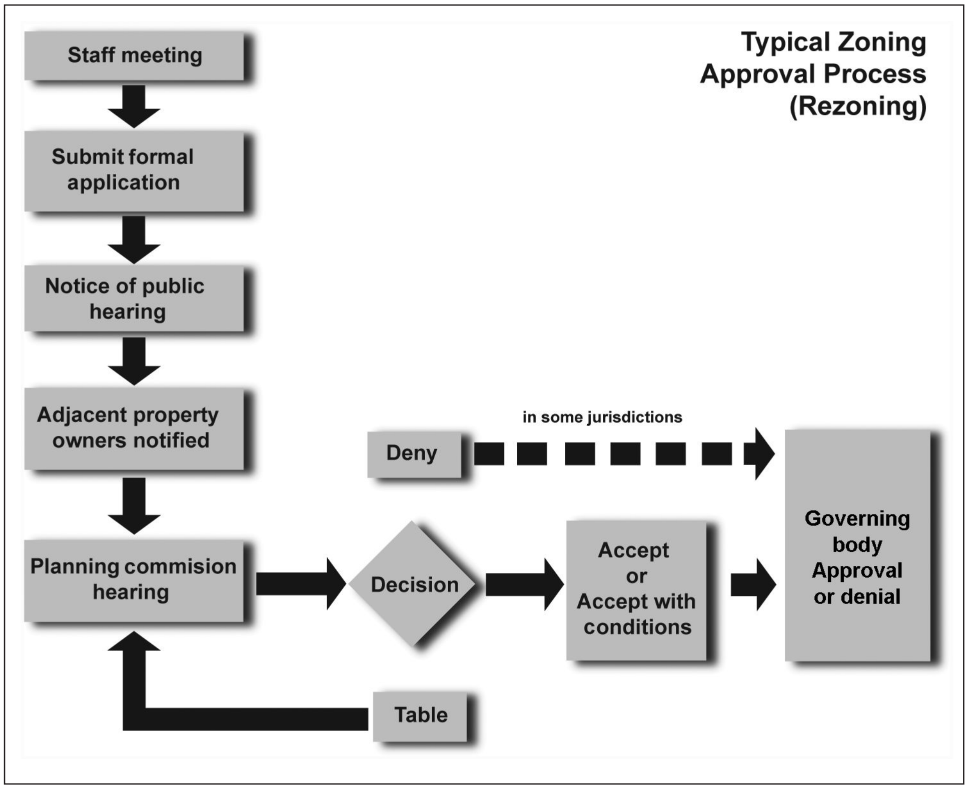

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FIGURE 13.6 **Diagram of a Typical Planning and Zoning Approval Process**

Commissioners are citizens that come from a variety of backgrounds, including architecture, engineering, law, education, business and industry, real estate, and other pursuits. Their terms of office are generally affirmed by the governing body. They are expected to act with a high degree of ethics by interpreting the adopted plan and its accompanying policies without regard to the political outcome of their decisions. Commissioners must recuse themselves from a case where they have a conflict of interest. In most jurisdictions, neither applicants nor their representatives may contact a commissioner prior to the hearing of the case.

The American Planning Association conducts specific educational programs for planning commissioners at the national level.

Board of Zoning Adjustment (or Appeals)

A Board of Zoning Adjustment (or Appeals) is a quasi-judicial entity that renders decisions on variances, exceptions, or modifications to an approved zoning regulation. (See Figure 13.7.) Where a planning commission's opinion is ultimately approved or denied by a governing body, an appeal of a board of zoning adjustment's decision is typically to the district court. Testimony taken at a board of zoning adjustment hearing builds a case record that may be reviewed in a subsequent court action.

A board of adjustment does not render an opinion on the validity of the underlying zoning. Rather, it considers cases where an applicant complies with the spirit and intent of the zoning ordinance, but where rigid enforcement of the ordinance would create an undue hardship on the applicant. Examples of variances or modifications are property setbacks, parking requirements, and height and area requirements. Some jurisdictions also allow use variances or the issuance of special use permits.

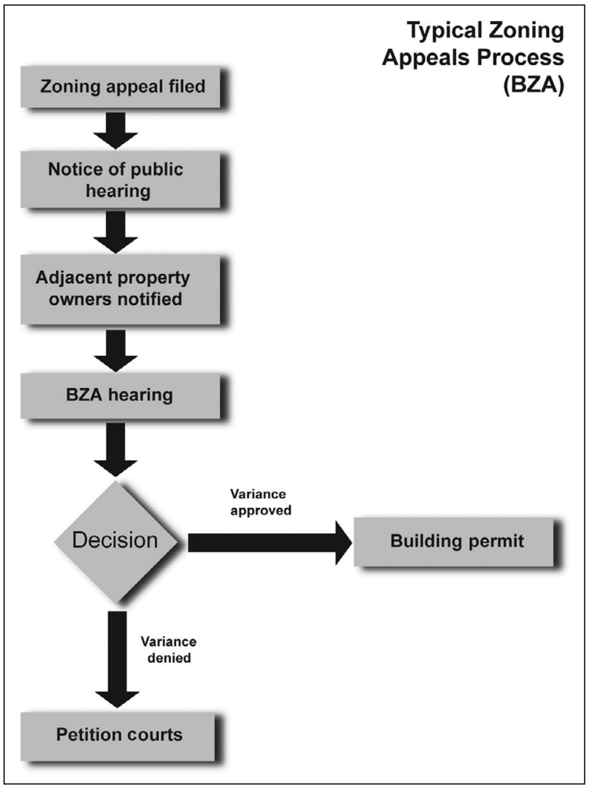

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FIGURE 13.7 **Typical Board of Zoning Appeals Process**

Planning Staff

Depending on the size of the jurisdiction, a planning staff may play a pivotal role in the creation of plans, as well as in the process of planning and development review. Some smaller towns and cities have no staff planners, and rely on the city engineer, public works director, or a consultant to provide technical support or advice. Larger cities sometimes have substantial planning staffs, practicing in a variety of specializations, and organized into specific subdivisions. These may include current planning and zoning, future planning, economic development, district planning, environmental planning, and a variety of other categories.

When approaching a governmental jurisdiction on a planning or zoning issue, the initial contact may be a staff planner. They can be helpful in rendering advice to an applicant or their architect on interpreting an adopted plan or a zoning ordinance. Ultimately, a staff member typically provides an opinion on compliance or noncompliance to the board, commission, or governing body, along with recommendations for conditions of approval.

Across the United States, licensed architects and individuals holding architectural degrees serve with distinction as members of planning staffs in a variety of capacities.

Nongovernmental Planning Participants

The planning and regulatory process requires active participation from a variety of stakeholders and interested parties. Organizations like chambers of commerce, hospitals, educational institutions, religious institutions, not-for-profit developers, and others have a keen interest in planning, zoning, and community development decisions.

At times, these organizations are integrally involved in a proposed action, such as expanding their facilities or campus into an adjacent neighborhood. They may also participate as an advocate for a cause they want to promote, such as business growth or economic development. Under any circumstance, many of these organizations represent major employers, community leadership, significant investors, or motivators of larger constituency groups. Their contribution to the planning process cannot be dismissed or underestimated.

THE PLANNING AND REGULATORY ENVIRONMENT

The Comprehensive Plan

The term "comprehensive planning" entered the lexicon by the mid-twentieth century. Reinforced by federal policies and some state statutes, it remains the cornerstone of most local planning efforts. Although it may vary in style and format in different jurisdictions, comprehensive planning addresses community-wide goals and aspirations, establishes future directions, and provides an implementation framework for components such as land use, transportation, housing, recreation, and infrastructure over a long-range period.

By the late twentieth and early twenty-first centuries, planning entered a new realm of thought and practice. Interests such as sustainability, human scale, "shrinking cities," environmental factors, and urbanism gained prominence. Terms like "new urbanism," transit-oriented development, walkability, green building design, brownfield redevelopment, and the reduction of "suburban sprawl" became central issues of plans in both urban and suburban communities.

Legal Authority for Planning

A long-established legal principle is that government possesses the authority to protect the health and welfare of its citizens. It is within this premise, as well as the powers granted by state governments through enabling legislation, that local communities undertake planning. Not all states even require planning from their local governments.

In many jurisdictions, implementation actions, such as the provisions of a zoning ordinance or other regulations or incentives, must comply with an adopted comprehensive plan. External funding for a project or program is frequently contingent upon compliance with the local comprehensive plan.

Components of a Comprehensive Plan

A survey of local comprehensive plans indicates a wide variety of planning components. They are typically formulated to address the unique nature of the community. Components may include:

- Vision, goals, and objectives
- Land use
- Transportation
- Parks, recreation, and open space
- Economic development
- Public utilities
- Community facilities
- Housing
- Historic preservation
- Downtown
- Physical character and urban design
- Intergovernmental coordination
- Sustainability
- Conservation, water resources, and coastal management
- Community health

- Education
- Neighborhoods
- Agricultural resources
- Implementation

Zoning

Zoning in the United States was affirmed as a legitimate exercise of authority in the landmark U.S. Supreme court case *The Village of Euclid, Ohio v. Ambler Realty Co.*, in 1926.

Many cities still use "Euclidian" zoning, which separates a community into a series of discrete districts. Each district has specific requirements for land uses, and perhaps building heights, bulk, setbacks, property coverage, parking and loading, and similar requirements. Traditional land use categories in zoning ordinances have included residential, commercial, institutional, and industrial, but these designations have evolved over time.

Other Zoning Techniques

Many communities have adopted innovative techniques to supplement or even replace conventional or Euclidean-based zoning. Examples of these techniques include the following:

- *Planned unit development (PUD).* Typically reserved for larger-scale development parcels, PUDs offer the ability to arrange land uses and cluster density with greater flexibility than allowed in a conventional zoning district.
- *Incentive zoning.* Also known as zoning bonuses, incentive zoning (see Figure 13.8) allows property owners greater development density or other bonuses if they agree to provide a benefit to the community in their development, such as a public park or plaza, a percentage of affordable housing, or public art.
- *Performance zoning.* A zoning technique that allows a development to be evaluated on measureable performance criteria, such as pollution or traffic generated, rather than on specific characteristics for use and density as defined in conventional zoning.
- *Overlay zone.* A zone defined by a specific geographic area that "overlays" and modifies the requirements of an underlying district. Overlay zones are frequently used to support historic districts or in the advancement of urban design guidelines.
- *Transfer of development rights (TDR).* An approach to zoning that allows an owner who desires to build at a higher density to purchase unused development rights from another property owner. TDR has been effectively used to preserve historic structures and agricultural property.

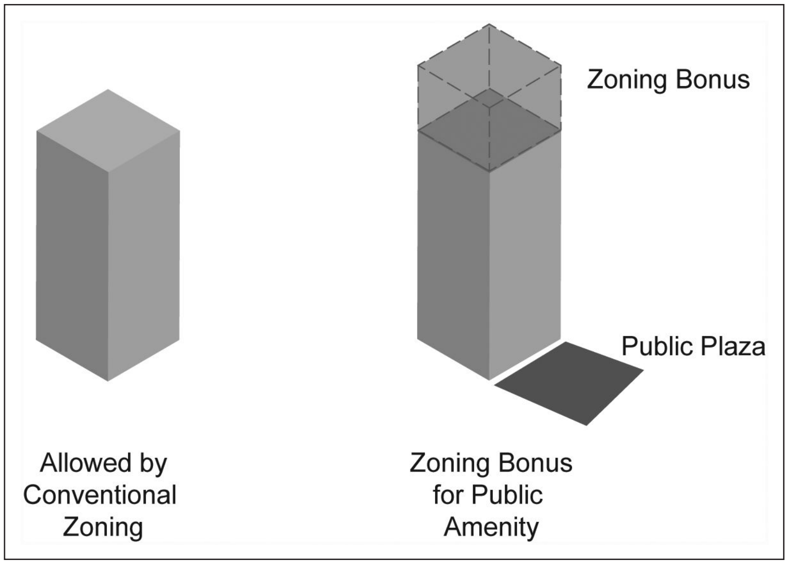

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FIGURE 13.8 Incentive Zoning

▶ See the backgrounder accompanying this article, Form-Based Codes, for further discussion of this approach to regulating urban development.

- *Form-based codes.* Unlike conventional zoning, which addresses land use, building height, and property coverage, form-based codes are organized around building forms, design character, and contextual relationships. The code narrative is frequently accompanied by illustrative drawings or diagrams.
- *Smart codes.* A highly advanced form-based code, a smart code addresses a full spectrum of development, from the dense urban core to the rural environment. Pioneered by architects Andrés Duany and Elizabeth Plater-Zyberk, smart codes promote compact development, walkable communities, and the conservation of rural land.

Amending a Zoning Ordinance: The Rezoning Process

During their careers, many architects are required to assist their clients in amending the zoning or obtaining zoning variances on a property. This is particularly true when working with private sector or developer clients, but it sometimes occurs with public clients. It is important to remember the key differences between rezoning a property and obtaining a variance or conditional use permit for a property.

A rezoning, which often involves changing the zoning classification (residential to commercial, for example), occurs at both the planning commission and the governing body (city council, board of supervisors, etc.); thus, it is a two-step process. The first step, a hearing at the planning commission, is typically preceded by one or more consultations with the planning staff. Since the staff will frequently give their opinion at the hearing, it is important to achieve a positive review of the proposed change. In many jurisdictions, in order to maintain objectivity, applicants, their architect, and their attorney are not allowed to make contact with or lobby the commissioners.

A second step in most jurisdictions is a hearing before the governing body. Planning commission decisions are most often considered as advisory to the governing body. They recommend approval or denial, but the governing body can, and often does, come to a different decision. Where the planning commission should consider the ordinance and the facts of the case objectively, the governing body, consisting of elected officials, quite often uses political judgment in making decisions. It is quite common to meet with these officials prior to the hearing.

Sometimes rezoning is controversial. Angry neighbors, advocacy groups, or people with a vested interest in the decision frequently attend and testify at either of the hearings. It is often expected that the applicant has met with potential opponents prior to the hearing. If a meeting has not occurred, the request may be tabled, and the applicant will be asked to meet with individuals or groups to attempt to resolve differences. Many architects are charged with this responsibility, and they are well suited to this task because of their facilitation and negotiation skills.

In most instances, a hearing before a board of zoning adjustment or appeals (BZA) appears similar to a planning commission hearing. There is, however, a significant distinction. As a quasi-judicial process, there is typically no subsequent hearing by the governing body. During a BZA hearing, a court record is established, and the appeal of a decision is to the courts. An appeal can be an expensive and time-consuming process, so it is essential that evidence is introduced with great care and with adequate preparation. Attorneys are frequently involved in leading complex zoning adjustment applications. As with planning commission hearings, proponents and opponents can typically be heard.

Site Plan Review and the Zoning Process

Many jurisdictions require a site plan review as part of the broader approval process. This process is most common for larger scale, complex projects or for planned unit developments. In a site plan review, the applicant must present plans and other documents that indicate a proposal's compliance with adopted site-planning criteria. The criteria usually focus on technical and design issues, such as parking layout, landscape and screening, lighting, signage, utilities and infrastructure, drainage, and water retention. Some jurisdictions also require building elevations or other design evidence to be submitted. When required, the issuance of building or construction permits is contingent on site plan approval.

Subdivision Regulations

Some jurisdictions adopt subdivision regulations to establish the minimum standards for the subdivision of property. Independent of a zoning ordinance, subdivision regulations deal with the division of property into two or more parcels. The standards vary among jurisdictions and are developed to address issues such as block size and configuration, street standards, street layout, rights-of-way, utilities, easements, drainage, lot size, and dedication of public land. They are intended to assure that a property owner or developer offers continuity and connections among neighboring subdivisions, preserves natural resources, provides adequate services, and minimizes public expenditures.

In the United States, subdivisions are recorded by the jurisdiction in maps known as plats that must conform to the standards set forth in the regulations. Depending on the size and complexity of the jurisdiction, a plat is typically adopted for approval by the planning commission, zoning board, governing body, or the department of public works. When submitting a subdivision proposal for review, the process is frequently similar to the zoning process.

Regulating Design

Increasingly, local governments have been adopting urban design or architectural guidelines to influence the quality and physical character of the community. In 1972, San Francisco's landmark Urban Design Plan established guidelines for preserving the city's unique design appeal. Some design guidelines are merely informative for property owners and their architects, while others are adopted into law.

Design guidelines can be developed for an entire community or for specific districts with a unique character. To maintain credibility and withstand challenges, they must be consistent with the goals of the comprehensive plan, the zoning ordinance, and other relevant regulations. Guidelines address a wide variety of subjects, depending on the community's character and their will to enforce design through regulation. Sample topics for design guidelines include:

- *Buildings:* scale; massing; setbacks or "build-to" lines; architectural details, such as materials, fenestration, roof lines, screening, awnings, and canopies; signage; and historic preservation.
- *Site:* parking; circulation; open space; landscape features; plant materials; drainage; utilities; streetscape; lighting; and outdoor art
- *Public realm:* streetscape paving, furniture, and plant materials; lighting; site access; off-site utilities; on-street parking; connections to public networks, such as transit, trails, bikeways, and parks; spillover into the public right of way, such as sidewalk cafés
- *Sustainability:* microclimate; green roofs, shading devices; planting; and water resources

The regulatory review of design guidelines may be assigned to a specifically constituted design review board, whose recommendations become part of a multiple-phase approval process. Alternately, design review may simply be incorporated into the planning commission review process. In either case, review by trained designers, either staff or board members, is important. It does not, however, always occur in practice.

URBAN PLANNING IMPLEMENTATION TECHNIQUES: DEVELOPMENT INCENTIVES

In addition to planning regulations, many communities use incentives to promote desirable development. Some incentives involve taxation laws and policies, while others involve the direct financial involvement of government in the development process. A summary of highly utilized incentives includes:

- **Tax abatement:** Temporary tax relief granted to a developer, company, or other applicant to relocate to a community, to expand their presence in a community, or to retain their presence in a community.
- **Tax exemption:** Partial or full exemption from taxes granted by a governmental body to encourage desirable development, such as the preservation of historic property or the provision of low-income or affordable housing. Property owned and used by a nonprofit organization engaged in educational, scientific, religious, or charitable purposes may also qualify for a property tax exemption.
- **Tax increment financing:** A financing technique that freezes certain taxes on a proposed development at pre-construction levels. The additional tax increment that would be generated by the development is used for subsidizing infrastructure or other approved community-based improvements that support the development.
- **Tax credits and rebates:** Taxes may be reduced or rebated for an individual or other entity to encourage desirable economic development activities that benefit the community or society as a whole. Federal, state, and local taxes may all be subject to this form of incentive. Federal tax credits to support historic preservation have a long-standing tradition. Other examples at various levels of government include tax credits for generating employment, for utilizing renewable energy, and for the development of the film industry.
- **Historic preservation incentives:** Governments at all levels offer a variety of tax incentives and grants for historic preservation. The federal government offers two levels of tax abatement, as well as allowing for the donation of a qualifying building façade as a charitable donation. Some states offer tax credits, tax abatement, or grants. There are also a number of philanthropic organizations that support historic preservation projects.
- **Fee waivers:** In order to entice a company or developer to locate, relocate, or expand, local governments may waive development or other fees to reduce initial development costs.
- **Self-taxing districts (also known as benefit districts):** a state may allow local jurisdictions, such as downtowns, commercial districts and corridors, and neighborhoods, to create a geographically defined self-taxing district. Revenues generated from these taxes can be used in a variety of ways allowed by law including construction projects, promotional activities, maintenance, and district administration.
- **On-site or off-site improvements:** To reduce project costs to a developer, a local or state government may provide necessary on-site or off-site improvements. Examples of improvements may include public utilities, roadways, rail connections, and parking facilities.
- **Land assembly, acquisition, and/or write down:** Difficulty in assembling the land necessary for development may inhibit a project that the community desires. Government may assemble and acquire land, in some cases, more expediently than a private sector developer or institution. To incentivize highly desirable projects, governments may "write down" the cost or even donate the property to reduce cost to the development.
- **Direct grants:** Governments have created a variety of grant programs to support a wide range of economic and community development activities. Examples include grant funds to support transit, housing, public works, tourism, and rural development.
- **Enterprise zones:** An enterprise zone, sometimes known as an urban enterprise zone, is a specific geographical area that has been designated as blighted. Governments use this designation to encourage developers, entrepreneurs, and business owners to develop a business in the zone through favorable tax policies, regulatory relief, or financial assistance. At the federal government level, enterprise zones are encompassed in the Empowerment Zone Program.
- **Project technical assistance:** Some government jurisdictions or economic development agencies offer technical assistance to developers. This may come in the form of planning and design support, economic analysis, land assembly, or other methods that allow for a reduction of upfront development costs.

THE MULTIPLE ROLES FOR ARCHITECTS IN URBAN PLANNING AND URBAN DESIGN

This article has provided information for practicing architects, as well as architecture students and recent graduates, who desire to achieve a better understanding of urban planning and urban design issues, approaches, tools, and incentives, many of which will be confronted by architects engaging in traditional practice.

The section also addressed some of the issues that architects must understand to more effectively coordinate work in a multidisciplinary team framework. These teams frequently require the knowledge, skills, and abilities of urban planning and urban design. As complex disciplines, additional education or experience is typically required to undertake professional practice in these disciplines. Many architects, however, have successfully pursued such a career path.

PLANNING SPECIALIZATIONS

Urban planning is highly specialized, and many planners achieve advanced degrees or obtain practice experience in a variety of focused areas. Also, many plans are focused on specific, rather than general or comprehensive, subjects. Common planning specializations include:

- Code enforcement
- Community development
- Development planning
- Economic/fiscal planning
- Environmental planning
- Facilitation and community participation
- Growth management
- Historic preservation
- Housing and housing affordability
- Infrastructure development
- Land use planning
- Parks & recreation
- Planning management
- Sustainability
- Transportation planning
- Urban design
- Water resource management

For More Information

Planning and Urban Design Standards (Wiley, 2006) by the American Planning Association.

Suburban Nation (Macmillan, 2010) by Andrés Duany, Elizabeth Plater-Zyberk, and Jeff Speck.

The American City, What Works, What Doesn't, 2nd edition (McGraw-Hill, 2002) by Alexander Garvin.

Local Planning: Contemporary Principles and Planning (ICMA Press, American Planning Association, 2009), edited by Gary Hack, Eugenie L. Birch, Paul H. Sedway, and Mitchell Silver.

The Practice of Local Government Planning (Municipal Management Series) (International City/County Management Association, 2000) by Charles Hoch.

Urban Forms: The Death and the Life of the Urban Block (Architectural Press, 2004) by Philippe Panerai, Jean Castex, and Jean-Charles Depaule.

Urban Planning Today (University of Minnesota Press, 2006), edited by William S. Saunders.

Classic Readings in Urban Planning (Island Press, 2001) by Jay M. Stein.

BACKGROUNDER

FORM-BASED CODES

Elizabeth Plater-Zyberk

Form-based codes represent a new approach to regulating the built environment. Using the legal precedents for zoning ordinances, and incorporating many of the components of conventional zoning, these regulations emphasize the quality of the public realm in urban development. This essay is a revision of the foreword (by the author) to Form Based-Codes (Wiley, 2008) by Daniel and Karen Parolek, and Paul Crawford.

Elizabeth Plater-Zyberk is an architect, urban designer, and partner in Duany Plater-Zyberk & Co., and dean of the University of Miami School of Architecture. She led the consultant team that helped the City of Miami Planning Department produce Miami21, a new zoning code enacted in 2009.

"Form-based code" is a new name for an old tool for the making and remaking of the built environment. In regulating building and open space development, the form-based code focuses on the physical character and quality of public space, and on the integration of uses, as distinguished from the quantitative concerns and separation of uses of its predecessor, Euclidean zoning.

DESIGN, POLICY, AND MANAGEMENT

Zoning is a component of public policy. Policy is one of a trio of controls that shape land and building development, along with design and management. Design, policy, and management vary according to type of environment, whether nature preserve, farmland, small town, or urban core. Priority must be given to management, the maintenance of places, their safety, cleanliness, and other performance.

Facilitating management is often a goal of design. Design establishes the intended relationship among physical components of a given place. In a downtown, to encourage commercial activity and to foster visual monitoring of the public space from buildings, the buildings define the geometry

(continued)

and face of the public realm. Design specifies the desired character of place.

Policy is the legal framework for the desired relationships and performance of places, guiding design. Policy can be enacted at federal, state, and local levels. For instance, federal and state environmental policies promote the preservation and continuing health of natural systems such as wetlands and drainage ways. The Americans with Disabilities Act (ADA) is a federal policy that establishes highly specific design parameters for accessibility. Building codes, intended to ensure the structural stability and safety of buildings, are often enacted at the state level. The control of land use, building density, and bulk is usually regulated at the municipal level, as the design and management goals of such policy vary by local concern. This devolution to the local level of built environment control results in a diversity of zoning regulation, and is one reason a national urban growth policy in the United States has been elusive.

FROM FORM TO ABSTRACTION AND BACK TO FORM

The history of regulating the built environment is long and interesting, with recorded building restrictions dating to centuries B.C. The form of twentieth-century American cities and suburbs has largely been determined by the modern zoning code. Its legal foundation established by a court case of the early twentieth century, zoning has evolved as the principal instrument of policy to prevent the most egregious negative impacts of siting, size, and use of buildings.

Like the self-imposed rules of colonial-era settlements, early zoning consisted of simple use and dimension restrictions. More complex documents emerged in the years after World War II, influenced by changes in urban mobility. The space reserved in the built environment for people and their activities of work, shopping, school, and residence increasingly had to be shared with parking. The larger building site required to accommodate both humans and vehicles changed the size of buildings and the value of land. The convention of downtown building height regulation, by mid-century, was replaced by an abstraction called floor area ratio (FAR), which excluded from its calculation parking and other nonhabitable areas of buildings. Zoning gradually became a numerical affair, losing touch with its original qualitative intentions.

THE IMPORTANCE OF PHYSICAL PREDICTABILITY

With the predictability of a fixed footprint and massing set aside, other relativity followed. Building height, originally correlated to the dimension of the public space in front (a 1:1 ratio of building height to street width governed some early-twentieth-century downtowns) was exchanged for building area related to property size. And with the introduction of a flexible setback, the location of the front wall of the building was no longer required to establish the steady line of the enfronting public space. Allowable building area growing disproportionately with property size encouraged aggregation and speculation, slowing the rebuilding of older urban areas. Gone was the vision of a city of intention, its physical predictability inviting broad participation in its development. With the level playing field among investors lost, speculation became a better investment than construction.

Proof of the virtue of physical predictability can be seen today in older residential areas, which in contrast to adjacent, often derelict commercial properties, nonetheless remain intact. Single-family neighborhoods that have maintained consistent building envelope described by uniform setback and height requirements maintain their value. Neighborhoods that were up-zoned, however, have taken on the uncertainty of the commercial areas and experienced the slide into disrepair. The prescriptive as opposed to proscriptive nature of form-based codes produces physical predictability. A build-to line rather than a minimum setback, or a uniform building height, provide confidence in shared value and outcome for the investor as well the resident public.

ENCOURAGING SUSTAINABLE COMMUNITY DESIGN

At the beginning of the twenty-first century, with extreme metropolitan extension and corresponding environmental concern, the smart growth imperative demands alternatives to urban sprawl, including the rebuilding of the urban core and retrofitting underutilized commercial and industrial lands. The movement to restrict sprawl and densify the city has generated some policy at state levels to encourage this change. But after two decades of repeating the mantra of smart growth goals while vehicle-dependent suburbia continued to sprawl, a more detailed commitment to place-making seems necessary for a culture that has forgotten how to walk, use public transit, and live in proximity to daily destinations.

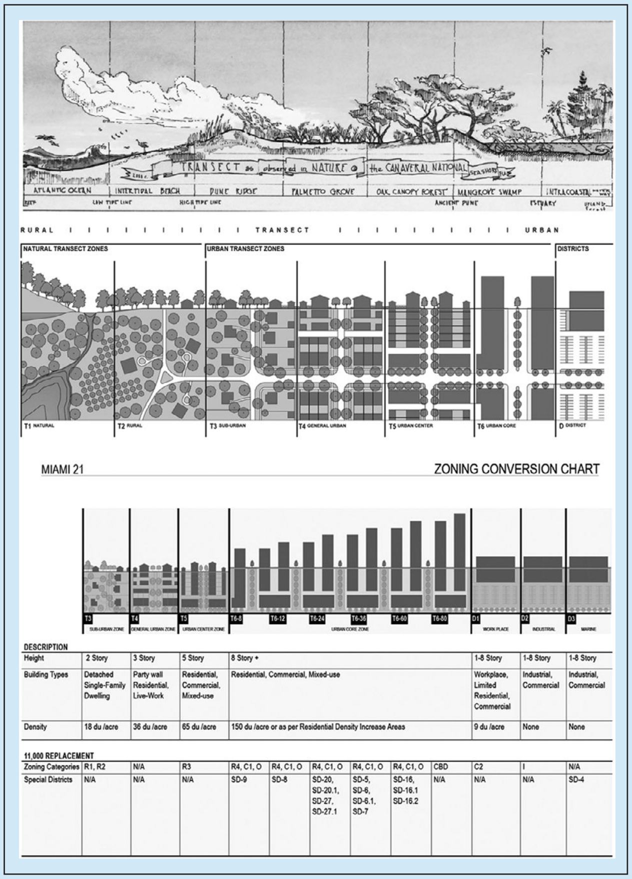
It is clear that the policy of intent is not enough. To produce successful compact transit-oriented environments, detailed regulations must specify how to arrange a diversity of uses and housing in close proximity, and how to give the desired character of walkability to public space by its components, dimensions, materials, and the qualities of the enfronting buildings. In short, form-based codes are needed to implement the intent of smart growth.

In the 1980s, the foundation for coding sustainability was laid in the development of Seaside, Florida. Its plan and graphic code distribute uses and building types on a grid of small blocks and narrow streets. Seaside's walkability and climate-responsive architecture reminded legions of visitors of the appeal and functionality of traditional urban patterns, and its market success encouraged developers to emulate its planning principles.

Seaside emerged at a time when the decades-long architectural priority for the object building was being countered by teachers such as Colin Rowe, whose figure-ground analyses of cities provided a new awareness of the geometry and quality of public space, streets, and squares; and Leon Krier, who revived the understanding of walkable dimensions, terminated vistas, and appropriate relationship of civic and private buildings and spaces. The idea of a building as a type, with multiple exemplars of one type aggregating to form public space of specific character, represented a departure from the contemporary expectation of original and innovative form for every building. And the organizing principle of urbanism as fabric and monument, private accommodation as background to monuments of civic representation, opened the door for seeking a desired effect through urban design.

Attempts to emulate Seaside's recall to urban design soon produced the awareness that the zoning, subdivision, and public works standards governing development across the United States literally precluded the building of compact, mixed-use neighborhoods, and as well, the rebuilding of existing urbanism.

For this reason, each form-based code that has been instituted in recent decades represents a hard-fought victory. The difficulty, time, and risk involved in changing local laws in the face of regulatory intransigence and the herd mentality of finance vehicles, makes the mere existence of these examples a paean to the efforts of those who have sought alternatives to the auto-dependent development that is now clearly identified with negative climate impact.



Duany Plater-Zyberk & Co.

FIGURE 13.9 Transects

VARIETY OF FORM-BASED CODES

Guided by the place-making principles articulated by smart growth, new urbanism, the transect (see Figure 13.9), and green building, the form-based code of today can take many forms. It may emphasize building type, as did the Seaside Code with eight types to encourage diversity. Or it may prioritize control of street type, as exemplified by Hercules, California; or building frontage type, as set out by the transect-based SmartCode. Categorizing the rural to urban range of settlement patterns, the transect is an evolved system of instruction for community design across a range of components.

Recent codes have taken on larger ambitions. The St. Lucie County (Florida) Towns, Villages and Countryside code governs a regional scale, guiding a county's growth with a vision of open space preservation and compact village development. Miami 21 uses the transect and a SmartCode framework to rationalize an existing range of density and form into a set of physical parameters intended to ease successional growth in the booming metropolis. In all cases the form-based code depends on the use of a typology, a catalogue of types—buildings or streets or both—to rationalize and make predictable built form and its effect on public space.

It is important to understand that the form-based code is not an architectural style regulation. While the development regulations of some new communities and historic neighborhoods may include highly specific style directives, most municipal form-based codes have no bias with regard to style. They may include, however, specifics related to green building, such as requiring high albedo or green roofs, limiting floor plate depth, or allowing encroachments beyond building lines to accommodate solar screening.

IMPLEMENTATION

Implementation of a form-based code can vary depending on local policy. As design guidelines for a greenfield development, it may provide detail under the jurisdiction of a municipal code. For a town or city it may be an option within the jurisdiction's existing zoning code, as in Sarasota, Florida; or it may replace the entire ordinance, in which case it must incorporate those conventions that represent the city's historical evolution, as does Miami 21. For a historic district, it may be an overlay to existing zoning to foster building form compatible with existing character, without changing the entire code.

Form-based codes can rationally integrate the multiple elements of city-making, from subdivision and public works standards to building density and height. This capacity is founded in the vision these codes share: a set of principles established by a high-minded and ambitious goal. This goal,

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PART 3: PROJECT DELIVERY

most succinctly identified as sustainable development, a holistic vision of community building, must be maintained as the *raison d'etre*. Understanding this, architects working under the guidance of a form-based code can look forward to the contribution their individual building designs will make to an aggregated urbanism that is livable and sustainable, in which the whole is greater than the sum of its parts, with a beautiful public realm.

As a global society swings into action to reduce carbon emissions, evidence ever more clearly points to the need to reduce dependence on vehicular mobility, and to remake the built environment as transit- and pedestrian-friendly places of dense economic and social interaction. One day these goals may be inherent in every initiative of developers, builders, and architects; but until then, the form-based code is a useful tool to help foster such an urbanism.

For More Information

Form-Based Codes (Wiley, 2008) by Daniel Parolek, Karen Parolek, and Paul Crawford.

SmartCode (New Urban News Publications, 2006) by Andrés Duany and Sandy Sorlien, et al.: www.newurbannews.com.

Form-Based Code Institute: www.formbasedcodes.org.

Congress for the New Urbanism: www.cnu.org.

Smart Growth America: www.smartgrowthamerica.org.

Center for Applied Transect Studies: www.transect.org.

CHAPTER 14

Research in Practice

14.1 Research in Practice Overview

Travis L. Hicks, AIA

Academic research has well-established methods, structures, support mechanisms, and dissemination outlets to support faculty, students, and researchers. As practice-based architectural research develops these structures and mechanisms, architects are beginning to leverage synergies with academicians and academic research.

INTRODUCTION

Integrating research into architectural practice brings the objectivity of data, metrics, and evidence to the more subjective or aesthetic aspects of practice. In a world that is increasingly dependent upon creative thinking and problem-solving skills of analysis and synthesis, "design thinking" from the creative process of design is making its way into the vocabulary of other disciplines such as business, education, and medicine. At the same time that the creative processes of architecture are being exported, the more objective, scientific processes from other disciplines are being imported into the design process. Although both subjectivity and objectivity have been present in architecture for centuries, there is a current wave of influence of research, metrics, data, and numbers in general, on professional practice.

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> ### AIA *RESEARCH PRIMER* DEFINES THREE CATEGORIES OF RESEARCH
>
> *Basic research* is "fundamental scientific investigation" and addresses building typology, practice issues, or materials and methods of construction. Note that the AIA's definition of basic research is different from the academic definition of basic research, which refers to the core data related to a research problem in that context.
>
> *Applied research* is "applying basic research findings into specific situations" and addresses leadership, practice, design, or building performance.
>
> *Developmental research* is "developing applied research results for general situations" and addresses seven broad agenda areas: social, technological, environmental, cultural, organizational, design, and educational.

While academic research and practice-based research have some differences, architects now find themselves using a variety of research methods in order to solve clients' problems, develop new technologies, and distinguish their practices from their competition. Enough overlaps and similarities exist between academic research and practice-based research that this overview of research resources is timely and relevant to practicing architects in firms large and small. This chapter will expose the reader to a wide range of topics related to research and its integration into professional practice.

RESEARCH CATEGORIES

The American Institute of Architects has offered some guidance for architects who are just beginning to explore research in practice, outlining three categories of research in its "Research Primer." This document defines basic and applied research and offers further details about the research methods and applications of those methods that fall under the category of developmental research.

ARCHITECTURAL RESEARCH METHODS

Architectural research at times looks like the scientific research of chemistry or engineering labs; at other times architectural research resembles the human-centered social sciences, environmental psychology, or behavioral sciences. Regardless of where the research falls in this spectrum, the scientific method can offer a basic framework for integrating research into practice. Beginning with far-reaching research goals, the researcher will establish a central question, or questions, to be addressed by the research. The project proceeds with the establishment of a hypothesis and research methods, the collection of data, analyses of the data, and, finally, conclusions and implications of the research. To apply this research, architects will depend upon their own interpretation and creative design process.

Research generally begins with the researchers' positioning the work relative to the existing body of knowledge and literature in the discipline. A literature review provides a background for the researcher and the reader. This background gives the researcher an opportunity to explore the theoretical, historical, technological, or contextual aspects of the topics at hand so that the contribution of the new work provides new knowledge or some challenge to the existing body of knowledge.

Architectural research methods fall into two broad categories of research: qualitative and quantitative. Qualitative methods depend on data influenced by subjective analysis and interpretation, while quantitative methods rely on objective analysis through higher-level statistical science and analysis. Qualitative data result from research methods such as natural observation, focus groups, and interviews, while quantitative data stem from metrics such as temperature, humidity, etc., that are measurable using scientific equipment. However, depending upon the kinds of information being gathered and the researcher's methodologies, the same research technique can be used to collect quantitative or qualitative information.

► Research Methods (14.2) addresses architectural research methods in further detail.

Sources of information can be primary, secondary, or tertiary. Primary sources of information or evidence represent the first appearance of information, theories, data, or other original materials upon which other research is based. Depending upon the type of research being done, these primary sources could range from documents in an archive tied to a library or other institution, or to existing buildings or other structures. It is through the analysis of these primary sources of information that academics establish new knowledge or theories.

Secondary sources of evidence are distinguished from primary sources through time, distance, or analysis. If an existing building is a primary source, then an analysis of that building, written in a journal article by someone miles away from the building and after construction of the building, is an example of a secondary source of evidence. Secondary sources are not the original evidence; instead, they are analyses, commentaries, reflections, or critiques of primary evidence. From secondary sources some architects will generate a literature review before seeking out those primary sources for more thorough research, while other architects rely on secondary sources alone.

Tertiary sources are further removed than secondary sources from the primary sources of evidence and include bibliographies, abstracts, indexes, or other lists of secondary and primary sources of information. One can find these lists in journals, books, online databases, or in individual articles. For architects diving into a new area of exploration, tertiary sources offer a starting point and a list of sources to locate before generating a literature review that can lead to original research and new knowledge.

As architects begin to explore research programs, they might find that secondary sources or tertiary sources are more readily available; however, over time and as one sharpens one's research agenda, one should seek primary sources or those sources as close to the original information as possible.

One key to this establishment of new knowledge, scholarship, or theories is the peer review process. Peer review offers legitimacy to one's work. In the academy, peer review is often a requirement for research to count as scholarship or new knowledge. Open dissemination of research through peer-reviewed journals is part of the culture of academia, while dissemination of practice-based knowledge will be more reserved due to the competitive nature of practice. Still, there are a number of firms that find an advantage through the dissemination of their work through white papers, conference presentations, and journal articles.

ACADEMIC RESEARCH IN ARCHITECTURE

While other disciplines, particularly those in the liberal arts and natural sciences, have well-established doctoral-level coursework, the discipline of architecture in the past relied on professional practice as a means to developing disciplinary expertise. Even among academics, the Master of Architecture degree held sway as the terminal degree for years; in recent decades, however, architecture programs have expanded their graduate programs to allow for more researchers and research projects. The primary research-oriented degrees in architecture are the Master of Science (M.S.), the Doctor of Architecture (D.Arch.), and the Doctor of Philosophy (Ph.D.).

According to *Design Intelligence* ("Doctorate Programs in Architecture & Design," 2005), there were 25 doctoral programs in the United States in 2005. This had grown to 29 doctoral programs by 2012, according to the Association of Collegiate Schools of Architecture. (See Table 14.1.) This increase suggests a slight growth in the number of these programs within architecture schools. In addition, there are other disciplines, such as art history or engineering,

TABLE 14.1 Doctoral Programs in Architecture

University	Location
Carnegie Mellon University	Pittsburgh, PA
Clemson University	Clemson, SC
Columbia University	New York, NY
Georgia Institute of Technology	Atlanta, GA
Harvard University	Cambridge, MA
Illinois Institute of Technology	Chicago, IL
Kansas State University	Manhattan, KS
Massachusetts Institute of Technology	Cambridge, MA
New Jersey Institute of Technology	Newark, NJ
North Carolina State University	Raleigh, NC
Princeton University	Princeton, NJ
Rensselaer Polytechnic Institute	Troy, NY
Texas A&M University	College Station, TX
University of California, Berkeley	Berkeley, CA
University of California, Los Angeles	Los Angeles, CA
University of Florida	Gainesville, FL
University of Hawaii at Manoa	Manoa, HI
University of Illinois at Urbana-Champaign	Champaign, IL
University of Kansas	Lawrence, KS
University of Maryland	College Park, MD
University of Michigan	Ann Arbor, MI
University of Nebraska–Lincoln	Lincoln, NE
University of Pennsylvania	Philadelphia, PA
University of Southern California	Los Angeles, CA
University of Texas at Austin	Austin, TX
University of Wisconsin–Milwaukee	Milwaukee, WI
Virginia Tech	Blacksburg, VA
Yale University	New Haven, CT

Source: Association of Collegiate Schools of Architecture, 2012, www.acsa-arch.org.

where individual Ph.D. candidates can pursue dissertation research centered on particularly architectural topics.

While practitioners are driven by project schedules dictated by clients, academicians' work has its own rhythm. Academic research will follow the academic calendar, factoring in individual faculty members' promotion and tenure schedules, post-tenure review schedules, grant cycles, class schedules, or other factors not common to architectural practice. Grants for college and university faculty and students are becoming increasingly competitive, yet institutions offer support through grant-writing specialists.

Research institutes have developed at some universities in order to provide centralized support and a cultural identity to faculty, students, and researchers. These institutes, such as Portland State University's Institute for Sustainable Solutions, offer opportunities for researchers to collaborate on projects and to take advantage of institutional resources, and expertise in writing grant proposals and managing large governmental or privately funded grants.

The literature of academia includes a number of scholarly journals not commonly read by practitioners. While practitioners are familiar with more mainstream journals such as *Architectural Record*, *Architect*, *Contract*, and *Dwell*, to name a few, academic research finds a more limited audience in journals such as the *Journal of Architectural Education*, the *International Journal of Architectural Computing*, and the *Journal of the Society of Architectural Historians*. These journals are generally accessible as printed documents through subscriptions, through academic libraries, or online as e-journals. Academic journals offer faculty, students, or researchers the opportunity to disseminate their work; to receive feedback, support, or criticism of their work; and to increase the body of knowledge in the profession. Unlike popular journals that are beholden to subscribers and advertisers, the academic journal maintains objectivity through peer review processes.

As an increasing number of journals go online in an e-journal format, there are more opportunities for researchers to disseminate their scholarship. Additionally, there are opportunities for academics and practitioners alike to disseminate their work through peer-reviewed conference presentations. These conference opportunities include those offered by the Environmental Design Research Association (EDRA), the Association of Collegiate Schools of Architecture (ACSA), and the Architectural Research Centers Consortium (ARCC), to name a few of the key conferences.

RESEARCH IN ARCHITECTURAL PRACTICE

In professional practice, research can match that generated by researchers in academic settings; however, practitioners will be inclined to generate research around specific projects or clients in order to maintain profitability or to win projects. Few firms are able to maintain stand-alone research practices, or research for the sake of research. Consequently, practicing architects sacrifice some of their own research agendas to make way for clients' agendas. In meeting a client's needs, the question of objectivity comes into play. How can an architect generate peer-reviewed, objective results unencumbered by competing subjective demands of a client? Despite the competing goals of objectivity and subjectivity, architects are finding ways to integrate research programs into their practices.

There are varying degrees of research integrated into the practice of architecture. Continuing education requirements demand that architects stay abreast of current trends and new disciplinary knowledge; therefore, many architects find themselves involved in a basic level of research in which they maintain a current understanding of professional literature. For those architects at the other end of the spectrum, research is more than just reading literature or taking a passive approach to research; these architects are actively engaged in research, funded through grants or partnerships, which is disseminated through peer-reviewed outlets. Between the two extremes there are other levels of research that will be addressed later in this chapter.

Unlike academic research schedules, the timeline of projects and, in turn, practitioners, is dictated by the client's business goals and schedules. The opportunity exists for academicians and practitioners to collaborate on research projects in order to take advantage of each other's strengths. Practitioners will have access to clients, existing buildings, and real-world design projects unavailable to the academician. The academic, however, will have familiarity with funding agencies, grant-writing skills, and space to undertake research projects. Collaborative efforts between academicians and practitioners can prove beneficial to both.

TRENDS IN ARCHITECTURAL RESEARCH

Evidence-Based Design

Evidence-based design (EBD) is a term associated with a design process that includes research as part of its methodology, with the critical application of knowledge gained through research in a specific design project. Evidence-based design has its origins in environmental psychology, evidence-based medicine, and health care design; however, as more architects and clients find value in the contribution of research into design, EBD as a process has expanded into other building and project types. Where the goal in evidence-based health care design might be related to patient health and well-being, the goal in these other building types will be different. In retail environments, for example, an evidence-based design goal might be to increase product sales and corporate profits. Consequently, the kinds of evidence sought after will vary from project type to project type.

While research can be applied to any project or building type, there are certain types that, due to their very nature, have had more time and energy focused around their research. As a logical progression from evidence-based medicine, health care architecture and design have leveraged evidence-based design practices. Additionally, learning environments, workplace environments, and retail environments rely on evidence-based design. With a growing movement toward evidence-based design practices, practitioners and academics alike are seeking training, experience, and credentialing in EBD short of pursuing a Ph.D. or other advanced degree. For this audience, the Center for Health Design, founded in 1993 by a group of health care design professionals, has established criteria for accreditation and certification through the Evidence-based Design Accreditation and Certification (EDAC) examination.

SELECTED FIRMS WITH RESEARCH PROGRAMS

- *Architecture Research Office*
  See the backgrounder Case Study: Architecture Research Office, by Kim Yao, principal, in this section for more information about ARO. (www.aro.net)
- *KieranTimberlake*
  Stephen Kieran and James Timberlake were the inaugural recipients of the Latrobe Prize for research in practice awarded by the AIA College of Fellows in 2001. The work of their firm seamlessly integrates research into practice with projects such as the SmartWrap™ building envelope system. (www.kierantimberlake.com)
- *Gehry Technologies*
  Founded in 2002, this spin-off of Frank Gehry's practice provides advanced technology services through research and development of technological solutions. Inspired by digital technology used in aviation and automotive engineering, the work of Gehry Technologies has produced innovative architectural forms by integrating research into design. (www.gehrytechnologies.com)
- *Gensler*
  Launched in 2005, Gensler's research program leverages the sheer volume of work done by this large global firm and the number of staff available to generate research and new knowledge. There are three components to Gensler's research initiative: evidence-based design, research methods and tools, and trends forecasting. One significant contribution of this multifaceted approach is Gensler's Workplace Performance Index®, a tool for correlating design to workplace performance. (*dialogue*, issue 19, Special Edition: Research, 2011)
- *Skidmore Owings & Merrill*
  SOM has teamed with Rensselaer Polytechnic Institute to form the Center for Architecture Science and Ecology (CASE), a collaborative think tank that brings together academics, practitioners, and manufacturers to study high-performance design issues in urban, global settings using actual buildings as research test cases. Launched in 2008, CASE has secured external funding from sources such as the National Science Foundation, the Environmental Protection Agency, and the AIA. (www.case.rpi.edu)

Materials and Technology Research

Current trends in digital fabrication have offered architects the opportunity to develop research around digital technology. Laser cutters, CNC routers, and 3D plotters have given rise to computational research and parametric design research. Rapid prototyping has allowed architects to develop custom material details for innovative systems three-dimensionally, economically, and quickly. Easy access to this equipment has made it easier for architects to produce material and technology research.

▶ Evidence-Based Design (14.4) further addresses the use of research in architecture practice.

Research into the development of new materials gives architects the chance to branch out and to address issues such as new sustainable materials. Researchers who are developing intelligent skins, recyclable materials, and building systems have been able to take advantage of research into building materials and technology. Building information modeling (BIM), parametric modeling, and other areas of digital technology have been integrated into research programs as architects develop hardware and software that offer insights into streamlining the design and construction process. Organizational support for digital and materials technology researchers exists through the Association for Computer Assisted Design In Architecture (ACADIA).

The aforementioned collaboration between SOM and Rensselaer Polytechnic Institute, CASE, has a number of research projects in the area of next-generation building systems. CASE's researchers are pushing the development of new materials and systems such as integrated desiccant systems, ceramic façade and structural systems, and integrated solar façades.

Organizational Research

As companies are faced with growth or shrinkage of their businesses, architects are called upon to support this spatial and organizational restructuring. Change management is a service that more architects are offering, and it involves the kind of research connected to organizational studies. Organizational research, grounded in the disciplines of business, sociology, psychology, and behavioral sciences, offers insight into the relationships between business objectives and the design of architectural form and space. Through this lens, architects, designers, and researchers try to understand organizations through a number of different research methods.

The kind of research generated by furniture manufacturers, such as that by Knoll Workplace Research, supports the trends in organizational research. Workplace strategists have found a niche market in supporting organizations that have changed as a result of globalization or the economy. Organizations request that these strategists help determine efficiency, space planning, branding, etc., related to the organization's restructuring.

The aforementioned Workplace Performance Index is a ratings-based tool developed by Gensler to illustrate relationships between design and performance. These relationships are of particular interest to businesses seeking to improve their attraction, retention, and engagement of staff while increasing their profits. Data gathered through workplace and organizational research has proven invaluable in strengthening the value of architects and designers in corporate office environments.

Sustainable Design Research

Another trend in architectural research is in sustainability. Sustainable design research has ranged in scale, including that of the molecular and chemical structure of building materials, and whole building systems integral to the architecture, energy sources, and environmental quality. One can point to the USGBC's LEED rating system, the EPA's Energy Star program, and any number of product rating systems as sources for the increasing number of research projects related to sustainable design.

Sustainable design initiatives have encouraged a burgeoning culture of green research. William McDonough and Michael Braungart have inspired a generation of scientists who will redefine the way building materials are made, used, recycled, upcycled, or repurposed. McDonough and Braungart Design Chemistry (MBDC) is a consulting and certification company that certifies products with the Cradle-to-Cradle label. By setting high standards for interior products, MBDC has caused product manufacturers to invest more time, money, and energy into research and development. As manufacturers develop more sustainable materials, indoor environmental quality research has led to more restrictive regulations for the content of interior finish materials. Greenguard Environmental Institute (GEI), for example, is an industry leader in establishing healthier indoor environments by establishing criteria for the content of products and materials.

Building commissioning as a project phase has also injected sustainable design research into building systems development. This development of more energy-efficient mechanical, electrical, and plumbing systems is spurred by market demand for these systems due to higher energy costs and an economy requiring such efficiency. Related to these developments in systems, alternative energy research has led to developments in solar, wind, and geothermal energy sources. One exemplar of alternative energy research and development is the National Renewable Energy Laboratory, the sponsor of the biannual Solar Decathlon competition. Colleges and universities as well as product manufacturers and vendors have invested millions of dollars to develop state-of-the-art residential designs that operate off the grid for this competition.

▶ The backgrounder on What Architects Need to Know About Building Commissioning (10.10) further discusses commissioning as a project phase.

RESEARCH AND SUPPORTING INSTITUTIONS

A variety of institutions have contributed to the integration of research and practice. One of the first and most prolific was the Educational Facilities Laboratory, which generated a wealth of research information and has served as a database for information on educational environments since its founding in 1958. The University of Michigan's Architectural Research Laboratory was one of the earliest proponents of design research in academia. Founded in 1948, this lab was a pioneer in integrating design, technology, and construction with research.

The AIA has a history of research-oriented discourse dating back nearly 100 years. According to Hadley (*A History of Research at the AIA*, 2009), the AIA Scientific Research Committee was founded in 1924, followed by a Research Advisory Service in 1949, and various entities in the 1960s including a Department of Research, Committee on Research, and Division of Research. In 1972 the Research Corporation was founded, focusing primarily on energy, followed by the Architectural Research Council in 1982. In 1986 the AIA entered into partnership with the ACSA to form a joint Architectural Research Council. The Architectural Research Centers Consortium (ARCC) is a global consortium of research centers focused on architectural research and design. ARCC hosts conferences that bring together academic researchers in schools of architecture from across the globe. (www.arccweb.org)

The European Association for Architectural Education's (EAAE) Charter for Architectural Research is a formal document that provides a framework and guidelines for architectural research. The intended audience of this document includes universities, practitioners, and others involved in architectural research. (www.eaae.be)

The Environmental Design Research Association (EDRA) holds annual conferences where scholars meet to discuss the latest scholarship in the discipline of environmental design. Founded in 1968 by a group led by Henry Sanoff, EDRA brings together people from a wide range of disciplines, including architecture, planning, interior design, environmental psychology, and sociology. (www.edra.org)

The Association for Computer Aided Design in Architecture (ACADIA) is an organization that promotes the research and development of computer software and tools that assist in architectural design and construction. ACADIA holds an annual conference where its members present their research and scholarship. ACADIA members consist of academics, practitioners, and computer industry professionals. (www.acadia.org)

Funding Sources

Architectural research is supported locally through architecture firms, college and university research programs, public-private partnerships, or product manufacturers; nationally and internationally architectural research is supported through public and private organizations, associations, and government grants, such as the National Science Foundation or Department of Energy. The AIA's support for research has waxed and waned with the economy and in response to the national and global discourses of the times. With recent trends in sustainability, BIM, disaster relief, and other global issues, the AIA has renewed its commitment to supporting research. Initiatives include the Latrobe Prize and the Upjohn Research Initiative.

Named for architect Benjamin Latrobe, the AIA's Latrobe Prize is awarded biannually to support research projects related to the advancement of the profession of architecture. Projects are selected by the College of Fellows through a competitive RFP process. In recent cycles the Latrobe Prize has been in the amount of $100,000 awarded in 2011 to "Public Interest Practices in Architecture," representing a team of academics and practitioners who are studying the realm of public interest architecture practices.

The AIA's Upjohn Research Initiative offers smaller research grants of matched funds to individuals or teams working on research to advance the profession. Recent recipients of the Upjohn Research Initiative grants include the project "Active Passive Environmental Systems," led by principal investigators from Sci-Arc and USC. For more information or to read RFPs for these research awards, visit www.aia.org/practicing/research/index.htm.

The Boston Society of Architects' Research Grants in Architecture program is dedicated to "practice-based and practice-oriented research that expands the definition of research in the profession and the industry…." Proposals that support collaboration among practitioners, students, and academicians are encouraged (BSA, "Research Grants in Architecture," 2012).

Founded in 1956, the Graham Foundation for Advanced Studies in the Fine Arts "makes project-based grants to individuals and organizations and produces public programs to foster the development and exchange of diverse and challenging ideas about architecture and its role in the arts, culture, and society" (Graham Foundation, "Grant Programs," 2012). Grants to individuals fall under two categories: (1) production and presentation, and (2) research and development. Grants to organizations are typically awarded to 501(c)(3) tax-exempt organizations, or in cases where the public is clearly served by the projects. In addition to these grants, the Graham Foundation also has an awards program for doctoral candidates as well as for periodic public exhibits and events.

The Robert Wood Johnson Foundation is another potential source for design research funding in the area of health care architecture and design. Historically the RWJ Foundation has supported research on the physical environment as it relates to their program areas: childhood obesity, health coverage, health professionals, health-related innovations, and public health (RWJ, "Program Areas," 2012). Much like the Graham Foundation, the RWJ Foundation offers grants to tax-exempt organizations such as universities and public agencies.

Government grants are potentially the most competitive and difficult for architects to win; however, these grants tend to be the most robust and substantial. Grant opportunities exist from the National Science Foundation, the National Institutes of Health, and the Environmental Protection Agency, to name a few sources. The mission of the NIH is "science in pursuit of fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce the burdens of illness and disability" (National Institutes of Health, "Mission," 2012). The funders invite U.S. small businesses to submit Small Business Innovation Research (SBIR) grant applications (Department of Health & Human Services, "Guide," 2012). Similarly, NSF offers small business innovation research programs and funding and has several programs for which architectural research is appropriate and relevant.

While practitioners are well versed in writing marketing proposals, many architects will find grant writing a seemingly foreign language. One approach for the practitioner is to forge partnerships with academicians more familiar with the grant-writing process, its nuances, and the administration of successfully funded projects. With most long-term research projects, the researcher should start small, build capacity through pilot projects or studies, establish a clear line of inquiry, and then pursue larger grants.

The rest of this chapter will provide a broad survey of research methods, applications, and case studies that should give the reader a better understanding of research in architectural practice and a starting point for applying research in one's own practice.

For More Information

Place Advantage: Applied Psychology for Interior Architecture (Wiley, 2009) by Sally Augustin.

Architectural Research Methods (Wiley, 2002) by Linda Groat and David Wang.

Evidence-Based Design for Multiple Building Types (Wiley, 2009) by D. Kirk Hamilton and David H. Watkins.

Qualitative Research: A Personal Skills Approach (Pearson Education Inc., 2006) by Gary D. Shank.

"Design Research," special edition of dialogue, a Gensler publication: http://www.gensler.com/uploads/documents/D19_03_08_2011.pdf.

BACKGROUNDER

ARCHITECTURE RESEARCH OFFICE

Kim Yao, AIA

This case study discusses the integration of a research program with practice at Architecture Research Office (ARO).

Kim Yao is a principal of the firm Architecture Research Office. She holds a Bachelor's of Arts in Architecture from Columbia College, Columbia University, and a Master of Architecture from Princeton University.

Architecture Research Office (ARO) is a 25-person architecture practice based in New York, New York. Our office's structure is based upon the studio method derived from architecture education and is oriented to work focusing on the integration of design and craft. The exchange of ideas, through discourse and pin-ups, is prominent. Research informs and inspires our process; our process, in turn, structures and disciplines our approach to inquiry. Whenever possible we take each project as an opportunity to augment our knowledge and expertise on issues ranging from urban to domestic, functional to conceptual, public to private. We also initiate our own research projects, to explore and investigate areas of interest to us and relevant contemporary issues of importance to the profession. Three categories encompass ARO's research program: issues, projects, and practice.

ISSUES

Our office-driven initiatives usually arise around issues from general architectural discourse or topics with immediate social relevance. While typically instigated internally, this research also provides productive overlap with projects and client-based work. For engaging projects where research of specific ideas can be in the foreground, a particular concern may be finding funding and/or offsetting cost for that research. Grants provide one means to pursue self-initiated research.

In 1998, ARO received a grant from the New York State Council on the Arts to investigate the relationship between computer-aided design and manufacture (CAD/CAM) and traditional craft practices. Work on this topic led to a gallery installation, product design, and, indirectly, to the commission for a private residence.

Museums, academia, and professional organizations also offer opportunities for pursuing firm-driven research in the form of ideas, competitions, collaborations, or grants. Organizations like the New York–based Van Alen Institute or the Storefront for Art and Architecture, which offer venues for architectural discourse and display, historically have challenged practitioners to submit concepts in response to current issues or design problems.

The American Institute of Architects (AIA) College of Fellows offers the Latrobe Prize Fellowship with significant funding to back research initiatives. ARO contributed to the 2007–2009 Latrobe Prize, "On the Water: Palisade Bay," a proposal led by structural engineer Guy Nordenson and landscape architect Catherine Seavitt to anticipate how climate change and sea-level rise will transform the New York City waterfront. Barry Bergdoll, Philip Johnson Chief Curator of Architecture and Design at the Museum of Modern Art (MoMA), used the study's final report as the basis for the exhibition "Rising Currents: Projects for New York's Waterfront" in 2010. The exhibition was part of MoMA's Issues in Contemporary Architecture program, which provides a prominent platform for research and design addressing key contemporary issues.

PROJECTS

Projects offer the easiest access to architectural research opportunities of all types. The questions posed are traditionally ones of site and program. Each of these areas offers infinite opportunity for research (for example, historic, social,

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environmental, economic for site; relational, functional, hierarchical, organizational for program).

Projects and the collaborative process of the design team can also provide ample opportunity for specific research. We strive to work with firms that believe in collaboration—where the sharing of ideas and development of solutions is integral to the design process. Often we actively identify designers from whom we hope to learn; their area of expertise should complement and ultimately augment ours, in order to better each project.

In 2009 we entered a design competition called "From the Ground Up," organized by Syracuse University and two nonprofit regional organizations aiming to create a highly sustainable, low-income single-house prototype located in Syracuse, New York. ARO teamed with Della Valle Bernheimer Architects and energy consultant David White. In addition to addressing the competition's programmatic and budgetary requirements, our team decided to design in accordance with the German Passivhaus standard, a strategy that felt uniquely appropriate to the parameters of the competition. Passive houses can exceed LEED Platinum for energy efficiency and sustainability. We used the competition as a vehicle to simultaneously distinguish our design's performance while learning about a standard that is becoming increasingly prevalent and pertinent. Our entry, R-House, was among three winning designs that were constructed in 2010.

In ARO's work, we use an active and information-driven pre-design phase to balance these questions and to navigate the outset of each project. Ultimately, pre-design offers a distinct opportunity to gather and analyze information prior to putting forth an early conceptual design. During this phase project parameters are set, ranging from the practical to the abstract. A series of goals and criteria are the outcome of the phase, forming the basis for future design phases.

For higher education clients, this phase can be pivotal in establishing program, site, budget, and design agendas, as well as project delivery methods. A pre-design study for the Friedman Study Center at Brown University demonstrated how the client could meet all program goals within a smaller total project area than originally planned by the university. This strategic shift, from an initial assumption to a researched conclusion, increased the construction cost per square foot of the project, while saving valuable real estate for future academic programs. When possible we also return to our clients, following occupancy, in order to ascertain how a project is performing and how users occupy the space (this process can be formalized with a postoccupancy evaluation).

PRACTICE

We consistently question and challenge our assumptions about how ARO practices architecture and services each project. Our tools are a means to understand environments and to represent our design work. We discuss and plan for software and hardware upgrades and acquisitions. We also critically evaluate our techniques, and how these can be best supported through software and process.

Beyond design production tools, this research extends to project management and financial software. We endeavor to apply technology wherever appropriate to the changing needs of practice, which includes new financial management tools as well as parametric design software. But we have also sought new efficiencies in very practical challenges like file management and e-mail archiving.

We also question our design process. For building projects, collaboration can involve a typical team of engineers and designers, or collaborating architects. For planning, it can entail identifying different techniques for brainstorming or envisioning a project. We do this externally in terms of design team selection and identifying opportunities for collaboration.

In 2008 we prepared a study for The Alliance for Downtown New York in response to their need for a master plan for a 40-acre site between the new World Trade Center and Battery Park. The goal was not to propose a single vision but to influence decision making in the city. In lieu of a master plan we proposed a strategic framework founded on a series of design principles intended to guide development and planning in the neighborhood. The final document was called Five Principles for Greenwich South: A Model for Lower Manhattan. We invited 12 architects, landscape architects, engineers, and artists to design hypothetical projects to test and illustrate the principles for the final document and subsequent exhibit.

Perhaps most important, we consistently engage in discourse within the office via frequent administrative and project management meetings and design reviews. While this discourse is an outgrowth of our design process, it is instrumental in how we structure the office. We set our own goals, and through discussion identify issues of interest, in turn influencing project selection, and ultimately transforming the practice. We are self-critical in order to consistently challenge ourselves to design better.

SUGGESTIONS FOR IMPLEMENTING A RESEARCH PROGRAM

- Be inquisitive and ask questions of your peers, clients, and colleagues. Make this inquiry part of your design process.
- Participate in lectures, symposia, and seminars through professional organizations and universities in order to stay engaged in contemporary issues (professional, urban, environmental, etc.).
- Acknowledge when you can benefit from others' expertise in order to identify opportunities for collaboration and learning.
- Protect your design process and promote the value of strategic thinking by adequately building pre-design into project schedules.
- Engage in critical discourse within your office and among your peers, in order to better your design process and project and office management.

BACKGROUNDER

RESEARCH AND SMALL-FIRM PRACTICE: INTEGRATION AND IMPLEMENTATION

Susan Jones, FAIA, LEED AP

This case study presents different strategies on how to use the unique strengths of a small firm to integrate research and generate richer and more meaningful design. A small firm is herein defined as a firm employing fewer than 10 persons.

Susan Jones is principal of atelierjones in Seattle, Washington, a small firm that has been recognized by numerous national and local design awards, and has been published nationally and internationally. Jones also teaches graduate design studios as affiliate associate professor in architecture at the University of Washington.

DEVELOPING A SPECIALIZED RESEARCH STRATEGY

Traditional research is defined as generating new knowledge through specialization within a particular field or endeavor. Large firms seem well suited for a successful research agenda given the usual criteria: focus, long-term commitment, mastery of existing knowledge, and innovation or generation of new knowledge within a specific field. Likely, the resources—both human and financial—required to commit to this sort of traditional research agenda are not available to a typical small firm.

For the small firm, less likely to focus on large, highly technical buildings demanding deep specialized knowledge, broader research agendas can be developed that may respond to particular cultural, community, or environmental issues. Small-firm research agendas may be more likely to align with personal values of the firm's founder, or be theoretical issues uncovered through aligning with academic institutions. Given the grand challenges that our built environments pose for our natural environments, our profession's commitment to research at all scales is ever more necessary.

How then can research be conducted within the context of a small firm?

RESEARCH AS DESIGN GENERATOR

Research that applies design intelligence to existing knowledge to develop new design knowledge can be strategically scalable to the small firm. Where traditional research generates new, deeper specialized knowledge within one field, design research generates new, broader knowledge out of existing, specialized knowledge. The opportunity for design firms—large and small—is to leverage existing knowledge and generate new, innovative design. Integrating research into a design practice in this way enables firms of all sizes to engage in design research without the larger commitment required to generate specialized forms of new research knowledge.

DEFINING A RESEARCH STRATEGY FOR THE SMALL FIRM

Specialization in order to better use the limited resources of an architecture firm is a common, tested method of a successful architecture practice. Some firms, however, may choose to invert that model and focus almost exclusively on projects that are not commonly undertaken, and therefore have no specialists in that project type. For these firms, it is necessary to absorb a research methodology based on inquiry within the design process in order to successfully complete these new project types, and for the firm to flourish.

Such research-based practices strategically seek out opportunities that have not yet been built, tested, or designed. The design research firm strategically seeks out employees who question and are constantly skeptical of methods or solutions that have been designed or built before. Over time, this design research firm may develop a reputation for its ability to critically analyze the existing context and knowledge, and develop and build design solutions that have not been generated before. Because this strategy is often initiated by the personal passion of one of the leaders of the firm, it is well suited to the scale of a small firm.

The first element of success is internally based—defining the general area of focus, attracting key employees who share that passion, and building an environment of inquiry and collaboration within the firm. The second element of success is externally based—developing permeable boundaries to the firm in order to leverage external sources of knowledge and shared passion. Both of these elements of success are well suited to the small firm.

LEVERAGING DESIGN RESEARCH INTERNALLY

Engaging in research at any scale involves commandeering resources, both human and financial. Small firms can be more subject to contraction based on economic conditions, and when they are, the loss of one person is a significant percentage of the firm size. In addition, because projects are often small and have shorter durations, downtimes between projects may be more common and have greater economic impact on the firm. Embracing a design research agenda that

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has continuity throughout the life of the firm is an ideal way to even out the levels of workload and boost employee morale within a firm. With a broader research goal in mind, some of the most productive times for the small firm can be between projects—assuming the principal has planned financially for these short but intense bursts of research work. By returning periodically to issues of deep, passionate concern to the founder and all of the employees, the entire firm is enriched and the design life of the firm both deepened and broadened.

DEVELOPING PERMEABILITY: LEVERAGING EXTERNAL SOURCES

Often, as entrepreneurial architects, the founders of small firms are comfortable with risk and have deep dedication, personal talent, and passion for architecture. Staying closely involved with the projects is often a source of deep satisfaction. The small-firm founder is also the most externally focused in the firm, responsible for the broader connections that result in new projects enabling the firm's continued success. It is in this context that the small firm can begin to leverage its ability to engage with research. Like many architects, small-firm principals find themselves jumping in scale between large issues and smaller detail issues. Recognizing this proximity to both project issues and broader context issues as a competitive advantage can be a valuable way to create and maintain a strong research culture within a small firm.

No firm or individual within a firm can hope to master the myriad issues any one project contains. However, by creating and cultivating a permeable knowledge boundary around the firm, a small firm can embrace broader circles of knowledge by intersecting with recognized national and international primary sources of knowledge. Mining these external fields for productive methodologies and design opportunities allows the small firm to leverage this knowledge in ways unique to its practice, usually through the curiosity and passion of its founder.

The small firm's intimate engagement with projects can create immediate opportunities to leverage that deep external knowledge base, overlay it with design intelligence, and create new design knowledge. Indeed, the very constraints outlined above—both human and financial—can raise the level of external knowledge, since the small firm must rely on external experts, and the information is filtered at a very high level of design intelligence—because the firm is, by nature, small.

Leveraging passion for issues central to the small firm in order to create fruitful external partnerships, across academic or nonprofit lines, is another area of important leverage. The small-firm founder or key employees may have more freedom to create time between projects, which enables them to teach. By forming strong relationships within an existing academic environment, architects have the chance to collaborate with students—to teach—and engage in design research within mutually compelling areas.

Leveraging mutual areas of passion is the backbone of fruitful collaborative partnerships between external nonprofits and architecture firms. Driven by issues born out of an ethical or personal imperative, the small firm that identifies similarly driven nonprofits or related corporate entities can collaborate, maximize each other's complementary strengths, and work together to create stronger, more authentic and valuable design research.

Some of the most spectacular examples reside in the myriad nonprofit organizations that have sprung out of environmental fields, such as the International Living Building Institute and its early start with key former employees of Bob Berkebile's small firm in Kansas City, now BNIM. The small firm that truly engages with external values-based organizations is in a strong position to understand those organizations' needs, and apply their design intelligence to addressing issues that were never identified before, creating new design knowledge and even new markets. Again, driven by the necessity to leverage external collaborations, the small firm has a unique advantage.

PROACTIVE DESIGN LEADERSHIP

Ultimately, engaging in design research allows firms to uncover, understand, and reveal rich areas of research often not conceived of as design opportunities. The strategy of incorporating research as a design generator allows architects to uncover new project types, new project materials, new construction techniques, even new sites or new clients for firms of any scale. By conceiving of the small firm within such a broad continuum of both speculative and tangible issues, the small firm can achieve a strong, proactive position of ethical design leadership. This proactive design leadership often allows the small firm to then adapt more quickly to new opportunities that arise for the future of the firm.

For More Information

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Building Community: A New Future for Architecture Education and Practice (Jossey-Bass, 1996) by Ernest L. Boyer and Lee D. Mitgang.

"Reflections on Architectural Research" by Daniel Friedman, FAIA, in *Architecture: Celebrating the Past, Designing the Future* (AIA and Visual Reference Publications Inc., 2006), ed. Nancy B. Solomon, AIA.

"A History of Research at the AIA" (AIA, 2009) by Nancy Hadley, Assoc. AIA: http://www.aia.org/practicing/akr/AIAB081882.

14.2 Research Methods

David Wang, Ph.D., RA

This article covers a definition of research and the distinction between research strategies and tactics. It applies these terms to some representative cases of current research relevant to architects.

INTRODUCTION

For purposes of this article, research is defined as *any activity that yields evidence to inform actionable decisions*. This definition covers all the essential factors of research, but in a fitting way for architects, as explained below.

Research Activity

Some years ago, the *Journal of Architectural Education* published an issue focused on research. One contributor, MIT Professor Jan Wampler, wrote that research amounted to walking around and looking at things ("Watching," *JAE*, 1979). When it comes to design as a set of actionable decisions architects make, some of it does indeed begin with just looking at things. It is said that when Le Corbusier was designing the famous shell-like roof on his Ronchamp Chapel, sitting on his desk was a seashell that he had picked up on a beach stroll years earlier (*Texts and Sketches for Ronchamp*, Jean Petit, 1965). Or consider the fact that architecture education once included "The Grand Tour," in which a young architect would be sent to travel in Europe for a length of time. The idea was to go around looking at things.

However, research in architecture involves more than just looking around. Research requires focused activity. This article will introduce the reader to the basic qualities, methods, and concepts of research that will produce useful, verifiable results with application to practice.

Research Evidence

Research must result in *evidence*. The dictionary defines evidence as "that which tends to prove or disprove something; ground for belief; proof." What disqualifies much (but not all) of "looking around" activity as research is that it yields no outcomes, which is to say, it yields no evidence. Several years ago, this author published an article that evaluated research methodologies in 253 papers presented at architecture conferences (Wang, 2006). A very small percentage of these "research" papers had measurable outcomes. There was little in them that can be used by others for future actionable decisions. Evidence, on the other hand, is *measurable*. Once something is measurable it is taken out of the realm of subjective experience; it becomes understandable by, and useful to, others.

Research Extrapolation: From the Specific to the General

Evidence is information *about* something; if we have this information, we can *use* it in future applications. For example, we now know that the following factors contribute to disorientation in wayfinding for residents in adult care facilities: lack of architectural

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reference points, long corridors with many doors, lack of windows or access to windows, and ad hoc signage. We know all of this because focused research was conducted to give us evidence that, for instance, long corridors with many doors distracts seniors in their ability to navigate to and from their rooms (Anjali Joseph, "Health Promotion by Design in Long-Term Care Settings," Center for Health Design, 2006). The useful nature of this information is evident for all who are involved in senior care, from designers to administrators to family members.

In what follows, this article first addresses different ways to gather evidence for actionable decisions, including an overview of research strategies and tactics. Following this, two examples from AIA published research are provided.

RESEARCH: GATHERING EVIDENCE FOR ACTIONABLE DECISIONS

This section addresses ways of seeing, or *strategies*, and ways of doing, or *tactics*. This distinction is useful in sorting through how to gather evidence for actionable decisions. Thinking in terms of strategies and tactics helps to develop *habits of mind* that see everyday aspects of practice in research-oriented ways. Much of the research addressed in this section is done by related industries in support of the architecture profession. The results often come to architects in the form of manufacturers' product information, or in various references from organizations architects depend on daily (UL assemblies ratings, for example). In this sense, for an architect, understanding the research behind a piece of information is helpful in evaluating the credibility of that information. But one thing is clear from the AIA websites: *Active* research is increasingly a part of what architects do.

Research Strategies: "Ways of Seeing"

All humans interact with the world in a variety of definable ways. These ways can be considered ways of "seeing" the world. For example, a significant amount of architecture practice presumes a *causal* world. The UL ratings for doors and wall assemblies, the structural strength of materials, the performance of thermal insulation, the flame spread ratings of carpeting, etc., are all based on the assumption of *causality.* Each of these materials and assemblies has undergone tests that determine predictable outcomes (dependent variables) as the result of causal interventions (independent variables). For instance: Given a fire (the independent variable), this door will hold for two hours (the dependent variable).

Another way of "seeing" is *correlational*. Consider again the example cited above regarding seniors and wayfinding. All of the evidence cited can be demonstrated *correlationally*. Long corridors will not *cause* all seniors to lose their way, but a statistically significant number of them will. This suggests that difficulty navigating corridors is *correlated* to age and the length of the corridor. This can be noted as useful information for future design decision making.

A third way of "seeing" is *qualitative*. Suppose an architect is embedded among a group of seniors as they find their way through a facility, documenting what they say, and charting how they wayfind. Suppose the architect then interviews them and records their reports of how they made sense of their experiences. This kind of research will not reveal causal links, and will probably not produce anything dependably correlational. Nevertheless, it can provide a rich *qualitative* understanding of how seniors experience this particular environment. This type of outcome can also inform designers in future related projects.

Causal, correlational, and qualitative are different ways of seeing the world. (Causal and correlational are often subsumed in the general term "quantitive.") "Seeing" is the word used because a research strategy itself does not entail any actions. Actions derive from tactics, which are considered in the next section. A research strategy simply determines how one "sees" a way toward a solution to a research question. Much of this depends on the nature of the problem. For instance, if the question has to do with flame spread rating or structural loading, most likely the strategy will be a causal, which is to say, an experimental approach. If the question concerns the health of seniors relative to residential environments, most likely the strategy will be correlational.

There are other research strategies that affect architecture practice, such as history research and simulation research. Architects involved in preservation are specifically involved in history research. To this end, the AIA Historic Resources Committee is one source. Its website (http://network.aia.org/HistoricResourcesCommittee) links to the *Guide to Historic Preservation*, which not only defines history research at the strategic level, as Preservation, Rehabilitation, Restoration, and Reconstruction, it also provides a list of research tactics in this arena. In addition, architecture practice, in general, involves historical awareness. Buildings by definition endure through time; they come from a set of cultural-temporal roots, and they move a culture forward in time. The design of a successful building is difficult without some sense of history.

Simulation is another important research strategy. In 2012, this is one of the most actively evolving research arenas, thanks to the rapid progress of computer technology. One result is that simulation modeling blurs the lines between strategy and tactics; the next section notes that computer simulation can easily be used tactically quite apart from (or in conjunction with) any research strategy. Simulation is the representation of real-world settings such that real-time inputs can be used to generate real-time outcomes. Note that this definition does not require simulation to be linked to computers. Simulation research without using computers can be seen in enacted emergency scenarios, from simple fire drills, to complex events such as terrorist attacks, or earthquakes. For example, a large firm in Seattle uses the simulation of emergencies at hospitals (as Figure 14.1 depicts) as one way to calibrate its designs to the needs of users.

NBBJ

FIGURE 14.1 Simulation with Human Actors at Valley Medical Center, Renton, Washington

Research Tactics: Actions for Data Collection

In contrast to research strategies, research tactics are actions taken to procure the data needed to make actionable decisions. The *Guide to Historic Preservation* referred to above, for example, provides several lists that have tactical relevance. Where can one find information about a historic building? Answer: local lists, statewide surveys, the National Register of Historic Places, the World Heritage List. What can be done to generate evidence? Answer: documentation, condition survey, conservation analysis, archaeological research, building chronology, landscape analysis. The list goes on. The difference between strategy and tactics should be clear: Tactics involve *actions*.

A good example of tactics can be found in an article published on the AIA Architects Knowledge Resource (www.aia.org/akr) titled "Pre- and Post-Occupancy Evaluation of the Arlington Free Clinic." Strategically, occupancy evaluation usually falls in the range of correlational to qualitative. In this article, the authors provide a list of what is entailed at the tactical level:

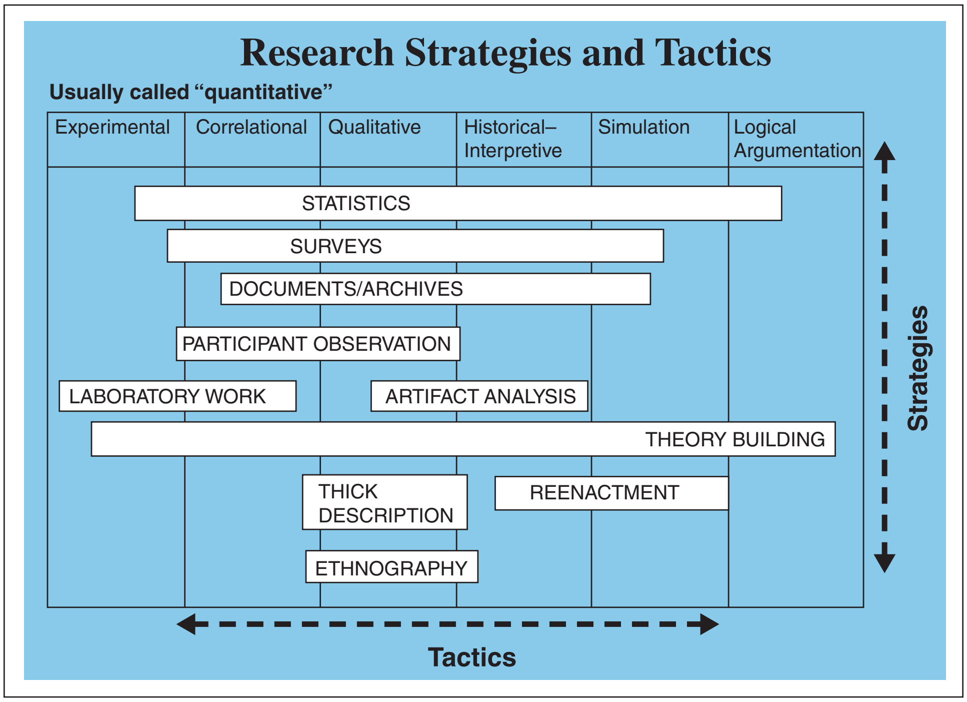
> Occupancy evaluation (OE) can be portrayed as a multistep procedure that consists of establishing a purpose, collecting and analyzing quantitative and qualitative data, making an assessment, and stating the lessons learned (Kennon et al., "Evaluating Health care Facilities," *The Journal of Health Administration Education*, 1988) … Evaluations assess the effectiveness of design decisions for human users (Zimring and Reizenstein, "Postoccupancy Evaluation," *Environment and Behavior*, 1980) or with regard to building system operations. … Evaluations often focus on new buildings, but they are most effective when information is collected from both the predecessor building (preoccupancy evaluation) and the new building (postoccupancy evaluation). This approach allows for effectiveness comparisons (Shepley, et al., 1988).

The goal of all of these actions was to obtain measurable outcomes for how a building design can have an impact, physically and organizationally, on daily operations. These actions illustrate the tactical dimension of research.

The *variety* of tactics in the citation above also illustrates their difference from strategies. While research strategies tend to stand alone, research tactics can be numerous for each study, as noted in Figure 14.2. Refer again to the example of senior residential housing. The research strategy was correlational, finding statistically significant relationships between long corridors and competency in wayfinding. Obviously one tactic was the use of statistics. In addition, interviews, questionnaires, and observation were all tactics in service to the correlational research strategy. Again: one strategy; many tactics. In fact, tactics are usually blind to which strategy is being employed. For instance, history research can use statistics as much as experimental research or correlational research. At the tactical level, many quantitative-based tactics can aid qualitative strategies, and vice versa. Rather than using the broad distinction between "quantitative" and "qualitative" to describe research, as if there are just these two categories of research, think of "quantitative" and "qualitative" strategies and "quantitative" and "qualitative" tactics.

What follows is a representative list, not an exhaustive one, of research tactics architects can use.

Modeling. Architects make models all the time, and this can be seen as a research tactic. It is no exaggeration to say that thinking architecturally is itself the ability to think in models. That is, architects are experts at *representing* things. And models represent. Drawings, physical models, virtual buildings, even critical path method charts are all models. The research validity of a model typically resides in its capacity to generate a set of documentable data. Usually multiple iterations of models will yield an integrated set of data that results in new knowledge (Donald Schon, *The Reflective Practitioner*, Basic Books,1984).



D. Wang and L. Groat, Architectural Research Methods, *2nd ed. (Wiley, 2013)*

FIGURE 14.2 The columns represent research strategies ("ways of seeing"), while the horizontal entries list a sampling of research tactics. Note that many tactics can be used per strategy, and across strategies.

Simulation at the Tactical Level. Computer technology now enables modeling to be "smart" in the sense that computerized modeling can interact with real-time inputs. As already noted, this technology makes simulation modeling a tactical tool for any kind of research strategy. For example, Autodesk's Revit® program computes sun angles for any building configuration at any time and location. Advanced simulation software modeling entire cities is available from various vendors such as the UrbanSim program at the University of Washington, or ArcGIS by ESRI. And rapid prototyping technology can make multiple physical models of a concept almost at the speed of thought. Michael Speakes recently called this "thinking-as-doing," and regards it as a new kind of design intelligence that can be "tested, redesigned, and retested quickly, cheaply, and under conditions that closely approximate reality" ("After Theory," *Architectural Record*, 2005). Building information modeling (BIM) not only models construction sequences to minimize on-site accidents; it can also simulate concrete as it hardens after a pour so builders know when to remove the forms (J. P. Zhang and Z. Z. Hu, *Automation in Construction* 20, 2011). Computers can now simulate complicated evacuation scenarios during building catastrophes. One such study, which simulated the evacuation of the World Trade Center North Tower during the September 11, 2001, attack, generated useful information about the distribution of exit stairs in high-rise buildings, among other things (E. R. Galea et al., *Journal of Fire Protection Engineering*, 2008). If research is the generation of data from which we can derive generalized information, computer modeling is at the cutting edge of how technology is changing architectural knowledge production.

Literature Review. This tactic carries a basic message: Get to know the literature on the topic at hand (Zina O'Leary, *The Essential Guide to Doing Research*, 2004; John Creswell, *Research Design*, 2003). As familiar as this term is, architects tend not to familiarize themselves with the literature on a subject prior to jumping in with their own proposals or solutions. Much research has shown that even creative acts such as designing buildings improve with more exposure to what has gone on before. A disciplined reviewing of relevant literature always results in new insights, new ideas, and new perspectives to help in solving a problem. "Literature" doesn't only mean books or journals; it can be any documentable source that provides relevant information. In the course of literature review, making a list of notable references, alongside new ideas, is helpful.

Meta-analysis. Suppose a firm is interested in the latest solutions for Alzheimer's units in nursing homes. Conducting a meta-analysis entails surveying all of the published examples of the latest designs in this typology. From this exhaustive survey can be generated a list of recurring features that, together, amount to a set of design guidelines. To do this well, it is important to begin the literature search with an explicit list of what is being searched. This list will necessarily evolve while the search is in process, as recurring features are noted. Another concern is to be reasonably assured that the literature being searched is complete. This can be done by defining all of the established sources, publications, journals, manufacturer's information, the top experts in the field, etc., that speak to the topic, and making sure that the best of each source is represented. Another way to compile a list is to survey the recommendations of the top experts in a particular field. Find out where they go to get their information, or to publish their findings.

Typology. Creating a typology means putting common things into categories. Once the categories are established, all sorts of new information can be generated. For example, architecture firms are sometimes grouped into design, service, and delivery firms. Once a typology is established, statistics can be generated on how these types relate. For example: What percentage of the nation's total architecture firm billings can be attributed to "design" firms, to "service" firms, and to "delivery" firms? All sorts of similar descriptive statistics can be developed using typology as a research tactic.

User Research. Understanding the needs of the user can obviously inform building design. On the front end of the design process, *design ethnography* is receiving more attention as a way of understanding users (Tony Salvador, Genevieve Bell, and Ken Anderson, "Design Ethnography," *Design Management Journal*, 1999). This tactic entails the designer being embedded in the user's world for a length of time. In one example, architects spent several weeks in northern Italy to experience how kitchens were used. Generalized design knowledge gained here involved the best location for kitchens and other design strategies to encourage gathering. Other ways to learn about users during the design process involve interviews, surveys, questionnaires, and focus groups (Robert Weiss, *Learning from Strangers: The Art and Method of Qualitative Interview Studies*, 1995). At the tail end of projects, postoccupancy evaluation is now a well-known tactic. As stated in the AIA Best Practices article "Green Building Post-Occupancy Evaluation: Learning from Experience," "While a POE helps determine whether a building functions as the architect and owner intended, its added benefits for architects include strengthening the client-architect relationship…."

Descriptive Statistics. This term is distinguished from other types of statistical analyses (for example, inferential statistics) in that the goal here is to simply summarize a set of data. This can be done in a variety of ways: by bar charts, by pie sectional diagrams, or simply by tabulations. Descriptive statistics require little formal statistical training, just a keen sense for arranging information in ways that explain the data to a general audience numerically. The key is in highlighting relational threads in a mass of data. A fine example of descriptive statistics can be found in the 2007 *Design for Aging Review 9: Data Mining Findings*, issued by the AIA Design for Aging Knowledge Community. Of the 72 projects submitted to this awards system, 36 won awards. Descriptive statistics are used throughout the report's four sections, but Section 2 is the data mining section. Bar charts summarize site location distributions of the submissions, their payment sources, and their target markets; pie charts highlight sustainability factors in the projects; and tabulations easily call out data such as range of room sizes, or range of total building area for independent living, assisted living, and skilled care typologies.

Case Studies. The classic on this topic is Robert K. Yin's *Case Study Research: Design and Methods* (Sage Publications, 2009). Yin offers a two-part definition of case study. First, a case study examines "a contemporary phenomenon within its real-life context especially when the boundaries between phenomenon and context are not clearly evident." This simply means that case studies of this sort are not done in a laboratory, but in situ in their social contexts. For example, consider the AIA Best Practices (www.aia.org/practicing/bestpractices). The term "best practices" itself implies cases, ones that are exemplary to the extent that the knowledge they provide can be generalized. Many of these examples take place in their social contexts. The second part of Yin's definition holds that a case study copes with "many more variables of interest than data points." This means that a case study tries to take in *all* factors of a phenomenon in its real-life context (as opposed to, again, experimental research, which attempts to abstract a phenomenon down to its essential variables). Hence the "variables of interest" are many in a case study. "Green Roof Design," one of the AIA Best Practices documents, specifies a good variety of factors related to this topic. Slightly less comprehensive is "State of Washington: A Case Study in Construction Waste Management." The case reports that savings in dumping costs and local employment opportunities resulted from the increased recycling activity, but no empirical data were provided.

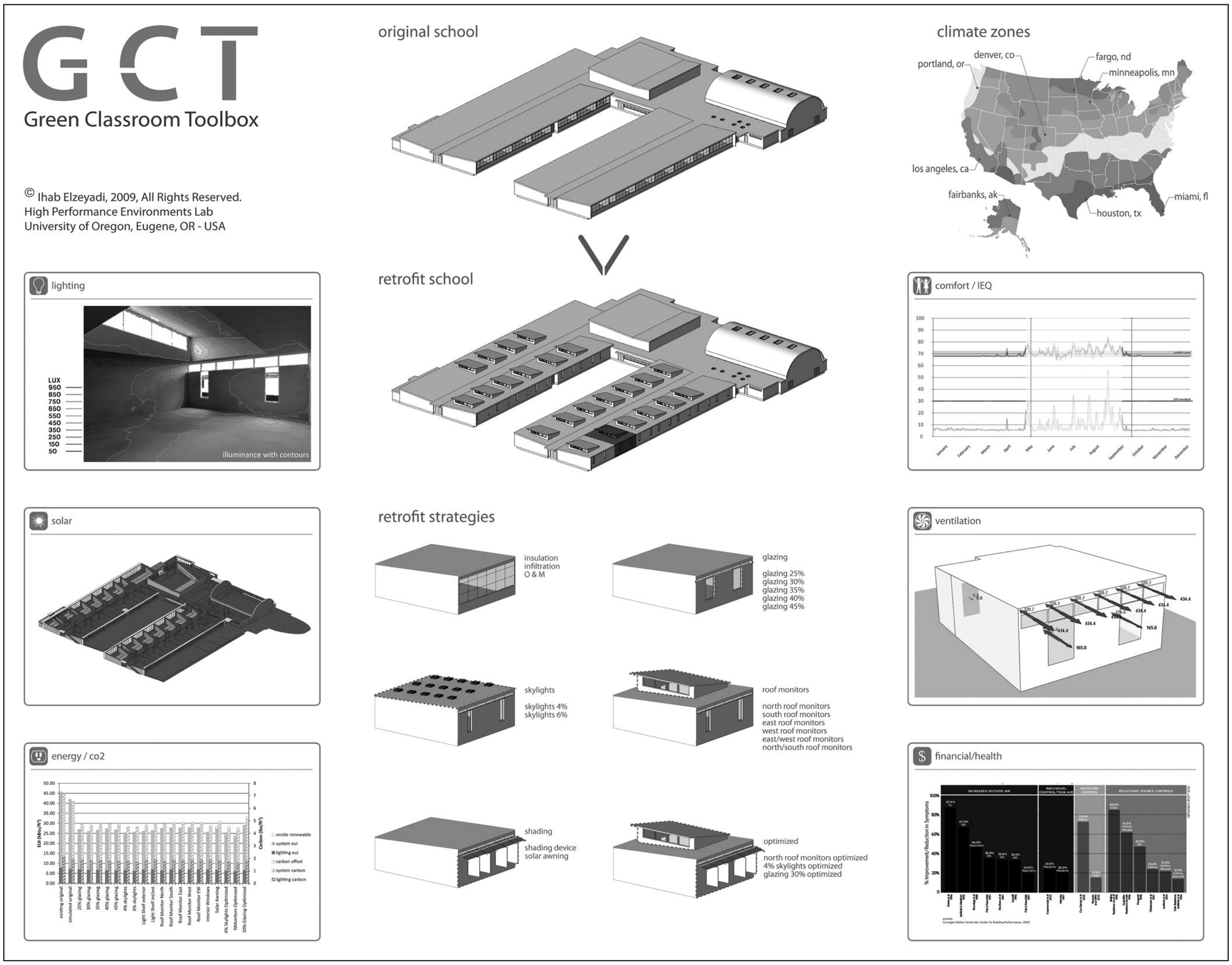
RESEARCH EXAMPLES

Green Classroom Retrofit Toolbox (GCRT): Evidence-Based Design Guidelines to Adapt K–12 School Facilities for Climate Change

This example, from the *AIA Report on University Knowledge Volume 4*, is selected for a variety of reasons. First, it seeks to establish measurable parameters for a much-prized design value ("green" design) that is all too often trumpeted without measurable support. Second, its use of a variety of tactics (and even strategies) illustrates some of the points made above. Third, the study is an example of *triangulation* in research, defined as approaching a problem from multiple perspectives so as to arrive at outcomes that are more robust.

The research problem is this: While 46 percent of all future planned school construction in the United States will be additions or retrofits, little of the current literature on green design has taken note of this obviously large body of construction. The promised outcome of the study is a toolbox of actionable items for assessing and planning projects in this domain. The claim is that use of these tools will lead to measurable benefits in the "triple bottom line" of planet, people, and profit. Needless to say, if successful, this toolbox can be an enormous resource for architects, not to mention school districts, municipal policymakers, builders, vendors in the recycling industry, and so forth.

The study was in four phases. The first involved qualitative focus groups and interviews of school principals and other school personnel to develop a putative list of best practices. The second phase used an experimental strategy (that is, the research that demonstrates causal connections) by deploying a computer simulation program that measures energy efficiencies for each of the best practices, as shown in Figure 14.3. Third, a meta-analysis was conducted of 150 empirical studies that linked employee behavior to overall "green" strategies in work environments. The three areas here had to do with indoor air quality (positive impact: 5 to 20 percent), temperature control (positive impact: 5 to 10 percent), and daylighting quality (positive



Ihab M. K. Elzeyadi, University of Oregon

FIGURE 14.3 Images of Computer Simulation in Developing the Green Classroom Toolbox

impact: 5 to 20 percent). These impacts had to do with health, productivity, task performance, and test scores. From these, fourth, the toolbox was developed. The toolbox consists of a checklist of best practices, a prioritization guide based upon an evaluation of the best practices, and a meta-analysis guide that links these practices to health and performance in schools.

The study is exemplary in its attention to detailing the stages of research and the tactics involved. As well, the three phases showed awareness that the recommended outcomes need to be derived from multiple sources for triangulation purposes: (1) from people in situ, (2) via technical modeling, and (3) all of this overlaid by a meta-analysis that seeks to relate documentations of human behavior, which is free and hard to predict, with explicit green environmental agendas and design. The actual tools themselves are apparently not in the report, but are available upon request from the researcher, Ihab M.K. Elzeyadi from the University of Oregon.

Again, studies like this one are commendable because they do the hard work of quantifying evidence in support of green design. Vis-à-vis practitioners, Elzeyadi's study demonstrates that very few practitioners are likely to have the time and resources, or even the interest, to take on such a complicated study. However, once such a study establishes generalized procedures and measures, the outcomes can benefit large sectors of the community.

Main Street Connectivity: Patterns and Processes Linking Urban Commercial Patches

This project is part of the 2011 AIA Upjohn Research Initiative Program. It is included for the following reasons: First, it is an example of the use of multiple case studies in one research project. Second, the project illustrates the importance of interdisciplinary resources in environmental design research. In this project, the investigators deployed a theory from landscape ecology as a new tool for studying street patterns in three locations in urban Pittsburgh. Third, the project illustrates collaboration between the architecture practitioners and the academy: Ed Shriver, principal at Strada Architects in Pittsburgh, teams up with two Carnegie Mellon architecture professors, Kelly Hutzell and Rami el Samahy. Finally, as in the first example, this project also uses a good mix of research tactics.

A quick search of the Internet will show that "percolation theory" applies to a wide variety of fields; it seems to have roots in statistical physics (Dietrich Stauffer and Amnon Aharony, *Introduction to Percolation Theory*, Taylor and Francis, 2010). Thus, by the time Ed Shriver got hold of the theory through landscape ecology sources, it had already an interdisciplinary pedigree (R. H. Gardner et al., *Landscape Ecology in Theory and Practice*, Springer, 2001). Percolation theory generally has to do with clusters of common factors in conjunction with other clusters, and their resultant behavior in real-time contexts. The assumption is that if actual processes are still unknown, changes in the patterns of clusters may yield useful knowledge.

The idea in this project was to treat three urban streetscapes in the Pittsburgh area as organic clusters. An impressive array of tactics were used to collect data on each location. With GIS technology and on-the-ground research, student teams mapped each of the locations with regard to ground floor and second floor uses. Observations and photographs were used to document conditions. Interviews of passersby were conducted at various times of the day. Time-lapse photography was used to chart the rhythms of use for each location. Archival research accessed information on each neighborhood reaching back 20 years. Shriver at Strada Architects then subjected all the data collected to percolation analysis.

The research team developed an understanding from these cases—upon which they could frame a larger theory—of how urban patterns behave in response to a wide range of real-time inputs. The result is a technique for analytical mapping that can be of use to retailers, developers, city planners, and architects, as more knowledge is gained for the design of vital city commercial blocks. For example, models could be developed to demonstrate how businesses will be affected by temporary diversions of traffic for street improvements. Research such as this can discover how the specific business "ecology" of a local "main street," with its unique demographic and ethnic signature, might respond to regional, perhaps even national, economic rhythms.

CONCLUSION

To summarize, research is *any activity that yields evidence to inform actionable decisions*. Toward this end, the first task is to select a way of seeing a problem—that is, to decide on a research strategy. Each strategy may then use a variety of research tactics to mine the actual data. The goal of research is new knowledge that can be applied in general ways beyond the specific case.

As for thinking of design research as "walking around and looking at things," it must be said that much of architecture professional practice entails knowledge that comes from doing, sourced from years of experience. This kind of experiential knowledge is often difficult to measure. It can be described as a practitioner's *tacit* knowledge, as Michael Polanyi described in *Personal Knowledge* (University of Chicago Press, 1958).

Nevertheless, research can add to knowledge gained from experience, and understanding research methods can aid the practitioner in framing specific approaches to gathering evidence for actionable decisions.

For More Information

AIA Research Priorities: http://www.aia.org/practicing/research/index.htm.

2010 International Conference on Architectural Research: http://info.aia.org/arcc/program/program.html.

Linda Groat and David Wang, *Architectural Research Methods* (New York: Wiley, 2002). The second edition of this book is scheduled for release in April 2013.

John Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 2nd edition (Thousand Oaks: Sage Publications, 2003).

Zina O'Leary, *The Essential Guide to Doing Research* (London, Thousand Oaks, New Delhi: Sage Publications, 2004).

Robert K. Yin, *Case Study Research: Design and Methods* (Sage Publications, 2009), 18.

14.3 Research and Practice

Mardelle McCuskey Shepley, FAIA, D.Arch., FACHA, EDAC, LEED AP

The practice of architecture has evolved dramatically over the last decade, and research is now frequently incorporated in the design decision-making process. This section addresses the history, benefits, integration, and financial implications of research in professional practice.

ORIGINS OF DESIGN RESEARCH

For as long as people have been creating shelters, they have been integrating research into practice. This early research, although not involving the scientific method, did rely on previous experience, trial and error, and observations about the physical world. In our contemporary era, however, the notion and definition of research has evolved to reflect constructs from the scientific method and a level of rigor critical to a sophisticated society.

Design research, as it interests those in professional practice, tends to fall into two camps—research based on human outcomes (e.g., psychological, ergonomic, and physiological measures), and research on the impact of technology (e.g., sustainability and building systems).

The origin of design research on psychological human outcomes is rooted in the field of environmental psychology. The notion of environmental psychology gained traction when the role of experience (nurture) was acknowledged as a significant contributor to development of the human mind and personality. Applied psychology also served as a harbinger of environmental psychology, as it implies the implementation of tangible modifications to achieve desired outcomes. *Environmental Psychology: Man and*

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His Setting, by Proshanky, Ittleson, and Rivlin (Holt, Reinhard & Winston, 1970) was a seminal contribution.

Ergonomic studies typically focus on the interface between humans and furniture or equipment. Physiological measures are linked to medical outcomes and entail the gathering of data such as blood pressure, pupil dilation, and cortisol levels.

Regarding technology, research on sustainability has been fueled by current movement in support of green environments and the need to calibrate the effectiveness of sustainable interventions. A variety of tools have been generated in response to measuring sustainable effectiveness, including a range of simulation software packages, Building Quality Assessment (BQA), Post-Occupancy Review of Building Engineering (PROBE), and BRE Environmental Assessment Method (BREEAM).

Design research has become synonymous with evidence-based design (EBD), although they are not the same. EBD, which has been defined as "the use of research or extensive validated experience to inform the design process" (Shepley, *Health Facility Evaluation for Design Practitioners*, Asclepion Publishers, 2010, p. 243), is the applied outcome of design research. Not all design research leads to information that can be used directly in private practice, as the results may not be tangible enough to apply to design projects.

▶ Evidence-Based Design (14.4) further discusses the application of research to architecture practice.

BENEFITS AND CHALLENGES OF RESEARCH IN PRACTICE

As with any trend, there are benefits and challenges. Benefits of research are both fiscal and logistical. The challenges are primarily with regard to resources, but there are ways to overcome these challenges. Table 14.2 summarizes the benefits of research based on the work of Zimmerman and Martin ("Postoccupancy Evaluations: Benefits and Barriers," *Building Research and Information* 29 (2), 2001) in combination with two other benefits: continuous improvement and marketing advantage.

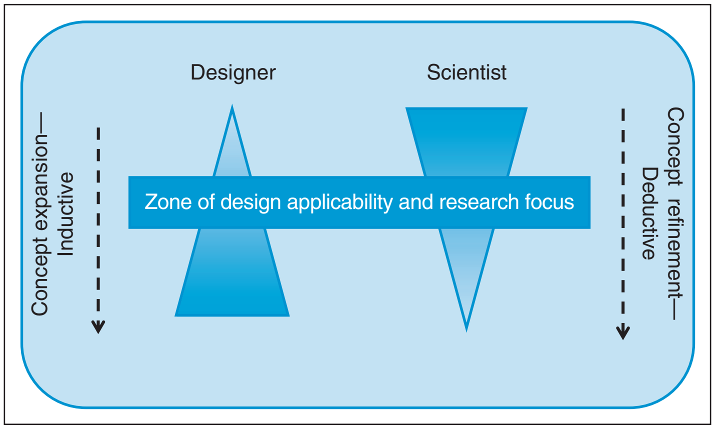
Regarding the challenges of research, there are several. However, there are means of addressing these barriers, as shown in Table 14.3 and in Figure 14.4.

TABLE 14.2 Benefits of Research

Benefit	Description
Continuous improvement	One of the primary benefits of research in practice is the ability to learn from research about successes and failures and improve the quality of future design work. Each iteration of a particular building type has the ability to inform the subsequent building and reduce the number of unknowns.
Design feedback	Design research can be formulated to resolve questions that are creating conflict during the design project. For example, if members of a design team have opposing opinions about a particular design intervention (e.g., the location of an entry), a survey of building users might help determine the most effective approach.
Facility competitive advantage	Results of research can be used to improve the facility relative to consumer needs and thus give them a competitive advantage over other facilities.
Firm marketing advantage	Firms that have the resources to conduct design research will have a competitive advantage over firms that do not. More and more clients are requesting that the design team includes members who appreciate evidence-based design.
Improving fit	By assessing the ability of our projects to achieve their design goals, practitioners are able to identify those design interventions that were most effective. This has the effect of improving the fit between the design objectives and the built outcome.
Operating cost reduction	If the research data provide information that can lead to building efficiencies, cost reductions can be achieved.
Supporting change	Growth is a natural part of self-evaluation. Research supports the evaluation of the effectiveness of innovations, which in turn can be implemented in future facilities.

TABLE 14.3 Challenges of Research and Solutions

Challenge	Description	Solution
Client attitudes	Not all clients are aware of the importance of research and may inhibit the collection of data.	By involving and educating clients in the notion of research during the original interview process, willingness to participate in later stages will be enhanced.
Differing perspectives	Researchers and designers may have different problem-solving processes, which may undermine communication. Designers tend to think inductively, while scientists are more deductive thinkers.	Designers and researchers should interact from the beginning to the end of the project, rather than being involved sequentially. Using two approaches to problem-solving results in maximum creativity (see Figure 14.4).
Lack of expertise	Firms may not have staff with sufficient experience in research.	Lack of expertise can be overcome through continuing education research classes, collaboration with academic researchers, or hiring of design researchers.
Lack of funding	Research needs to be funded; firms don't always have sufficient overhead to pay for it and clients may not wish to support it.	There are a handful of sources for grants. Alternatively, design professionals should include research tasks as part of their fee proposal, particularly when strength in research has been used as a means of obtaining a project.
Maintaining objectivity	Firms are reluctant to conduct research that might demonstrate a shortcoming in their projects.	Objectivity can be achieved if research hypotheses are identified prior to conducting a study and if the research team includes participants external to the firm who designed the project being evaluated.
Reluctance to be scrutinized	Firms may be reluctant to be scrutinized by external reviewers, due to the perception of liability or discomfort with potential negative data or evaluation results.	Overcoming the reluctance to be scrutinized requires a culture shift. If more firms conduct research, then the evaluation of our work will be common practice.
Schedule coordination	The schedules of the research team may be in conflict with the design production team.	Schedules of researchers and practitioners can be aligned if team leaders who have been identified from each group are in regular communication.



M. Shepley, Health Facility Evaluation for Design Practitioners *(Asclepion Publishers, 2010)*

FIGURE 14.4 Inductive and Deductive Processes

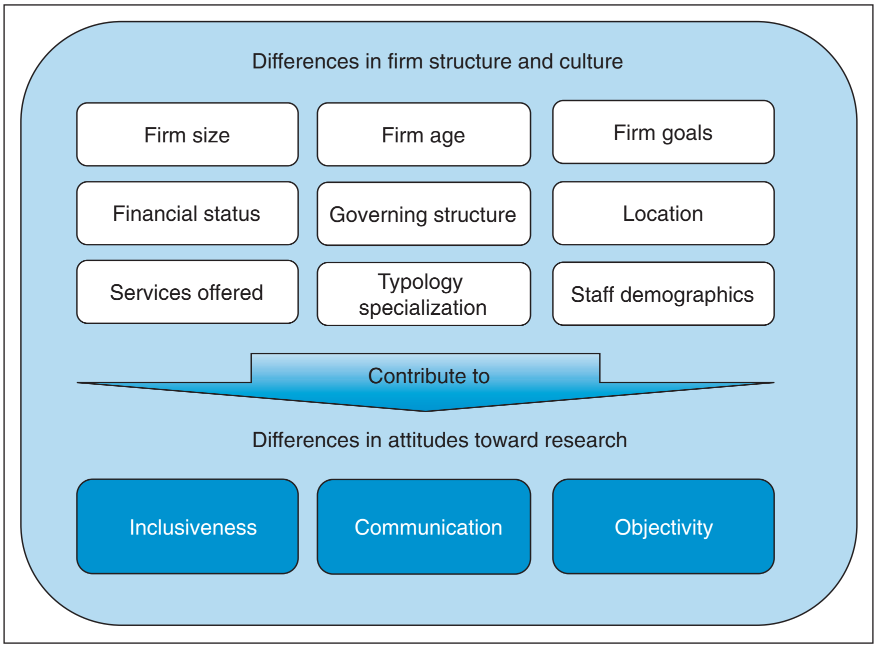
THE IMPLEMENTATION OF RESEARCH IN PRACTICE

The Impacts of Firm Structure and Culture on Research

In spite of the previously mentioned challenges, many firms are fully capable of conducting research, particularly when these limitations have been addressed. However, the likelihood that a firm will gather and implement data varies due to differences in firm structure and culture. For example, large firms with sufficient discretionary budgets, and new firms that emphasize innovation, may be more likely to engage in research. Small firms with fewer resources, on the other hand, may be less likely to do so. Figure 14.5 summarizes some of the factors that may influence a firm's predilection or ability to conduct research.

In addition to these structural characteristics, each firm's culture varies significantly. Firms differ in personality, as represented by their willingness to share information outside the firm, inclusion of a wide range of participants in the research collection process, and the degree to which they can be objective in analyzing the research results.

- *Communication*. Firms vary in their willingness to share the results outside the firm. A key element of research in practice is advancing knowledge by disseminating information; therefore, reticence to share results compromises research endeavors.
- *Inclusivity*. Firms differ in the degree to which they will incorporate a wide range of populations (e.g., visitors and maintenance staff) in their research, in addition to administrators. When the range of study subjects is limited, the implications of the study and ability to generalize the results are also reduced.
- *Objectivity*. Firms differ in the degree to which they are willing to ask research questions without feeling compelled to shield the outcomes, should the results not meet their expectations. Objectivity can be achieved by allowing individuals outside the design process to conduct the postoccupancy evaluation (POE) and by focusing on issues associated with the original design objectives.



M. Shepley, Health Facility Evaluation for Design Practitioners *(Asclepion Publishers, 2010)*

FIGURE 14.5 Firm Structure and Culture

Transforming Research into Code

According to Ballard and Rybkowski ("The Evidence-Based Design Literature Review," University of California, Berkeley, 2007), there are several stages in the integration of research into code and other formalized building standards. One of the most critical steps is the generation of hypotheses around which studies can be built. The studies that develop from these hypotheses are combined into a meta-analysis to ascertain whether there are clear patterns. When patterns are determined, the results of the analysis are shared with code-developing agencies during the public vetting of design standard recommendations. If deemed appropriate by the design standards committees, they may be incorporated as appendices. Eventually, after testing and review, they may be incorporated into code or standards manuals.

Creation of Research Teams

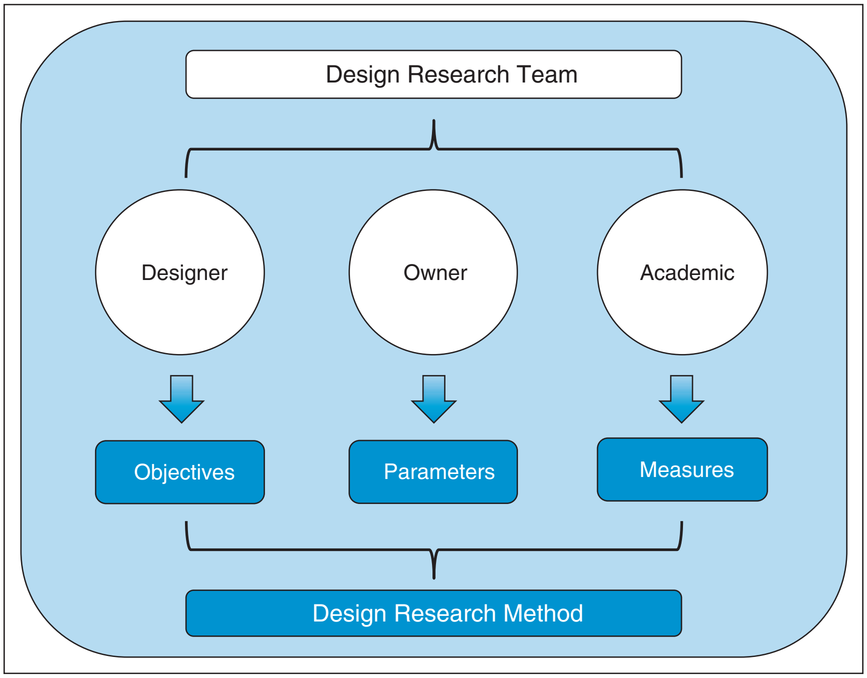
An ideal research team has three categories of participants:

- *The facility owners* establish the parameters with regard to funding and site access.
- *The designers* help determine the research objectives via hypotheses or design goals.
- *The academics or office researchers* establish the methods and guard for objectivity. (See Figure 14.6)

Research/Practice Models

There are five typical models for integrating research and practice:

1. *Contracted research consultants.* These consultants are hired for the sole purpose of providing a particular service, such as gathering data, producing a RING paper, or providing CEU presentations.



M. Shepley, Health Facility Evaluation for Design Practitioners *(Asclepion Publishers, 2010)*

FIGURE 14.6 Research Team Assignments

RESEARCH CONSULTANT MODEL: EVIDENCE-BASED DESIGN AND SUSTAINABILITY

A design firm was interested in determining whether a conflict existed between evidence-based design (EBD) and design features that promote sustainability. They obtained a grant and contacted an academic who would serve as a consultant regarding the research methods that would be most effective in exploring the issue.

METHOD

The primary method was to identify best-practice facilities that incorporate EBD and facilities that incorporate multiple sustainability features. Representatives from these facilities were asked to complete a survey inquiring as to their perception of the conflicts and synergy associated with these two design approaches. The research team segmented the process of idea generation, data collection/analysis, and dissemination into eight stages of collaboration between the firm and the research consultant:

1. Firm generates concept based on needs identified in the field. (Idea Generation)
2. Research consultant develops proposed protocol for study. (Idea Generation)
3. Firm members generate list of concepts for survey and list of study sites. (Idea Generation)
4. Research consultant and firm generate list of experts to evaluate sites. (Idea Generation)
5. Research consultant distributes list of potential study sites to experts and analyzes data. (Data Collection and Analysis)
6. Firm and research consultant develop survey. (Idea Generation)
7. Research consultant distributes survey and analyzes data. (Data Collection and Analysis)
8. Research consultant and firm write articles and present results. (Dissemination of Results)

From Shepley, Baum & Rostenberg, "A Collaborative Research Project on Evidence-Based and Eco-Effective Design," 2009.

RESULTS

The primary outcomes of this study were that, while there are occasional conflicts between sustainable measures and EBD measures (e.g., the need to have eco-friendly biodegradable finishes conflicts with the requirements of EBD for cleanability and bacteria resistance), in general the two approaches were compatible.

2. *Partnerships with academics*. This collaboration would typically support research on a particular project. Firm staff and academic researchers might develop and disseminate a project together. Students would play a role in analyzing and summarizing the data.

PARTNERSHIP WITH ACADEMICS: CLINIC OCCUPANCY EVALUATION

A design firm was interested in conducting a pre- and post-occupancy evaluation of a free clinic. The principal-in-charge contacted an academic and asked if this study could be conducted while working with students. The client was also interested in playing a significant role in the research project.

METHOD

The research method for this study was a pre- and post-survey that was distributed to staff and patients and their families. The survey questions were directly linked to the original design objectives for the facility. Staff distributed the questionnaire in the old facility, and then again several months later after they relocated to the new facility.

1. Firm makes presentation to students and academic researcher. (Idea Generation)
2. Academic researcher develops survey that will be distributed to subjects and obtains IRB approval. (Idea Generation)
3. Firm and client review the survey, which is revised by the academic researcher. (Idea Generation)
4. Client distributes survey and returns to academic researcher. (Data Collection and Analysis)
5. Students analyze data. (Data Collection and Analysis)
6. Client, firm, and academic researcher write articles and present results. (Dissemination of Results)

RESULTS

In general, the new facility was more highly rated than the old facility regarding the original design objectives. There were a few objectives that were not as effective, one of which was comfort. The team concluded that the newness of the furnishings in the new facility may have made some patients concerned about damaging the products.

3. *Partnerships with vendors*. Occasionally a manufacturer will request input from a firm or collaborate with an academic institution to explore the effectiveness of a specific product.

PARTNERSHIP WITH VENDOR: INCUBATOR DESIGN

A hospital neonatologist and a manufacturer of medical equipment were interested in developing a new design for an incubator. The neonatologist contacted an academic to conduct a research literature review and generate design options. The academic recruited another faculty member in industrial engineering with whom to collaborate. Both faculty members involved their students in the process.

METHOD

The project began with an in-depth analysis of the literature on the design of neonatal intensive care units (NICUs) and incubators. The team of architecture students and faculty focused on the needs of infants and families, and the industrial design students focused on staff ergonomic requirements. Researchers made behavioral observations at the site. After a meta-analysis of the literature design, the architecture students and the industrial design students generated and shared proposals.

1. Neonatologist contacts academic researchers and vendor. (Idea Generation)
2. Academic researchers organize literature review on design research. (Idea Generation)
3. Students gather research literature on NICUs and incubators.
4. Students gather behavioral observation data in an NICU. (Data Collection and Analysis)
5. Students generate design proposals and present them to academic researchers, neonatologist, experts, and vendor. (Data Collection and Analysis)
6. Students modify designs based on input. (Data Collection and Analysis)
7. Students and academic researchers present results to vendor engineers. (Dissemination of Results)
8. Academic researchers, vendor, and neonatologist write articles and present results. (Dissemination of Results)

RESULTS

The team generated design recommendations that incorporated a broader interface between the infant and the family, and more effective ergonometric design for the staff.

4. *Academic advisory councils*. Practitioners may participate as members of an advisory group in support of an academic research organization.

INDUSTRY ADVISORY COUNCIL: HIAC LITERATURE REVIEW

Some universities have formal affiliations with industry. The example described here is the health industry advisory council (HIAC) at a top-tier research university. Members of the industry contribute to a university organization that includes faculty fellows and students. Members participate in an annual meeting, make presentations in classes, serve as studio critics, and have access to faculty with regard to research questions.

METHOD

An HIAC firm was interested in studies that had been published on the topic of behavioral health and emergency departments. The researchers conducted a literature search using combinations of the keywords comparing a variety of health environments to patient and operational outcomes. They consulted approximately 20 databases, and considered more than 500 articles for inclusion.

1. HIAC firm contacts academic researcher with regard to the research question. (Idea Generation)
2. HIAC firm and academic researcher develop a process for summarizing literature. (Idea Generation)
3. HIAC firm develops a list of keywords for the literature search. (Idea Generation)
4. Graduate student gathers research articles and summarizes them. (Data Collection and Analysis)
5. HIAC firm, academic researcher, and student meet bimonthly to discuss progress. (Data Collection and Analysis)
6. HIAC firm uses results to inform design process. (Dissemination of Results)

RESULTS

Fifty-four articles relating to the intensive care environment were selected to be incorporated and summarized. The firm used the information to inform design decisions regarding an upcoming project.

5. *In-house research*. This model assumes that the firm has researchers who are part of their staff.

IN-HOUSE RESEARCH: HOSPITAL DAYLIGHT STUDY

A design firm completed a new critical care unit. One of the primary research objectives was to increase access to natural light and window views. The firm had an in-house director of design research, who worked with the professional staff and the client to examine the outcomes of the new facility relative to the outcomes of its predecessor.

METHOD

This complex study involved several methods. Regarding the environmental variables, the client gathered data on light levels in the new and old facility. Regarding outcomes, the research team gathered data on patient pain levels and other medical statistics. The client also provided staff attrition and absenteeism data.

1. Firm and director of design research propose research project to client. (Idea Generation)
2. Firm and director of design research produce research tools. (Idea Generation)
3. Client gathers light data, distributes and retrieves questionnaires, and obtains HR and patient medical data. (Data Collection and Analysis)
4. Firm and director of design research analyze data. (Data Collection and Analysis)
5. Firm, client, and director of design research write articles and present results. (Dissemination of Results)

RESULTS

The patient outcomes supported the hypothesized trends, but were not statistically significant. Improvements in retention and absenteeism were found.

RESEARCHER PRACTITIONERS

Design Firm Research Job Description

As the title of "researcher" in a design firm is relatively new, the job descriptions are wide-ranging. This position is different from that of a researcher/practitioner, as the individual assigned this job will rarely engage in the traditional activities of professional staff. Table 14.4 gives a list of tasks that might be conducted by a design office researcher.

TABLE 14.4 In-House Researcher Tasks

Task	Description
Client presentations	Share EBD research, instill confidence in design decisions, provide inspiration.
CEU presentations	Educate and raise awareness of EBD issues.
Design review	Identify design decisions that are not incorporating EBD and identify those decisions that are doing so effectively.
Group facilitation	Organize group interaction around EBD issues.
Marketing	Bring added dimension to scope of design services.
Mentoring	Promote intern education and research skills.
Practitioner-focused facility evaluation (PFE)	Evaluate individual projects and create a system of evaluation for future projects.
Peer-reviewed journal publication	Produce journal articles describing the results of research projects or literature reviews.
Programming	Work with programmers to integrate EBD in the design process.
Research	Create methodology, obtain IRB approval, gather and analyze data, and produce summary report.
RING (Research, INnovation, and Guidelines) papers	Write papers whose purpose is to gather and summarize research related to a particular design issue, and generate design guidelines.

While many practitioners call themselves researchers, the degree to which these individuals achieve this title varies. Kirk Hamilton notes four levels of practitioner researcher that build upon one another:

Level 1: Those who evaluate and employ existing research. To meet the definition of this first level, an individual would review the research literature on a topic, such as the impact of views of nature in a preschool classroom, and implement the findings.

Level 2: Those who evaluate and employ research, as well as predict and measure outcomes. These individuals gather data on the impact of the environment. A common example would be a postoccupancy evaluation to determine whether the primary design goals had been met.

Level 3: Those individuals who meet the requirements of Levels 1 and 2 and disseminate the results. Dissemination could take place via conferences or publications. A critical aspect of design research is to share the results, so the profession at large is able to profit by the new knowledge.

Level 4: Those individuals who wish to advance to Level 5 must do more than just publish. They must publish in peer-review journals.

Level 5: According to Hamilton, the highest level of practitioner researcher is one who, in addition to meeting the requirements of the previous four levels, expands his or her education by obtaining a research degree or participating in a similar learning opportunity.

Other activities that a practitioner/researcher should engage in include:

- Conducting POEs on projects
- Annotating drawings with EBD citations
- Informing clients about EBD issues
- Hiring researchers
- Evidence-based design and construction (EDAC) certification
- Sending staff to research conferences
- Sponsoring research faculty

Level 1: Evaluate Existing Research

As mentioned previously, evaluating and using research is the first step toward becoming a researcher practitioner. This may be a challenge for the uninitiated. One method for evaluating research is to use the SUPPORT system outlined as follows (Watkins and Shepley, *Design for Critical Care Design for Critical Care Environments*, 2009):

Uses Substantive Methodology

Study methodology must be examined to ensure credibility. Consulting with outside experts, considering the demographics of participants, and using purposive samples strengthen research. Reliability and validity of instruments contribute to the quality of a methodology as well.

A study does not have to be quantitative to be credible. If carried out in a structured manner using a previously explored method, its strength will be enhanced. Naturalistic inquiry, which was developed by statisticians, is a prime example of a qualitative research method involving an orderly analysis of interview and observation data using auditing, member checking, and case reporting techniques (Lincoln and Guba, *Naturalistic Inquiry*, Sage Publications, 1985). The authors have developed and documented their method as rigorously as methods associated with inferential statistical analysis. As an example of how naturalistic inquiry might begin, in the case of interviews the researcher would transcribe the conversation and then generate "cards," each containing a single concept raised in the discussion. These cards are then compiled into groups of associated ideas. Individuals other than the original compiler independently corroborate the categorization.

Uncovers New Knowledge

Does the article describe research that has successfully uncovered new knowledge? Authors should address a new idea or build on an old one. If it is a literature review, it should combine articles together in a new way, identify holes in the body of research, or set the information in a historical or conceptual context.

Is Peer Reviewed

In evaluating a research article, one should confirm whether the article has been published in a peer-reviewed journal. A peer-reviewed journal is one in which the manuscripts are evaluated by reviewers who are experts on the topic of the article. Single-blind reviews allow the reviewer to know the name of the submitter, but the author does not know the name of the reviewer(s). A double-blind review is one in which the reviewers are not revealed to the authors and the authors are not revealed to the reviewers.

There are several journal ranking systems that evaluate the quality of a journal, usually calibrated according to the frequency with which articles in a particular journal have been cited.

Identifies a Problem or Hypothesis

Authors of research articles should evaluate whether the article clearly identifies the problem they are addressing or hypothesis they are testing. These intentions need to be articulated in the introduction to the paper. If the purpose of the study is unclear, it is unlikely that the results will be useful.

Involves Objective Researchers

Researchers are cautioned to maintain their objectivity. However, a firm can conduct objective research if steps are taken to avoid conflict of interest. Enlisting external researchers to provide checks and balances, or creating preset protocols that are followed regardless of the data outcomes, serve to enhance objectivity.

Uses Repeatable Methodology

One requirement for research is that the methods be sufficiently clear so that the study can be replicated. This allows the outcomes to be retested by others, resulting in the development of a body of knowledge around a specific question. Studies that cannot be replicated, either from lack of information or from lack of support of the hypotheses, eventually fall by the wayside.

Has Triangulated Outcomes

Triangulated outcomes are the result of multiple methodologies applied to a single study question. Examples are interviews, behavioral observations, and questionnaires. Researchers may use a combination of qualitative and quantitative approaches to gather a full understanding of a problem. Similarly, different studies using different methods but addressing the same questions serve to triangulate one another.

Level 2: Predicting and Measuring Outcomes

The process of predicting and measuring outcomes is the crux of research methodology. The primary activities are literature review, hypothesis formulation, methodology development, data collection, and data analysis.

▶ See Research Methods (14.2) for further discussion of methodology.

This research process may entail filing for institutional review board (IRB) approval for the use of human subjects, depending on the nature of the research and the site. An institutional review board is an organization that evaluates whether the research treats subjects appropriately, as well as other topics such as whether the study is ethical. If academics are associated with the study, they are likely to be required by their universities to file for approval if their study involves human subjects. Most educational, correctional, and health facilities also require IRB approval.

Level 3: Disseminating Research

As mentioned, not all firms are inclined to distribute the results of their research, although there are a variety of forums for making presentations, both nationally and internationally. Ideally, a submission is made to a peer-review conference, which enhances the status of the presentation. In addition to sharing information, the preconference advertising and the presentation are opportunities to establish the level of expertise of the firm.

There are typically two categories of periodicals in the profession: (1) the lay press, which focuses on the design process, and (2) academic journals, which focus on research. Each project, however, has the potential to be formulated to address the different readerships of these two groups of journals. Ideally, however, a crossover journal that promotes both design and research would provide the most appropriate venue for advocating design research. The following is a list of peer-review design journals:

- *AIA Academy Journal*
- *Building Research Information*
- *Children, Youth and Environments*
- *Environment & Behavior*
- *Facilities*
- *Health Environments and Research and Design (HERD)*
- *International Journal of Construction Management*
- *International Journal of Sustainable Energy*
- *Journal of Architectural and Planning Research*
- *Journal of Environmental Psychology*
- *Journal of Interior Design*

In addition, some professional journals in other fields, such as health, recreation, and education, will publish design research articles that focus on typologies related to their specialties.

Level 4: Peer-Reviewed Publication

Three common review processes for journals are *invited*, *juried*, and *peer-reviewed*. Invited articles are submitted to a journal at the request of an editor or guest editor. The peer-review process is typically double-blind; in other words, the reviewers (typically three or four) do not know who the author is, and the author does not know who the reviewers are. In a juried article, the parties may know one another, but the review is done by a panel in competition with other submissions.

When submitting an article to a peer-reviewed publication, it is typically required that the research project received IRB approval if human subjects were involved. Most articles are submitted multiple times and are determined to fall into one of four main categories: approved as is, minor revisions required, major revisions required, and rejected. If an article falls into the second or third category, then the author(s) may resubmit. Authors may not have an article under review with more than one journal at a time.

Regarding style, there are several frequently used systems that dictate the format for the citations and references. In the instructions to the author, each journal indicates the required system for their periodical. Common systems include APA (American Psychological Association), MLA (Modern Language Association), and *The Chicago Manual of Style*.

▶ Research in Practice Overview (14.1) includes further discussion of doctoral programs in architecture.

Level 5: Specialized Education

Multiple master's, doctoral, and university-based certificate programs are available that support a specialization in research. Most certificate programs are associated with a master's or doctoral degree.

FUNDING AND FINANCIAL IMPLICATIONS

Return on Investment

The results of the application of research findings to design solutions frequently add costs to a project. The basic notion behind return on investment (ROI) is that annual savings, which is another common result of applied research, will mitigate these increased initial costs. Savings are typically calculated in economic terms, but may also be represented by environmental and social impacts. This triad is known as the "triple bottom line."

For example, if research associated with EBD requires the addition of amenities to a project (e.g., increased use of natural light), the cost of more windows, skylights, and light tubes needs to be weighed against cost savings associated with decreased long-term electrical energy expenditures, reduced impact on the environment, and a more psychologically healthy environment. The use of water collection devices for the purpose of supporting landscape materials would lower water utility bills, save a precious resource, and provide a healing natural environment. A specific example that focuses on economic savings from the addition of hand-washing devices in hospital rooms is provided in the EDAC literature.

The prediction is that, within a reasonable time span, the cost of features added in support of research will be paid for economically, environmentally, and/or socially. ROI is important to the design process because it makes a business case for evidence-based design.

Lean Design and Target Value Design

Lean design (LD) is often discussed in tandem with the business case for EBD. One of the premises of LD is that all participants in the design process are integrated from the project's inception. Participants in the case of EBD would include design researchers. When researchers are incorporated at the onset of a project, they can provide support in determining which design features will be most effective, when the budget is limited. If these factors are necessary and added late in the process, it will be much more expensive to add them in. Target value design is a technique that benefits from research and is used in LD.

▶ Contractor-Led Design-Build (9.4) further discusses lean design and target value design.

LINKING ACADEMIC RESEARCH AND PRACTICE

Coordinating Schedules

One of the complications of collaboration between academic institutions and professional practice is the difference between their schedules. Students and faculty work around a semester-driven pattern, while participants in professional practice are committed to the frequently shifting production deadlines of their clients.

Regarding student involvement, interaction is most effective toward the end of the fall or spring semesters. In the course of a single semester, a small research study might be undertaken, such as a brief postoccupancy evaluation or energy use analysis. A single semester would also be sufficiently long for a master's student to conduct a focused literature review. Doctoral students in upper-tier research institutions follow a different rhythm. They normally spend a year taking research foundation classes, followed by a year of specialization classes and the development of a research topic. The subsequent study phases (refining tools, gathering data, analyzing data, and writing the dissertation) typically take two to three more years.

Conducting research with faculty can be similar to working with a doctoral student; however, specific consulting tasks (e.g., evaluating a project for evidence-based design content) are briefer and more flexible. Regarding joint publishing with professional academic researchers, faculty is more likely to be productive during the summer months.

Intellectual Property, Patents, and Copyrights

The notion of intellectual property is frequently discussed in academic settings. Intellectual property is often referred to as the intangible assets associated with inventions and designs. While much of the research that is conducted will not produce a copyrightable product, some products might, particularly with regard to new technologies, design methodologies, or software.

Many universities will have specific policies with regard to intellectual property, the purpose of which is to assure that the discoveries associated with work at the university serve the interests of the institution. This property may be managed under a division of commercialization within the university. If faculty members conduct research outside of university activities, then the property is their own or shared with their collaborators. As such, when practitioners and academics decide to collaborate, the issue of intellectual property must be addressed. In most academic institutions, intellectual property developed as a result of activities associated with their employment, or with funding support, is owned by the university system.

FUTURE OF DESIGN RESEARCH

Institutional Perspectives

The five collateral organizations associated with architecture practice and education—the American Institute of Architects (AIA), the American Institute of Architecture Students (AIAS), the Association of Collegiate Schools of Architecture (ACSA), the National Architectural Accrediting Board (NAAB), and the National Council of Architectural Registration Boards (NCARB)—have each indicated their support of the role of research in architectural design. These organizations have converged in their advocacy for the incorporation of research skills in the development of young architects. One of the primary directives of the 1996 Boyer Report, *Building Community: A New Future for Architecture Education and Practice*, was to "make research-based learning the standard."

As stated in the NCARB 2008 accreditation report, "innovation and responsiveness in design is based upon a sound foundation of empirical knowledge and research in all applicable content areas that influence decision-making" (NCARB, *NCARB Position Paper for the NAAB 2008 Accreditation Review Conference*, 2008).
The AIA research priorities are:

- Social research focused on people
- Technological research focused on materials and methods
- Environmental research on the physical context of architecture
- Cultural research on the relationship between society and environment
- Organizational research on professional practice relationships
- Design research on place creation
- Educational research (AIA, "Architectural Research," 2005, http://www.aia.org/practicing/research/index.htm)

The Future of the Integration of Research and Practice

Unfortunately, only a limited number of practitioners incorporate research in the design process. In a series of interviews with architects, researchers found that while practitioners acknowledge the necessity for research, the utilization of research is less common (Kim and Shepley, "The Autonomy of Health Care Architects," *Health Environments Research* 1 (2): 14–26, 2008). Challenges to implementation include lack of access to information, expense, and lack of expertise.

However, this pattern is changing. Based on 2012 hiring trends, and as long as the economy is stable, large firms are likely to incorporate researchers in growing numbers. There are multiple reasons for this phenomenon:

- Champions from professional practice are increasing in number and broadening their support. Architects have become aware that the use and generation of research in professional practice increases the strength and autonomy of firms (Kim and Shepley, "Health Care Design Complexity, Specialized Knowledge and Health Care

Architects' Professional Autonomy," *Journal of Architectural and Planning Research* 28 (3): 194–210, 2011). The use of science serves to back up the experience of practitioners, and enhance their credibility with clients. Intuition is being substantiated by data, which reduces the frequency of inappropriate architectural innovations.

- Clients are becoming more informed about the benefits of research, and requesting that it be incorporated in their buildings.
- There has been a growth in the number of conferences that include presentations on the role of evidence-based design, creating educational opportunities for professionals. Practitioners are gaining a clearer understanding of the role of research in design.
- There has been a growth in the number of organizations that support design research, such as the Center for Health Design (CHD), the Institute for Family Centered Care, the Institute for Patient Centered Care, and grassroots groups such as Researchers in Professional Practice (RIPP) and Student Health Environments Association (SHEA).
- The percentage of doctoral students who are returning to the profession rather than to university settings has increased. These researcher/practitioners are changing the culture from within by communicating respect for the role of research in office practice.

▶ See the backgrounder Evidence-Based Health Care Design: An Understanding of Its Tipping Point (14.4) for more about the Center for Health Design's work in evidence-based design for health care.

Based on this cultural shift, the increasing need for research and its use by practitioners is likely to continue. By 2020, we expect research in practice to be commonplace, and the quality of architecture to benefit from the integration of research and practice.

For More Information

Building Quality Assessment (BQA): http://www.rlb.com/life/america/service_building-quality-assessment.html.

Post-Occupancy Review of Building Engineering (PROBE): http://www.rlb.com/life/america/service_building-quality-assessment.html.

BRE Environmental Assessment Method (BREEAM): http://www.breeam.org/page.jsp?id=66.

The Evidence-Based Design Literature Review and Its Potential Implications for Capital Budgeting of Health Care Facilities (University of California, Berkeley, 2007) by Glenn Ballard and Zofia Rybkowski: http://www.hret.org/resources/2410002811.

Health Facility Evaluation for Design Practitioners (Asclepion Publishers, 2010) by Mardelle McCuskey Shepley.

"Health Care Design Complexity, Specialized Knowledge and Health Care Architects' Professional Autonomy," *Journal of Architectural and Planning Research* 28 (3): 194–210 (2011) by D. Kim and M. Shepley.

BACKGROUNDER

THE EVOLVING PRACTITIONER RESEARCHER

D. Kirk Hamilton, FAIA, FACHA

This backgrounder explains the new roles associated with a research-informed design practice, and the skills practitioners will need to develop to take full advantage of the potential. The author contends that an evidence-based practice has the opportunity to develop competitive advantage.

D. Kirk Hamilton, a founding principal emeritus of WHR Architects, is a professor of architecture at Texas A&M University. Coauthor of *Evidence-Based Design for Multiple Building Types* (Wiley, 2010), he writes and speaks frequently on the use of research in design.

There is a new and growing breed of architecture practitioner. As more architects find that the quality of their design decisions can be improved by thoughtful reference to solid evidence from research, they begin to seek new skills. As more clients ask for reliable confirmation that a firm's prior work has produced measurable positive results, architects need to be able to perform or commission credible, unbiased studies. Architects, more than ever before, are finding a practical need to develop the skills to *use* research, as well as to *do* research. The use of research in design can be called an

(continued)

evidence-based design process, or a research-informed design process. Doing research, or conducting formal studies in the context of practice, is called applied research. The practitioner researcher is an evolving model that addresses these important opportunities to improve designs, capture the results associated with design projects, and answer important design questions with new knowledge.

WHAT NEW SKILLS ARE NEEDED BY DESIGN PRACTITIONERS?

Architecture education's traditional emphasis on design and technology has dominated the training of most practitioners, and few have strong foundations in research methods and literature review. Although a research-informed design process does not abandon a practitioner's normal process of designing, it adds some additional steps. This can require a bit of skill development.

The evidence-based practitioner must learn to convert the statement of one or more key design issues into a researchable question, with many potential sub-questions. They must learn to search the scholarly literature and other credible sources for material relevant to the design issue and the research questions.

The scholarly material found must undergo critical evaluation to determine its reliability and relevance to the current question and project. Careful interpretation of the material's implications for the practitioner's project will lead to development of design concepts.

These concepts, informed by an understanding of research implications, will be produced in expectation of some intended result, which may be called a design hypothesis. All designers make intuitive assumptions about the results a design concept will produce, but few are documented.

The evidence-based practitioner will need to formally document design hypotheses during the design phase, and be prepared to follow with careful measurements after the design has been implemented to determine whether the design hypotheses have been supported.

A chain of logic should connect the architect's design concept back to interpretation of specific citations from the literature. A commitment to hypothesis documentation and confirming measurement is sometimes described as a minimum requirement of an evidence-based practice.

EVALUATION OF PROJECTS IS REQUIRED IN AN EVIDENCE-BASED PRACTICE

The careful evaluation of completed projects is a form of research, so practitioners who commit to measure the outcomes associated with their design hypotheses become researchers. Architects will want to document project results that have importance to the client, which can mean using the same metrics the client uses in managing their business. Practitioners will also want to gather project information the firm can use to improve future projects—both measures recording each unique project's outcomes, and comparative data related to the firm's ongoing collective body of work. Serious evaluation after a project is complete requires a full understanding of design intent, and may need to compare project outcomes with the client organization's previous performance results. The practitioner must be wary of bias or the appearance of bias when involved with self-evaluation, so collaboration with the client or an independent third party may be desirable.

PERFORMING APPLIED RESEARCH CAN ANSWER IMPORTANT QUESTIONS

Some questions cannot be answered by the current literature. If the design issue is very important, the potential impact of the design decision is high, and little is known, the topic may lend itself to the performance of applied research. New skills an architect might need to perform research include learning to write an effective research question, and the ability to select appropriate research methods to answer the question. Data collection, analysis of findings, and the careful development of conclusions are skills most practicing architects would need to learn. The true evidence-based practitioner will always publicly share research findings with the field, through publication and conference presentations. Even in cases of negative results, open sharing allows the firm and others to avoid similar future outcomes. In many cases, the firm may wish to add a qualified researcher to the team so that these activities are properly conducted.

DESIGNERS NEED TO BETTER UNDERSTAND RESEARCH; RESEARCHERS NEED TO BETTER UNDERSTAND DESIGN

Architecture requires a team effort for all but the simplest of projects. In this context, the designer who may not have had research training needs to learn how to communicate effectively with a researcher in order to benefit from the collaboration. Similarly, the researcher in practice must understand the goals and values of the designers with whom they collaborate. They begin speaking different languages and valuing different parts of the process, but must learn to work together on behalf of better projects. An effective partnership between designer and researcher is crucial to development of superior projects.

A NEW BREED OF DESIGNER-RESEARCHER IS EMERGING

There are a growing number of practitioners who have completed both a design education and graduate training in research. These designers have a high degree of comfort when turning to the literature for relevant evidence, understand how to interpret scholarly material, and can also skillfully practice the art of architecture for decisions that demand a response to intuitive passion. The qualified and competent designer with the additional skills of a Ph.D. researcher is becoming a valuable commodity at some firms.

RESEARCH IN PRACTICE CAN PROVIDE A COMPETITIVE ADVANTAGE

The skills of a practitioner researcher can contribute to improved design decisions, and help to build a body of credible outcomes associated with completed projects. These demonstrably better designs, and the unbiased results from past projects, can be used to convince future clients of the value of the practitioner's involvement with an intended project. It is clear that effective use of evidence from scholarly research and performance of applied research by practitioners can lead to important competitive advantage in the marketplace. We will see much more of the practitioner researcher.

BACKGROUNDER

RESEARCHERS IN PROFESSIONAL PRACTICE: UNDERSTANDING CHALLENGES TO AN EVIDENCE-BASED PRACTICE MODEL IN ARCHITECTURE FOR HEALTH

Erin K. Peavey, Assoc. AIA, M.Arch., LEED AP

Building design and construction (BD+C) researchers in professional practice help guide the process by utilizing existing evidence to make design decisions, and creating new knowledge to answer important questions in the design process. This 2010 study was designed to develop an understanding of the emerging role of researchers in professional practice.

Erin K. Peavey is a researcher and medical planner at HOK in New York. She is on the board of the Academy of Architecture for Health Foundation and on the faculty at New York School of Interior Design's Graduate Program in Health Care Interior Design. Her work has been published in numerous scientific journals and industry publications.

As the health care design industry has become increasingly focused on employing research to advance design decision making, researchers are a growing part of the architecture practice. Researchers are helping guide the process of using existing evidence to make design decisions, creating new knowledge and exploring design innovations. In an effort to shed light on the role that researchers play in the design field, Texas A&M University, in collaboration with the Academy of Architecture for Health, performed a 2010 study (Hamilton, Peavey, and Pentecost, EDRA, 2010). The study explored the role of researchers in professional practice and the perspectives of health care architecture practitioners using an evidence-based practice model (EBPM). This study defined evidence-based design (EBD) as "the process of basing decisions about the built environment on credible research to achieve the best possible outcomes."

This three-part study consisted of: (1) a questionnaire to the AIA Academy of Architecture for Health (AAH) membership; (2) a questionnaire to Researchers in Professional Practice (RIPP) participants (a networking group for individuals conducting research inside health care firms); and (3) interviews with RIPP participants. The results shared here focus on components related primarily to researchers in professional practice and discuss ways to use researchers in practice and work toward synergy with practitioners.

Through the use of online questionnaires, 609 AAH members out of 6,811 completed the survey, yielding an 8.9 percent response rate. Of the 35 health care design researchers who were contacted, 17 responded to the questionnaire, yielding a 49 percent response rate. Of these researchers, 7 offered to be interviewed on their roles as research professionals. All questionnaire and interview questions and protocol were reviewed and approved by the Texas A&M University Internal Review Board, and responses were confidential.

FINDINGS: RESEARCHER AND PRACTITIONER INVESTIGATION

Demographics of Researchers in Professional Practice

Little is known about the diverse and evolving population of health care researchers in professional practice. The RIPP questionnaire explored the barriers to evidence-based practice and revealed the initial demographics of the researcher group. Study questions inquired into each researcher's formal education, practice type, colleagues, daily work life, and other roles they have outside of research.

The majority of researchers were educated in architecture, and other degree types including psychology, nursing and allied health, and marketing. Many of these individuals had degrees in multiple subjects. The highest level of education for researchers was a doctoral degree (53%), others had master's degrees (23%), or had either a bachelor's degree or professional degree (21%).

Most researchers had either 2 to 5 years or 20 to 30 years of experience as a researcher—few were in between

(continued)

these extremes. Researchers worked primarily with project managers, architects, hospital administration, and medical planners. In addition, they worked with other research personnel, lead designers, client staff, and hospital middle management.

Researchers performed a wide range of activities depending on their background. Based on survey responses, researchers spend the majority of their time in the following ways: finding and interpreting literature, creating studies, collecting and analyzing data, and reporting of results. In addition to traditional research roles, researchers perform marketing (75%), programming (45%), design (30%), and medical planning (23%), as well as project management and consulting. These additional roles varied depending on the background of the researcher. Interviews revealed that marketing was most commonly directed at the client, where research experience and expertise were important in securing a commission. This commission included projects ranging from a greenfield building to an independent research study.

Questionnaire Results: Contrasting Perspective of Researchers vs. Practitioners

The questionnaire was designed to shed light on practitioners' and researchers' views on barriers to adoption of an EBPM. The study compared the views of practitioners with and without experience using EBD with the views of researchers. Of the 609 AAH study respondents, 54 percent had experience using EBD and 46 percent had no experience using EBD. This response was used to create two separate groups, which were then compared on a number of factors and associated with the responses from RIPP group (Hamilton, Peavey, and Pentecost, EDRA, 2010).

The study indicated that practitioners with experience using EBD were significantly more comfortable using research in the design process than those who lacked familiarity with EBD. Interestingly, though, there was not a significant difference in these two groups of respondents' apprehension over the logistics of research within a practice. Specifically, these groups both voiced concerns that the precedent for billing research services was currently lacking, and stated that additional time devoted to research often bumped up against the timelines of project schedules. What this shows is that even as practitioners become more experienced in using research, important issues persist, representing challenges to fitting research with a practice model that need to be strategically addressed within each architect's practice.

Table 14.5 shows barriers perceived by researchers and practitioners. These barriers were different for each group. Practitioner barriers centered on research-related components of EBD, such as comprehension and application of evidence, whereas researcher barriers related to business concerns, such as needing additional labor hours and time. An issue for both groups was the need for a consistent billing precedent that would allow companies and organizations to charge for research-related services.

TABLE 14.5 Comparison of Barriers to Evidence-Based Practice Model for Practitioners and Researchers

Top Barriers for Researchers	Top Barriers for Practitioners
Labor Hours	Relevant Evidence
Additional Time	Identify Flawed Research
Billing Precedent	Billing Precedent
Relevant Evidence	Contradictory Research
Client Support and Contradictory Research	Additional Time

Note: The top barriers for researchers focused on issues of business and project management, whereas the top barriers for practitioners were related to understanding and utilizing research.

Interview Results: The Researcher Perspective

Interviews with researchers allowed the study to expand beyond the quantitative data to understand the issues in greater depth and illuminate the practice-based researcher perspective. The interview questions discussed the role of the researcher within their firm and with clients, how they spent their time, and the types of difficulties they had had in using the EBPM.

At the time of the study, no overarching job description existed for researchers in professional practice, and thus researchers defined their own roles. In this process, practitioners and clients frequently misconceive the role of the researcher. One researcher posed the question as, "Should [researchers] be integrated into the design process, treated as advisers, or as librarians of EBD literature and resources?" The respondent went on to say that integration throughout the project was paramount.

For the creation and implementation of successful research, interviewees stressed the importance of fostering partnerships with facilities, architects, and designers. Interviewees frequently focused their desire to foster a sense of community. As one interviewee put it, "Research is about transparency, objectivity, and community of learning." The interviewee went on to expound on the difficulty in translating the research culture to a competitive design field, where research is often a competitive advantage first and foremost. Unlike many researchers who work in academia, these individuals in practice are often the only researchers at the firm and lack the ability to discuss and exchange ideas with other researchers.

Funding was mentioned as a key issue by all interviewees. In a design practice, research funds come from a number of areas, including research and development, education, or as a marketing expenditure. Additional funds come from clients wanting to show the value of the design intervention and demonstrate the building's impact on operational systems. Researchers stressed that it is best to embed research into the initial scope and proposals, thereby rooting it with the overall project. Although grant funding is a viable option, strong competition exists for these limited funds.

Advice from Researchers

Last, we asked researchers what words of advice they had for others in the field. Researchers advised practitioners and their research partners to work with high-level hospital management from the beginning of project formation. Researchers emphasized the need to "secure buy-in from senior leaders, to ensure success of the project," and to help frame learning and improvement opportunities that each unique project and client possess.

Researchers recommended utilizing various subject matter experts, collaborating with others to obtain a variety of perspectives and a comprehensive approach. Researchers suggested partnering with university and independent researchers to provide both support and second opinions. In field research, they recommended dedicated persons on site at the facility. In many situations, when a dedicated person did not exist, research duties were often the first task to be brushed aside when other assignments materialized. Furthermore, researchers stressed that when a study is unable to confirm a hypothesis, it offers a great chance to explore the hypothesis to understand design issues through a new lens.

CONCLUSIONS AND RECOMMENDATIONS FOR ARCHITECTS

By understanding the challenges facing an evidence-based practice model, we can begin to change the face of practice. When leveraged correctly, research can show the vital role of the built environment in reducing operational costs, increasing operational effectiveness, and having a positive impact on the occupants. The synergy between architects and researchers can help quantify the impact of the built environment on the client's bottom line. It is essential that architects show the viability of design in affecting myriad complex issues that have an impact on their clients. By working together, researchers and architects can empower their clients to make informed decisions and invest in research that improves the quality of each project.

14.4 Evidence-Based Design

Travis L. Hicks, AIA

Evidence-based design (EBD) is a trend in the practice of architecture that has grown out of evidence-based medicine and other evidence-based discourses. Grounded in research, EBD takes advantage of current knowledge, data, and well-informed clients to arrive at better design solutions.

BACKGROUND

Since the early 1970s, evidence-based design (EBD) is one of a number of different "evidence-based" discourses among a wide range of disciplines. For example, there are similar evidence-based paradigms in medicine, education, nursing, dentistry, and policy, to name a few. Evidence-based design (EBD) is a term that has come to mean many different things to different audiences at different times.

At its best, EBD is a design process that leverages best practices and current knowledge as well as primary, secondary, or tertiary evidence in order to solve a particular problem or answer a specific question through a rigorous process that resolves design issues with evidence. When misrepresented, EBD can be a convenient rhetoric used to justify what one would have done intuitively or through a more conventional design process. This article seeks to provide some guidelines for telling evidence-based design apart from conventional architectural practices and from research for research's sake; additionally, this article offers some suggestions for integrating an EBD program into one's practice.

Evidence-based design is "…a process for the conscientious, explicit, and judicious use of current best evidence from research and practice in making critical decisions, together with an informed client, about the design of each individual and unique project."

—D. Kirk Hamilton, FAIA

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Qualities of Responsible Evidence-Based Design

- The design process relies on knowledge and information gleaned through research and the gathering of evidence.
- Completed projects go through a rigorous postoccupancy evaluation, or similar analysis, in order to make subsequent projects more successful.
- Research and evidence are woven into the design process; conversely, the design process responds to research reciprocally.
- Results of research are open-ended, not predetermined, so that the design is open-ended.

Signs of Dubious Evidence-Based Design

- Architect relies solely on intuition, past projects, or standard practices to arrive at a design solution, while claiming to be practicing EBD.
- Product manufacturer points to its product data and claims it as "evidence"; however, closer inspection reveals that the data is not changing the way the product has been conceived and/or produced.

Basic evidence-based design methods involve some of the same techniques that are applied in other kinds of architectural research. Research is key to gathering evidence to be used in the design process. What distinguishes evidence-based design from pure research, however, is the application of research into a design project that will, in turn, become an architectural project to be studied at some future date. The expectation of evidence-based design is that design solutions are improved through this cyclical process of asking a question, answering the question through a design process, and then refining/altering the question the next time.

Assembling an evidence-based design team will be a critical step in the process of establishing a practice or project built around EBD. Some firms will already have research departments or individual research staff members; other firms will have to strategize the implementation of a research program. Introducing a research program into a firm without a preexisting research staff will take time and planning. Firms specializing in particular project types will want to target their research hires around their expertise. For example, a firm specializing in K–12 projects should consider hiring a researcher with a background in learning environments research projects.

Sample Researcher Profiles

- Graduate of doctoral program in architecture with Ph.D. or D.Arch. and research focused on technology, typology, sociology, or other relevant research categories
- Architect-practitioner with significant programming expertise around a specific building or project type—for example, a justice programming consultant
- Graduate of doctoral program in sociology, psychology, history, engineering, or similar discipline relevant to design research
- Former professional with experience relevant to project type—for example, a former nurse who works on research team in a health care–focused practice
- Researcher from manufacturing or industry with insight into the research projects from these related industries—for example, a former furniture industry employee with workplace research experience

One challenge of implementing evidence-based design into one's practice is the well-established standard services offered and the need to reconsider or alter the standard services and phases of projects. Architecture firms will have standardized project management tools, techniques, and expectations based around traditional project phases. "Squeezing" research programs into project phases that already have tight profit margins is not the way to establish one's self as a leader in evidence-based practice. Starting small, with a single researcher working on a single project, and giving the research the appropriate time and space required, is a better approach to starting a research program.

EVIDENCE-BASED DESIGN METHODS

1. Question

The first step in a research project is often stating a question, or questions, that will be answered through a methodical process. Understanding that the very practice of architecture is a complex problem-solving exercise that ultimately answers a plethora of questions, there is not an expectation that every problem one encounters in a project will be pursued with the same level of research and/or evidence-gathering strategies. The architecture team should determine some hierarchy of questions in much the same way one would design for formal hierarchy in a building design. Working with an informed client, the design team with evidence-based experience will organize research questions around project goals and priorities.

Sample Research Questions

- What arrangement of patient room furniture promotes the shortest hospital stay? *Project goal*: Reduce hospital stays by a certain amount of time.
- What relationship between open labs and closed labs promotes the greatest efficiency? *Project goal:* Decrease the time before a particular drug goes to market.
- How do lighting strategies and reflectivity of ceiling finishes influence student test scores? *Client's priorities:* Increase test scores above state or national averages.
- What is the relationship between work surface heights and collaboration in research and development facilities? *Client's priorities:* Promote product innovation through collaboration.
- How will a change in the materiality and geometry of the façade affect the R-value of the building enclosure? *Project goal:* Design a building envelope that reduces the building's energy consumption by a certain percentage.

STEPS IN THE EVIDENCE-BASED DESIGN PROCESS

While there are a number of different versions of the EBD process, the following steps are common to many of these versions:

Question: Through a literature review or by virtue of previously completed projects, arrive at a question to be addressed through the design project.

Collect data: Collecting data will take on different forms, depending upon the kind of data to be collected. This collected data will inform and influence the design process.

Hypothesize: A critical step in the EBD process, stating a hypothesis the architect is beholden to prove/disprove, will make the process more rigorous.

Design: Like other architectural projects, designs that follow an EBD process will have a design process. An EBD-oriented project team will have methods and tools to evaluate a project's trajectory toward its EBD goals periodically throughout the design process.

Construct: The construction of the design based on solid evidence or knowledge is a critical component of EBD, so that a post-test or postoccupancy evaluation of the project is possible.

Analyze: The analysis of the design and construction project is commonly done through a postoccupancy evaluation, and this analysis offers insights into the project's success.

Refine question: A key to evidence-based design is that the process results in a refinement of the question or project goals, and the EBD cycle begins all over again.

Share results: Publication of the results from the EBD process will advance the collective body of knowledge in the profession.

Not all questions will make great research questions. The experienced design and research team will be able to establish a short list of questions that are central to the project and the client's goals. Shortly after establishing this hierarchy of questions and project goals, the architect or design team should generate a literature review to offer a background knowledge base for the research project and to hone the questions. The term "literature review" is primarily associated with academic settings; however, many of the academic literature review techniques will sound familiar to practitioners who have done background research to set project goals for a client.

The literature review is both a process and a document; however, the review begins with a process of casting a wide net in order to capture a wide range of material that come to bear on the research question or topic. Whether an article has been peer-reviewed will affect the importance of that article; in addition, the manner of peer review will increase or decrease the article's importance. A double-blind peer-reviewed article, one where the identities of the authors and reviewers are kept from each other, is given greater credence than a single-blind peer-reviewed article, one where the authors' identities are known to the reviewers. An inquiry to the editorial staff will generally reveal a journal's approach to its review process. As the reviewer sifts through and filters the information in the literature,

SUGGESTIONS FOR CONDUCTING A LITERATURE REVIEW

- Seek current knowledge while still framing literature within a historical context.
- Target academic journals in addition to books or mainstream periodicals. University libraries will have access to academic journal articles.
- Seek peer-reviewed work to elevate the objectivity and accountability of source materials.
- Draw a diagram to describe relationships between different sources.
- Keep notes in an organized fashion so that they can be called upon in future phases of the project.
- Generate a spreadsheet summarizing each article, with the following headings: citation, setting, subjects, methods, and results.
- Use a citation program such as Endnote or Refworks for recording citations and inserting them in papers while you write.

a more concise literature and body of knowledge are established as a basis for the research question.

Where can one find scholarly journal articles? Academic libraries will offer greater access to current scholarship on a topic through academic journal articles that have been peer-reviewed. Consider an alternative resource such as Google Scholar (see www.scholar.google.com). Other online search engines are PubMed and InformDesign.

Following the literature review, a more informed question or project statement is possible. After forming the primary questions to be addressed through the project, a series of research techniques will be employed to collect data so that the architect can begin to address the research questions.

2. Collect Data

While every step in the EBD process is important, the collection of data is a critical component to establishing the pretest attributes of the work. If, at the other end of the process, one is to assume that there's something to be studied after the project is built, then the quantitative or qualitative data that is to be compared begins with the data collected during this step in the process. A variety of data collection methods can be implemented during this phase, and a number of those methods are described below.

Natural observation is a qualitative research technique used in evidence-based design research. This kind of observation involves the researcher's spending time observing subjects who are relevant to the design project. If the design project requires the redesign of an existing space, then the observation of that existing space is logical. If there is no existing building or space to be analyzed, then other research techniques would be more appropriate. In public building settings natural observation is more easily accomplished, as the observer attempts to "disappear" into the crowd. The question of "insider vs. outsider" comes into play in certain situations. As an insider, the architect might have privileged access to insights that an outsider would never observe.

As one considers how to approach any kind of observation, one has to consider the effect that the observer has on the observed. For a small residential project, the opportunity to observe is obviously not the same as it would be for a large shopping mall, for example, where the researcher can disappear. For those smaller private design commissions, there are other research techniques that would be more appropriate to pursue.

Surveys are another way for the architect to arrive at evidence to feed into the design project. Used frequently in workplace environmental research, surveys of staff members begin to reveal organizational aspects of the clients. These techniques allow architects to probe, question, and dissect a particular issue from the perspective of the client or end user. The practice of generating a survey is a science and an art, and previous experience writing surveys or reviewing surveys will make the survey stronger. There are a few things to consider when generating a survey for distribution, such as the target audience, target sample size, format of questions, and methods for establishing and maintaining anonymity. Choosing between online surveys and hand-written surveys is another consideration when designing the proper survey instrument.

Focus group sessions are another research technique used frequently in the EBD process, particularly when the research applies to a specific, targeted group or audience. Unlike a random sample questionnaire, which would be distributed randomly to potential survey participants, the focus group session, as its name implies, is a way to glean information from a group of people selected around a particular focus area or because of similarities in that population. For example, if an architect is designing a new pediatric intensive care unit, that architect might consider a focus group consisting of parents of children who spent a certain amount of time in a PICU. For the same project a separate focus group session could include doctors and nurses who work in this type of environment.

Focus group sessions can take a number of different forms. Focus group sessions might consist of surveys or questionnaires and seem more like a group survey. Focus groups might function more like group interviews. In lieu of simple question and answer sessions, some researchers will integrate more creative techniques with which to extract information from the group. One such technique is "visioning." In a visioning process, the researcher or architect leads participants through a more hands-on process of envisioning certain aspects of the project. Visioning exercises often include the use of inspirational images, drawings, diagrams, or models with which focus group participants are asked to interact.

At this point in the EBD process, one might ask what makes EBD different from programming. Programming and EBD have similar techniques, such as surveys, focus groups, interviews, and observation; however, evidence-based design is a cyclical process that takes knowledge gained from one project and applies it to the next one. In addition, design research is more rigorous than traditional programming. Architects and programming consultants will be familiar with many of these techniques because they will have used the same techniques to generate a program document for a project. The program document is a tool that can be used for the benefit of the project, regardless of any EBD goals. The additional requirements overlaid onto the project by EBD goals will mean that the design team addresses the hierarchy of questions to be addressed by the project and outlines a plan for targeting and answering these research questions through the design process.

In academic settings, particular research instruments will often trigger the university's institutional review board (IRB), which is a board consisting of faculty and staff with expertise in research methods and protocols, when research projects include human and/or animal subjects. While certain aspects of EBD research will not involve any such parameters, projects that include surveys, focus groups, natural observation, or interview techniques might trigger the need for IRB approval. Most architects doing research in professional practice would not necessarily be beholden to IRB protocol; however, such architects should be aware of the existence of institutional review boards, the concepts that govern IRBs, sensitivity to human subjects, and the risks involved in such research. In addition to this general awareness, architects might have certain clients, such as health care or higher education institutions, that will require IRB approval from them. Architects who participate in research projects with academicians should also be aware of the IRB approval process and the time that it takes academic researchers to submit for IRB approval and to receive approval or exemption.

Potential IRB Review "Triggers" in Academic Settings

- Research involves the observation of people, particularly minors.
- Research involves interacting with or talking to people of any age.
- Research instruments collect personal or demographic information about research participants.
- Research involves potential risk to participants, ranging from health and welfare risks to minor risks such as personal embarrassment.

3. Hypothesis

While in a typical design process the architect relies on previous experience, prototypes, or rules of thumb to assume the answers to all the questions, an evidence-based design process demands a suspension of belief. Stating a hypothesis or a series of hypotheses will allow for discovery and for the hypotheses to be supported or unsupported. Stating a hypothesis is one of the key differences between evidence-based design and a standard design process.

4. Design

How, then, does the design process change when there are evidence-based aspirations of the architect or design team? For illustration purposes, consider another component of the typical design process. For example, cost estimating is an activity that is done periodically throughout a project, generally at the ends of project phases. A project team that fails to generate periodic cost estimates will most likely find that the design is off track vis-à-vis the budget by the end of the construction drawing phase of the project. Is it possible to complete a project without a cost estimate? Yes; however, the results may be less than desirable. Is it possible to complete a project without any thought given to evidence-based design? Yes, but that project would not be able to claim EBD as an influence nor an outcome; moreover, the project would not benefit from the value that data and evidence could bring to the table. If project cost is something that needs to be evaluated periodically, then evidence is also an aspect of the project that could be evaluated periodically.

5. Construct

For an EBD process the construction phase will have similarities to any other construction phase. Those aspects of a construction phase that might be unique to EBD include more rigorous mock-ups for testing, higher levels of building commissioning, and rigorous testing, measuring, and balancing. Depending upon the research questions that the design team and client are trying to address, mock-ups will be important in the EBD process.

Mock-ups should be used to measure more than just aesthetics or whether the mock-up quality meets the specifications for the element constructed. Depending on the scale of the mock-up, the mock-up can be used to gain additional cycles from the cyclical EBD process. The mock-up can be analyzed, and the research questions can be reformulated and the design modified before the final construction is completed.

Communication between the design team, research leader, and contractors is critical during the construction phase. Much like LEED has made its way into the discussion during pre-construction conferences and regularly scheduled construction meetings, EBD has the potential to be a point of discussion in these meetings.

6. Analyze

The analysis of data will rely on different tools and techniques, depending on the data that has been collected after construction and/or occupancy. In the case of post-construction, the design team will be able to analyze the more technical aspects of the design. Engineering systems can be tested and balanced against the design criteria; however, the aspects of the design that rely on human interaction will require a postoccupancy evaluation (POE). Architects will be familiar with postoccupancy evaluations and the techniques generally used in POEs. Surveying end users, for example, will offer insights into the project's overall success, usability, and comfort.

For certain sets of primary source data, one might use statistical analysis software such as ATLAS.ti, NUD*IST, or Hypersoft. For less complex data sets, a researcher can use more common software such as Microsoft Excel or similar spreadsheet software packages. Analyzing the data should lead to statistics or data related to the initial questions and hypotheses.

The postoccupancy evaluation phase of a project engenders an attitude of open-mindedness. How often does an architect design something and then "walk away" from the project once the project is closed out? Most architects do not take the opportunity to revisit their projects and treat them as a source for research and data mining. Clients do not typically request POEs, either. In order to research one's previous designs, then, the architect has to begin writing the postoccupancy phase into the contract or begin doing the research with business development funds as a way to build a critical mass of data and expertise.

For the postoccupancy evaluation process to be considered evidence-based design, there needs to be a correlation between the questions and research methods used early in the process and those used in the postoccupancy analysis. The pretest data is collected early in the process to establish a hypothesis; the post-test data is what is collected during the postoccupancy phase. The analysis of the data should follow suit, so that research questions become clearer.

7. Refine Questions

Following through with an evidence-based design process means the research questions need to be refined so that subsequent projects take advantage of the previous project. Upon analyzing the results of the built project, the researcher, architect, or design team must determine if the hypothesis was supported, or not, through the project's outcomes. If the hypothesis was supported, then the architect can continue with similar attitudes or solutions when faced with a similar problem. If the hypothesis was not supported in the course of analyzing the project's outcomes, then the architect will alter the design or refine the question when faced with a similar problem or project.

One challenge with revising or refining research questions is that certain questions might only be applicable to a single design project. This limitation could be due to the unique nature of the building's program, site, scale, or some other feature that would prevent the project from being duplicated. "Signature" pieces of architecture would lend certain aspects of their designs to rigorous examination through a number of iterations; however, much of what would make that piece of architecture unique would not be duplicated through testing and retesting. Along those same lines of logic, a "cookie cutter" prototypical project for which many versions or variations exist could be more easily studied, redesigned, evaluated, redesigned, reevaluated, and so on.

8. Share Results

Disseminating one's work is critical to establishing the legitimacy and objectivity of the work. Most architects are familiar with the process of disseminating their work through monographs or journal articles; however, architects are not used to releasing the data or numbers about their work. Reasons for this reluctance to share information might result from a fear of exposing less-than-desirable conclusions or from a desire to keep information private or proprietary, thereby maintaining a competitive edge or client confidentiality.

Disseminating the results from an EBD process means that the architect finds ways around these blocks and shares the results from the research. Academic journals are one outlet for the research results. One example of an academic journal relevant to EBD is the *Health Environments Research and Design Journal*, or HERD. Research conferences are another way to disseminate information from the EBD project.

Activities of the Researcher During EBD Project Phases

- Pre-design phase: Develop research tools, participate in programming activities, establish project goals with client and design team, arrive at central research questions and hypotheses, set up EBD checklists for project.
- Design phases: Collaborate with design team, update EBD checklists, develop prototypes and mock-ups to generate preliminary data.
- Construction phase: Participate in testing and commissioning, maintain EBD priorities through site meetings and field reporting, update EBD checklists.
- Postoccupancy phase: Conduct postoccupancy tests, surveys, observation, etc.; collect data from postoccupancy; prepare reports for dissemination.
- Dissemination: Write journal articles documenting the results of research, contribute to conference presentations related to project.

APPLICATIONS FOR EVIDENCE-BASED DESIGN

The evidence-based design process transcends typology or context; however, there are a number of building types that lend themselves more readily to the EBD process. These building types either rely more heavily on data or numbers to be successful, or they are allied with end users or clients who themselves have evidence-based discourses.

Health Care Environments

▶ See the backgrounder in this section, Researchers in Professional Practice: Understanding Challenges to an Evidence-Based Practice Model in Architecture for Health, for more information about the work of the Center for Health Design.

Evidence-based design has a well-established history in health care environments where the collection of quantitative patient data has been readily available. Given the interest of hospitals and insurance companies in maintaining or improving the level of patient care and employee productivity, health care environments have over the years focused time and energy on architecture and interior design. Patient data such as blood pressure, heart rate, other vital signs, and length of stay are monitored and tracked in the standard operation of a hospital, nursing home, or other health care facility; therefore, the collection of data for architects in health care environments is more accessible. The Center for Health Design (CHD) is an organization that advocates for better health care design through research and education, supporting an EBD approach to health care design.

The pursuit of evidence-based medicine provides a natural synergy with EBD. Health care professionals seek to improve patient care and, in the process, collect data that supports the work of architects and interior designers. Information about staff efficiency and effectiveness, data related to accuracy and proficiency, and numbers of patient illness or death related to staff performance are of interest to those studying evidence-based medicine. This data, when shared with architects and designers, offers some insights into the relationships between welfare and design.

Learning Environments

Learning environments such as K–12 schools or higher education spaces also offer architects access to quantitative data, such as test scores, grades, student absences, and sick days. Design goals supported by research into these project types range from improving test scores to improving indoor environmental quality. Over the years architects and researchers have concluded that daylight has a direct and positive impact on student performance, and indoor environmental quality has a similar impact on health. More recently there has been research into the relationships between teaching styles, furniture layout, and learning in academic environments. A product of this research is Steelcase's "LearnLab: Classroom of the Future," a prototype for a flexible learning environment that challenges the conventional classroom layout and structure.

Another source of data tied to learning environments is the National Clearinghouse for Educational Facilities (NCEF). Funded through the National Institute of Building Sciences, NCEF collects and disseminates information about learning environments and links to a number of allied organizations and information sources.

Learning environments are not limited to schools; libraries also fall under this category. Libraries range from academic libraries to public libraries to school libraries. As EBD expands beyond health care design, there are opportunities for architects to find synergies with evidence-based librarianship (EBL) or evidence-based library and information practice (EBLIP). Recent research by the author suggests that EBD principles applied to library design will affect the ways that libraries are laid out.

Workplace Environments

Workplace environments are being studied relative to employee attraction and retention, reduction of sick days, productivity, and efficiency. For corporate office environments, the research is being led by furniture manufacturers such as Knoll, whose Workplace Research group is showing the way to advancements in corporate office design. Research in workplace environments has led to improved ergonomics for workers, more transparency in office partitions, and changes in standard planning modules. Ergonomic research has resulted in office accessories such as keyboard trays, monitor arms, high-end task chairs, and foot machines.

In addition to research being done by furniture manufacturers, there are leading architecture firms that are studying the relationships between design and productivity and efficiency. Gensler is one of the global leaders in this effort; through its Workplace Performance Index® it has established a tool to measure the relationships between business and design.

Retail Environments

Retail environments are another project type where research influences architectural design. Project goals for these retail environments tend to be different from the types of goals for health care. Retail data is generated through information technology systems linked to sales. Through studying sales figures, market research, and their relationships to retail space planning and layout, retailers are better equipped to generate retail designs that increase profitability.

An advantage that retail environment's EBD processes have over other building types is the rate at which retail spaces are designed and built and the sheer number of retail environments that exist. Compared to hospitals or laboratory buildings that take 5 to 10 years from start to finish, retail environments are generated at lightning speed. The EBD cycle is able to lead to conclusions at a similar pace, such that retail spaces are perhaps the most finely tuned environments based on research and evidence.

Science and Technology Environments

As their name implies, research laboratories are those facilities where hard science and bench research is undertaken. The people who run these laboratories are the same people who are funded by federal grants from agencies such as the National Institutes of Health or the National Science Foundation or through private investors. The kind of rigor that these agencies demand and that the researchers carry out means that the architecture of these spaces needs the same rigor.

Evidence-based design techniques will assist with a number of current issues in wet lab and dry lab architecture. For new construction projects, EBD has the potential to address questions related to daylighting, ventilation, efficiency, safety, and security. For existing laboratories in need of renovations or additions, an analysis of the existing building will generate the data needed to produce the architectural design. Airflow tests, light levels, and indoor environmental quality measurements are examples of a few metrics that can be collected and documented in existing laboratory buildings.

Importance of Evidence in Sustainable Design

One might argue that sustainable design is inextricably linked to evidence; otherwise, who would know what is actually being targeted for sustaining? In order to sustain something at a certain level, or to improve upon that level, the metrics or data of that level must be a known number to begin with. This area of metrics is where sustainable design and EBD overlap.

LEED for Existing Buildings: Operations and Maintenance, or LEED-EBOM, is a rating system that incorporates the pursuit of evidence in sustainable design. Within this system there are several categories that ask the architect or other design team member to utilize evidence gathered through energy analyses, existing building energy consumption, and other data before establishing the existing building's baseline. From this baseline of the building model or energy model, then, the design team establishes goals for improving the numbers. While the LEED rating system does not emphasize evidence-based design principles, there is a great potential for exploiting the LEED certification program in order to generate postoccupancy analyses of LEED-certified buildings with the express purpose of making design changes and then starting the cycle of research again. The mandatory five-year recertification cycle of LEED-EBOM-certified buildings will ensure that architects and owners are collecting data that can inform future design projects.

The Environmental Protection Agency's Energy Star® program encourages the collection of building energy data that gets tracked and recorded as energy use intensity per unit of floor area. Energy Star offers an interactive online Portfolio Manager® tool for building owners to monitor this resource consumption. The data collected and reported by owners is generating benchmark data for future building projects; in turn, these data provide a wealth of information for evidence-based sustainable design. The kinds of data tracked by this program have already resulted in collective building data that can be referenced as architects design buildings of similar scale and type.

EVIDENCE-BASED DESIGN ACCREDITATION AND CERTIFICATION

The Center for Health Design, founded in 1993 by a group of health care design professionals, has established criteria for accreditation and certification, codified through an examination. Much like the USGBC's LEED rating system and LEED examination have redefined professional practice, the CHD's Evidence-based Design Accreditation and Certification (EDAC) examination has the potential to redefine practice around evidence-based design.

According to the Center for Health Design, the "internationally recognized EDAC program awards credentials to individuals who demonstrate a thorough understanding of how to apply an evidence-based process to the design and development of health care settings, including measuring and reporting results."

The EDAC examination consists of 110 multiple-choice questions. One hundred of the questions are scored; 10 questions are pretest questions that are not scored. The test covers five different content areas: Evidence-Based Design for Health Care, Research, Pre-Design, Design, and Construction and Occupancy.

For More Information

Evidence-Based Design for Multiple Building Types (Wiley, 2009) by D. Kirk Hamilton, FAIA, and David H. Watkins, FAIA.

Evidence-Based Health Care Design (Wiley, 2009) by Rosalyn Cama, FASID.

The Center for Health Design, EDAC Program: www.healthdesign.org.

BACKGROUNDER

EVIDENCE-BASED HEALTH CARE DESIGN: AN UNDERSTANDING OF ITS TIPPING POINT

Rosalyn Cama, FASID, EDAC

Design research methodologies vary, but they are fundamental to the way most design projects begin. Putting rigor around those methodologies and making baseline knowledge accessible has allowed the evidence-based health care design movement to gain traction while successfully attracting the attention of owners seeking to align strategic objectives with policy-driven building programs.

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ACCEPTANCE OF EVIDENCE-BASED HEALTH CARE DESIGN

Tipping points occur when an external driver forces crucial conversations that shift behaviors. Such was the case for evidence-based health care design's tipping point. In 1999 the Institute of Medicine (IOM) instigated crucial conversations about the improvement of medical care delivery in their landmark publication *To Err Is Human* (IOM, 1999). The most discussed mandate that resulted from that report was to slow the spread of infection to save lives. It created market readiness for anything that addressed this issue.

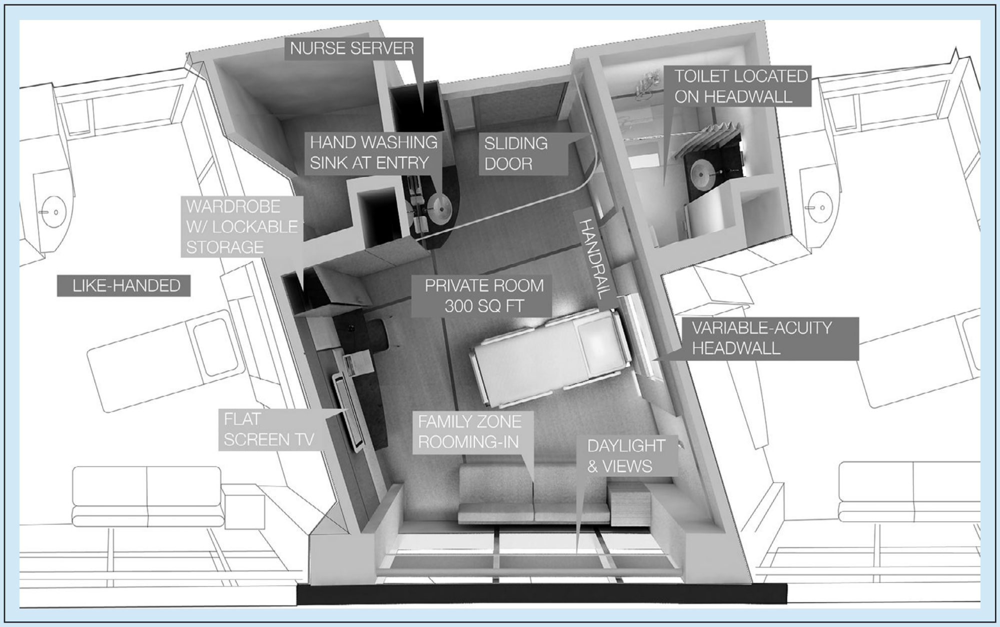
A health care building boom coincided with this mandate. Many hospital administrators charged with improving physical infrastructure were also faced with operational directives to improve the quality of care, particularly around safe delivery. Within the ranks of architects and affiliated design professionals there was concern that an evidence-based approach to design did not have enough data to fuel its adoption. Many feared that using peer-reviewed research, housed in the halls of academia, would squelch creativity.

In 1998, The Center for Health Design (CHD) commissioned a researcher at Johns Hopkins University to conduct an analysis of all research in the field linking design of the built environment of health care to outcomes ("Status Report: An Investigation to Determine Whether the Built Environment Affects Patient Medical Outcomes," H. Rubin et al., CHD,1998). The Johns Hopkins reviewers examined 78,761 articles for possible inclusion, but only 84 articles contained relevant data, fueling the profession's skepticism. However, 74 of the 84 articles (88 percent) demonstrated that some health care environmental feature was related to at least one patient outcome parameter. The health care industry's skepticism was beginning to shift to a need for more evidence-based knowledge.

The Center for Health Design instituted a field study research program in 2000 known as The Pebble Project. Health care providers, working from the Johns Hopkins study, began to build the body of knowledge by measuring design interventions linked to outcomes in need of improvement that were aligned with their strategic directives. Their findings fueled others to look at how the built environment affected these much-discussed outcomes. This design methodology was noticed within health care provider boardrooms and around policy-making tables. Requests for proposals began to ask for evidence-based experience. It didn't take long for design practitioners to see how evidence-based design could become a business strategy.

Two other research analyses were conducted by Texas A&M and Georgia Tech in conjunction with The Center for Health Design in 2004 and again in 2008 ("Review of the Research Literature on Evidence-Based Health Care Design," R. Ulrich et al., *Health Environments Research and Design Journal* (HERD), 2008), and the number of qualified studies grew into the thousands. With this growing adoption of an evidence-based design methodology, the acceptance of design innovation started to grow. Before, the only real measurable criteria for difficult design decision making was cost, and many new ideas failed at the point of budget evaluation. It took evidence to connect the reduction in the spread of infection to the design of the single-bedded patient room (see Figure 14.7) and its adoption into the *Guidelines for Design and Construction of Health Care Facilities*—the industry's accepted code or reference standard for health care buildings. Not only did this design intervention reduce the spread of deadly infection, but it also created a return on its investment in less than two and a half years by avoiding the added cost of care when a nosocomial infection occurred ("The Fable Hospital," D. Parker et al., 2004).

Interim mock-up studies are encouraged in the evidence-based design process. This quick way to prototype new design interventions in order to get to specific user input and



HOK/RMJM/CAMA

FIGURE 14.7 University Medical Center of Princeton at Plainsboro's Evidence-based, Single-bedded, Like-handed Patient Room

(continued)

aid in design detailing greatly reduces the cycle time for the acceptance of innovative design ideas. Architectural mock-ups as a mitigated risk technique have opened the door for innovative design discussions to evolve more rapidly, fueling subsequent return on investment studies. Mock-ups have assisted greatly in the value engineering discussions. (Note the reference in the "For More Information" section regarding "The University Medical Center at Princeton Inpatient Mock-up Project.")

RESOURCES FOR THIS PRACTICE METHODOLOGY

In evidence-based health care design, the initial baseline of knowledge was quite manageable for those entering the field in the 1990s. As that baseline expanded, so did its complexity. The need to capture the successes and failures of particular design interventions has moved beyond academia to the design studio in collaboration with owners. Many firms have engaged researchers, as have many product manufacturers and owners. Small firms can participate through a link to a university or research team member from a collaborative firm. In health care, the venue to share information has now grown to a variety of venues staged by all stakeholders. The norm is to share failures as well as successes. These stakeholders also demand knowledge about interventions yet to be proven.

Most important to this practice methodology is the ability to stay current on findings and awareness of what is emerging as innovative design interventions. There are several ways to tap into this knowledge base:

- Attend conferences and webinars.
- Join community interest groups or initiatives.
- Find related websites.
- Know which organization or university is producing useful tools.
- Subscribe to relevant peer-reviewed journals.
- Subscribe to magazines that track evidence-based project case studies.
- Seek out important white papers on relevant topics.
- Get the EDAC (Evidence-based Design Accreditation and Certification) credential.

Sharing the development of a project with a larger group of interested colleagues has gotten easier but more competitive in terms of research rigor. See a list of resources in the "For More Information" section below.

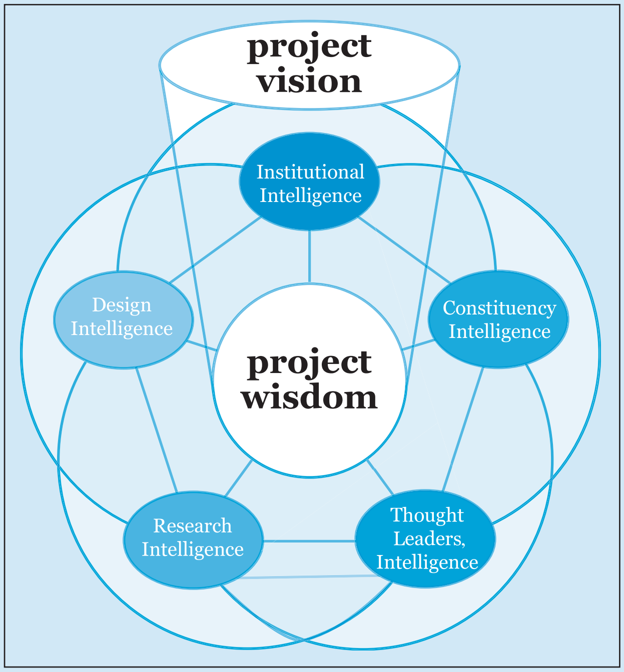
If a project team needs more research, there are many specialized firms that can serve as consultants. The Center for Health Design also offers assistance in a variety of ways, with third-party reviews and consulting, assistance with literature reviews, and the development of a project research agenda. As a firm's baseline knowledge grows, the CHD offers a number of tools to assist in the review and development of useful criteria to use in the research process. Subconsultants can also be found in other professions and from academic and/or manufacturing partners.

PROFESSIONAL SUPPORT

Universal to all design processes is the ability to collect and synthesize intelligence from a variety of sources. When this intelligence includes peer-reviewed research, it enriches a very specific body of knowledge referred to as "project wisdom" (*Evidence-Based Health Care Design* [Wiley, 2009] by Rosalyn Cama). It is here that an evidence-based vision is drawn, holds a project on course, and determines where innovation and value engineering will and will not be tolerated, as illustrated in Figure 14.8. Inherent in this process is the use of thought leaders on the topics that are believed to be innovative. Most thought leaders are known by many in their field. Using the AIA and other professional associations to identify these people also adds to a team's ability to take a project to a new dynamic level. Sometimes it is best to look beyond design to clinical associations. Companies often use thought leadership in their research and development work and are a great resource for finding experts in areas that will jump start a project team's evidence-based thinking. Nonprofits doing the research are also good sources for advice.

TRENDS MOVING FORWARD

It took the IOM to move crucial conversations about medical safety to the fore and drive the design of the single-bedded room into adoption. Health reform caused the design

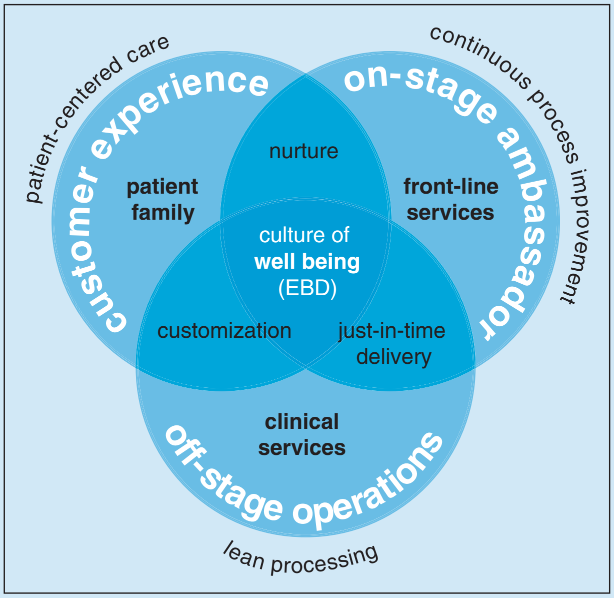


Rosalyn Cama, Evidence-based Health Care Design *(Wiley, 2009)*

FIGURE 14.8 Project vision: a stated view of what is to be upon project completion. The inspiration for a vision comes from "project wisdom," the knowledge gained from the open communication between all members of an interdisciplinary team. In an evidence-based design project, a project's vision is articulated as a measurable outcome.

industry to partner with hospital administrators to swing the pendulum from its position of patient-centeredness to a more balanced position including staff effectiveness. Doing more for less is not just a "lean" operational solution, it is also a design problem that can improve throughput while still reducing errors.

As the diagnosis and management of disease are addressed earlier in a person's care plan, an accountable care model is driving sustainable health and wellness. Design interventions for a culture of well-being, as shown in Figure 14.9, will emerge in our newly revised community and home-based health system. Moving way upstream, design professionals might consider collaborating with care providers to understand how at a societal level, before policy even takes hold, to drive conversations about preserving human existence through the design of restorative environments so disease is avoided. How we as humans can learn to live in a state of wellness through design is the true path toward heath reform. It is here that evidence-based health care design will reach its tipping point in all design sectors.



Rosalyn Cama, FASID, EDAC

FIGURE 14.9 Culture of well-being: the intersection of customized, just-in-time delivery of health services that are timely, continuously evolving, and nurturing.

For More Information

The Center for Health Design (see links for EDAC, the Built Environment Network [BEN], and the Pebble Project): www.healthdesign.org.

"Green Cleaning in Health Care: Current Practices and Questions for Future Research," CHD, 2011: http://www.healthdesign.org/sites/default/files/hhigreencleaning_paper.pdf.

Institute for Patient- and Family-Centered Care: http://www.ipfcc.org.

"Investigation to Determine Whether the Built Environment Affects Patients' Medical Outcomes," CHD, 1998: http://www.healthdesign.org/chd/research/investigation-determine-whether-built-environment-affects-patients-medical-outcomes.

Society for the Arts in Health Care: http://www.thesah.org.

"The Functional Mock-Up: The University Medical Center at Princeton Inpatient Room Mock-Up Project," *Health careDesign*, March 11, 2010, by Nicholas Watkins and Susan Lorenz.

PART 4

CONTRACTS AND AGREEMENTS

Agreements and contracts delineate project services, project delivery method, compensation, and the expectations and obligations of the parties involved. Risks are identified and managed with careful attention to agreements, understanding of insurance coverage, and awareness of dispute avoidance and resolution. The AIA Documents Program provides industry-standard contract forms for use between all parties to design and construction.

CHAPTER 15

Project Definition

15.1 Defining Project Services

Glenn W. Birx, FAIA

Defining the scope of project services is central to developing effective agreements for professional design services.

INTRODUCTION

To help set up a project for success, it is important that the client and architect establish a mutual understanding and agreement on its intent as well as on the expectations of performance of all parties involved. The architect must enter into a professional services agreement to define the project service expectations. Whenever there is a problem concerning architectural and engineering services serious enough to include attorneys and a dispute resolution process, the contract for services will be the initial document referenced by both sides. Moreover, throughout the dispute resolution process the professional services agreement will be the most important document in consideration of the architect's responsibilities. All discovery and argument will strive to determine an understanding of the services performed in the context of what was defined in the professional services agreement. Ultimate resolution will evolve from a determination of the contracted obligations of the parties and of whether or not those obligations were performed adequately.

Building projects are complicated, and most architects would prefer to resolve differences amicably to maintain healthy continuing relationships with clients. Accordingly, a good first step is to establish open communications and to be crystal clear as to the obligations of the parties prior to beginning work on a project. Because there are

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many types of services that architects and engineers can provide, a client may have a different understanding of what those services mean. A clear description up front of services to be provided will help clarify the client's expectations.

Beyond clarifying expectations, a clear description of services can also serve as a basis to adequately respond to the owner's programmatic requirements, allow the development of an effective work plan, allow for the negotiation of fair contract terms, see that adequate compensation is agreed to, and provide a benchmark for determining when requested services are additional to those in the contract.

TYPES AND CATEGORIES OF SERVICES

For ease of understanding services, it can be helpful to organize them into three groups: pre-design services, design-through-construction phase services, and post-construction services. Typically, most pre-design and post-construction services are considered "additional" and those associated with the design through construction phases are considered "basic," although many additional services can occur in these phases as well. See the section "Basic vs. Additional Services" below for a further description of these differences.

Pre-Design Services

Through their training and experience, architects possess knowledge to address pre-design issues such as site selection and programming, and almost all clients have the need for design consultation prior to the start of schematic design. Defining the problem is the first step in solving it, and there are numerous ways for an architect to assist in the pre-design phase. Steps in this process include such tasks as goals and visioning sessions, scenario planning, strategic planning, campus or master planning, project definition, program management, and other related activities. Often there is a need for a facilities program, which is a common pre-design task for architects. Facilities programming outlines the required spaces proposed for the facility, with various attributes about specific needs of spaces, including sizes and number of people, lighting, audiovisual needs, finishes, relationship to other spaces, and other issues. The program becomes an important tool for the design phases, and helps the design to proceed more effectively.

▶ The backgrounder on Programming (10.5) and Quality Management in Schematic Design (12.2) cover related information.

Some clients may require services prior to design to assist them with fund-raising activities. These might involve feasibility studies and cost estimating; renderings and models for brochures and fund-raising events; graphic design; return on investment analysis; and other services. Pre-design phase services offer excellent opportunities for architects to provide value-added services for the benefit of the project and to extend the relationship with the client.

▶ See Design Phases (10.5), Construction Drawings (10.6), Bidding and Negotiation (10.8), and Construction Phase Services (10.9) for further discussion of these topics.

Design-Through-Construction Phase Services

Most architects and clients are familiar with services traditionally provided during the five phases of design including schematic design, design development, construction documents, bidding or negotiation, and construction.

It is always advisable to review design-through-construction services on a project-by-project basis simply because the client's building standards or expectations might have changed, or the client may be providing some of the services, or, conversely, may be asking for more services. Services provided can also vary when project delivery methods other than design-bid-build are used, such as construction management, design-build, or integrated project delivery (IPD). The use of new technologies, such as building information modeling (BIM), may also affect the level of project services. Some clients are now expecting certain specific technology use by both the design team and the construction team.

▶ Project Delivery Methods (9.1) presents a broad discussion of current project delivery options.

Most basic architectural services often include services from consultants for structural engineering, mechanical/electrical/plumbing engineering, and sometimes civil engineering. But most other design-through-construction phase services are usually considered to be "additional." For example, some projects may require the use of specialty consultants in connection with food service (kitchen) planning, audiovisual systems, laboratories, libraries, theaters, data/communication systems, security systems, "green" or sustainable design, and lighting and acoustical design.

The fees for these specialty consultants can be included with the architect's fee proposal, but when doing so, it should be pointed out that such fees are not normally included as part of basic services. Other "additional" services can include renderings and animations; topographic, furniture, and equipment surveys; life cycle cost analysis and energy modeling; additional bid packages and multiple construction phasing; fast-track scheduling; building commissioning; graphic design; assistance for permits and other municipal fees; and many others. Owners often request architects to provide geotechnical engineering services and utility and boundary surveys.

Post-Construction Services

▶ Project Completion and Post-Construction (10.10) addresses project closeout, assistance to owners during the warranty period, and additional services beyond the architect's basic services contract.

Traditionally the only post-construction phase services offered by architects have been postoccupancy evaluation and building commissioning. However, increasingly architects are offering more services after construction. These services include maintenance scheduling, space planning, renovations, energy analysis and monitoring, disaster planning, tenant improvements, forensic analysis, code analysis, space scheduling, and others. With the advent of BIM technology, some architects are now offering services to assist the owner with the ongoing management of their new facility, such as space planning and renovations, maintenance issues, and the like.

Sustainable Design Services

▶ See Risks and Emerging Practices (16.3) for information about the risks entailed in sustainable design.

With any new services, there is the potential for differences in expectations of the architect and the owner, and sustainable design is another example. The very definition of sustainable design is not clear among owners and architects. There are several rating systems that attempt to measure the sustainability of a building, including LEED, developed by the United States Green Building Council, and Green Globes, developed by the Green Building Initiative. Within many of these programs, there are various levels of sustainability, such as the LEED Certified, Silver, Gold, and Platinum levels. If sustainability is a goal of the potential project, then an understanding of those goals is required in order to prepare a proposal for services, and the proposal must clearly outline the extent of those services.

Most architects' professional liability insurance policies exclude coverage when a guarantee or warranty is required by contract. This is especially true for sustainable design services. Even if the services that the architect is to provide are clearly outlined in a proposal or contract, architects should avoid contract language that provides any type of guarantee that those services will result in a certification, such as "LEED Silver," or building performance, such as a specific amount of energy consumption or operating cost savings. Such factors are often beyond the control of the design team, and are affected by construction and operation issues as well as design.

Sustainable design services are often required of the entire design and construction team, including the owner and contractors. In addition to outlining the required services of the design team, the proposal or contract for services should also describe what may be required of the owner, the contractor, and the subcontractors. The owner should be aware of the expectations on them, and should require the contractors to participate as necessary to achieve the sustainable goals.

- *Architect*: Overall project management and coordination, infrastructure design, specification of sustainable materials, products, and systems
- *Engineers*: Design of sustainable systems, development of energy model, specification of required materials and products, etc.

- *Owner*: Definition of goals, decisions on implementation cost, information on programs and usage, building commissioning, buy-in of maintenance staff, etc.
- *Contractors*: Cooperation in purchasing required materials, requiring subcontractors to meet the goals, construction waste and recycling programs, etc.

See LEED Checklists from the U.S. Green Building Council for examples of the goals that various parties related to the LEED design services on a project may strive for.

▶ Project Management with Building Information Modeling Processes (10.4) and Small Firms, Small Projects, and Building Information Modeling (11.3) further discuss BIM in practice.

Building Information Model Development

Increasingly, owners are requiring building information modeling services on their projects. BIM services can vary greatly, so if they are a requirement it is essential to define those services at the time of proposal or contract. It should be made clear as to which engineers and other consultants will be required to work in the BIM, and expected use of the BIM by the contractor should be clarified.

The AIA has published two documents that are most helpful with defining BIM services:

- *AIA Document E201™–Digital Data Protocol Exhibit*, which establishes the procedures the parties agree to follow with respect to the transmission or exchange of Digital Data
- *AIA Document E202™–BIM Protocol Exhibit*, which establishes the protocols and expected levels of development, and assigns specific responsibility for the development of each Model Element to a defined Level of Development at each project phase

Both of these documents are designed to be used as an attachment to the owner-architect agreement. AIA Document E202™–BIM Protocol Exhibit is particularly useful in defining not only the architect's and engineer's scope of work, but also that of the contractor and their subcontractors. The chart included in AIA Document E202™–BIM Protocol Exhibit defines the specific level of development of each model part by phase of the project, by all parties.

BASIC VS. ADDITIONAL SERVICES

The premise of "basic services" as distinct from "additional services" relates to the associated fees. Another way to look at it would be "services included" versus "services excluded." The terms "basic" and "additional" services come from the AIA documents, which over the years have become the industry standard for describing architectural services. The term "basic services" has become the benchmark for comparison of fees by clients. This baseline comes from the AIA description of "basic," to which unique requirements of a project are added or subtracted. Regardless of what they are called, there should be a detailed description of the services with the fee proposal. Similarly, there should be a description of services not included. The accompanying list delineates services that are most often considered as basic and those that are most often considered as additional, according to AIA Document B101™–2007 Owner-Architect Agreement.

BUILDING INFORMATION MODELING AND PROJECT SERVICES

The use of building information modeling in the AEC community is changing the culture of firms and the services they provide. Architecture firms currently using this technology, or planning to do so, must be aware of the following ways in which it can change how design services are delivered:

- The approach to project staffing may change. You may need more labor hours from your senior architects and more experienced staff assigned to teams earlier in the design process.
- In concert with the above, the breakdown and allocation of fees may change. Because design decisions are moved forward in the process, more labor hours will be expended in early phases and less in later phases.
- Renderings and animations are easily achieved using a building information model (BIM). Keep in mind that this can bring added value to the client.
- Contractors and subcontractors can use the building information model to develop and coordinate fabrication and shop drawings, which can provide added value to them.
- This technology makes possible myriad services related to facilities such as space planning, maintenance planning, energy management, etc., and these services can be offered to clients.
- The use of a comprehensive construction information database can be offered as a service to the owner, contractor, subcontractors, maintenance personnel, vendors, and others.
- Cost estimating can be facilitated more easily and could be offered as an in-house service.
- BIM technology can enable more effective construction staging and sequencing to the contractor.

Since BIM technology allows studying alternate designs more rapidly, firms must be careful to not offer clients too many options, which can be inefficient and costly to the architect.

BASIC AND ADDITIONAL SERVICES IN AIA DOCUMENT B101™–2007 OWNER-ARCHITECT AGREEMENT

BASIC SERVICES

Schematic Design

Conceptual site plan

- Preliminary building plans
- Preliminary sections and elevations
- At architect's option:
  - Study models
  - Perspective sketches
  - Electronic modeling
- Preliminary selections of materials and systems
- Preliminary estimate of the cost of the work (construction cost)

Design Development

- Plans
- Sections
- Elevations
- Typical construction details
- Equipment layouts
- Preliminary materials and systems specifications
- Updated estimate of the cost of the work

Construction Documents

- Drawings and specifications that establish in detail the quality level of materials and systems required for the project
- Updated estimate of the cost of the work

Bidding or Negotiation

- If requested by owner, reproduce and distribute the bidding documents.
- Consider allowable substitution requests.
- Organize and participate in a pre-bid conference.
- Answer questions from bidders by addenda.
- Organize and conduct the bid opening.
- Assist the owner in analysis of the bid results.

Construction Contract Administration

- Answer questions from the contractor.
- Provide interpretations of the construction documents.
- Issue supplemental drawings as appropriate.
- Visit the site at "intervals appropriate to the stage of construction."
- Report on observed deviations from the construction documents.
- Reject work that does not conform to the construction documents.
- Review and certify certificates for payment.
- Review and take appropriate action on the contractor's submittals.
- Order minor changes in the work.
- Prepare and issue change orders.
- Prepare and issue construction change directives.
- Conduct inspections for substantial and final completion.

ADDITIONAL SERVICES

- Revisions to the architectural documents caused by changes in instructions or prior approvals from the owner
- Changes to the drawings required by the enactment of new codes, laws, or regulations
- Non-timely decisions by the owner
- Changes to the project size, quality, complexity, schedule, or budget
- Extra work caused by performance failure by owner, contractor, or owner consultants
- Preparation for and attendance at public hearings or dispute resolution proceedings
- Review of contractor's out-of-sequence submittals
- Responses to RFIs where the information requested is in the contract documents
- Change orders requiring revisions to the contract documents
- Services related to fire or other damage
- Review of an extensive number of claims
- Evaluation of substitutions where revisions to the contract documents are required
- Preparation of alternate bid or proposal requests
- Construction contract administration services occurring more than 60 days after the originally scheduled date of substantial completion

STEPS FOR DEFINING SERVICES

Proposing and defining services to be provided is a critical part of practice and should not be taken lightly. Moreover, do not rely solely upon AIA standard forms of agreement or other contracts. Each project is unique, with varying code and local requirements as well as different client expectations, site conditions, and programmatic requirements. Communication with the client is a key element in determining what is required. Recognize that clients who have hired more than one architect might have become aware that they may receive differing services from each firm even for similar projects. Although an engagement may involve a repeat client on a similar project, remember there may be changes in the client's expectations or standards, and that the practice may have evolved, such as with the use of building information modeling or other technology. These are reasons to carefully define services for each project individually. To do this, use the following steps to facilitate a successful definition of scope of services.

Determine What Kinds of Services Are Needed

There are many factors that will affect the type, quality, and deliverables for each project. Among them are the program for the project, client requirements and expectations, the client's level of knowledge and experience in the project type, the need for engineering or specialty consultants to be retained by the architect, the types of other consultants to be hired by the client, the project budget and schedule, the firm's internal capabilities, and the method of construction procurement and delivery. Use the list in the accompanying sidebar and other checklists to be sure that all required design services are addressed. Contact others who may have worked for the client to uncover potential services that may be expected. Ask the client in what ways other consultants have not met their expectations, so that they may be addressed. Contact the local code and other officials (especially in an unfamiliar locale) to find out the processes and extent of required project approvals. Don't skip this step, or assume that it is already known. Do intensive research on the services required for delivering a successful project to the client.

Prepare a Proposal for the Services to Be Provided

The new AIA series of Owner-Architect Agreements (AIA Document B101™–2007 and its related family of documents) is a good start, and as the AIA-endorsed professional services agreements, propose their use for a project whenever possible. However, do not rely on these documents alone in assuming that the client fully understands the scope of services to be provided and has reasonable expectations of the project outcome. Additional communication is strongly recommended to fill voids and provide clarifications. Many clients don't have a clear understanding of what the scope language in the professional services agreement means in terms of deliverables, the requirements of the client in terms of providing information and making timely decisions, and the services provided by others such as owner's consultants and contractors. While AIA Document B101™–2007 attempts to clarify these items in a thorough manner, direct conversation with the client regarding their extent should supplement the written document.

A proposal for services, in a letter or some other appropriate format, should be prepared in advance of preparing the professional services agreement. The proposal should expand on and clarify the proposed services consistent with the architect's understanding of the project. It should elaborate on specifics such as the schedule (duration) of the project, the number of design meetings and public presentations, the type and quality of renderings, the number of site visits, and progress meetings during construction, etc.

In some cases, it may be advisable to define the expected number and type of drawings for each phase of the project. If the architect selection process includes a fee basis, the proposal should also define the fee for basic services and for those that are considered as additional services.

It may be useful to provide a list of "services not included" (often termed "exclusions") in the basic services fee proposal, to further clarify what is not included in the basic fee. The proposal should be the starting point for negotiating the professional services agreement, which will more fully describe the scope of services and fees.

▶ Agreements with Owners (17.1) discusses owner-architect agreements in greater detail.

▶ The scope of services proposal is distinct from proposals prepared to acquire projects, such as in response to a request for proposal (RFP). For more on RFPs, see "Qualifications, Proposals, and Interviews" (6.5).

Negotiate the Final Scope of Services

▶ For related information, see the other articles in this chapter, Services and Compensation (15.2) and Negotiating Agreement (15.3).

It is always better to negotiate services before discussing and negotiating fees. Since fees are tied directly to the services provided, it is important to have a clear description of services in the proposal. Since many clients do not fully understand this link, it is best to ask which of the proposed services are not needed if asked by the client to reduce the fee. Be prepared with an estimate of the required labor hours and other costs associated with each service, although fees are often based on value provided to the client rather than the hours required to perform them.

Prepare the Professional Services Agreement

At the conclusion of negotiations, the proposal should be revised. It should contain the final agreed-upon services, schedule, and compensation. Some clients will want the proposal to be included as an exhibit with the professional services agreement. In this case, the final proposal should contain a more complete and detailed description of the scope of services, whether using AIA documents or some other contract form. Remember that AIA documents and other standard contract forms include only general descriptions for the scope of services, and that the final proposal will likely incorporate a more detailed description tailored to the unique requirements of the project.

If the client does not accept the detailed description in the final proposal, as with many state or governmental projects, modify or provide a reference to the proposal so that it is represented somewhere in the final agreement or elsewhere in the project, such as in the client-architect correspondence file. Contracts should be written with the understanding that the signatories to them may not be around, for various reasons, at the time when disputes may arise. Absolutely do not rely on verbal agreements. The written record is essential.

Monitor and Manage Changes in Scope

If the agreement is sufficiently written, it will be clear as to what is and isn't included in the contract. There should be no question as to the legitimacy of a request for additional compensation in the event additional services are requested. There may be times, however, when unanticipated services arise regardless of efforts to include clarifying requirements in the proposal. In such cases, knowledge of the contract language and its scope is essential so that additional services can be identified and requested. It is best to raise the issue prior to beginning the work, and then to negotiate the additional service in good faith with the client. Most professional services agreements require prior client approval for additional services before the architect can be paid for them.

FACTORS AFFECTING THE SCOPE OF SERVICES

The unique nature of most projects requires an understanding of the factors that can have an effect on professional services with respect to their type, quality, and depth, etc. Possible factors that can affect the level of professional services include the following:

- Programmatic requirements
- Project budget
- Project schedule
- Engineering consultants included in basic services
- Specialty consultants required under your agreement (those outside your core expertise or those usually used with basic services)
- Services (consultants or contractors) to be provided by others
- Your firm's own internal capabilities
- Regulatory requirements and public approval process
- The client's goals, expectations, and values (if you don't know, find out)
- The client's level of knowledge and experience regarding facility development and building construction
- Whether or not BIM technology must be or will be used
- The method of construction procurement (e.g., services for a design-build project will be vastly different from services for a traditional design-bid-build project)
- The form and terms and conditions of the professional services agreement
- The level of risks associated with the project services

RISK ASSESSMENT

As the scope of services is being defined in a proposal, the next step will be to assess the level of risk associated with that scope of services. This can inform the level of compensation required for the project. Riskier projects can require a higher level of compensation. Each project will have a unique set of circumstances related to level of risk, but following are a few examples to assess:

- *Client type*. Some clients are more demanding than others. Some argue about every invoice. Some can't make up their minds about what they like, and then change their minds. Some will be building a building for the very first time. These and many other characteristics of clients can have a dramatic effect on the amount of person-hours spent on the project. Assess the client before submitting a fee proposal.
- *Type of project delivery.* The same project can have different levels of risk depending on how the construction is procured. A design-build project can be riskier than a traditional design-bid-build project, which may be riskier than a construction-manager-at-risk project.
- *Fast-track and other fast construction schedules.* Typically, any type of fast-track project schedule, no matter what type of construction method is used, is riskier than the traditional method of starting construction when the bid documents are complete. There are inherent risks associated with starting construction prior to the completion of bid documents. These types of projects have a higher level of risk, and therefore should command compensation associated with that risk.
- *Construction cost responsibility.* The expected responsibility associated with delivering the project design within the owner's budget should be assessed and understood. The AIA B101 Owner-Architect family of agreements requires the architect to deliver the project on the owner's budget, and if not as a result of bidding or negotiation, then he must revise the documents at his own expense to meet the budget. This risk should drive the architect to be very careful in developing documents. They should be aware of the local construction market, and should build into the documents a series of alternates or other techniques to see that the project is delivered on budget, so that an extensive redesign effort can be avoided.
- *Standard of care expectations.* Risk will be dramatically increased if a client or his attorney suggests contract language that alters or increases the standard of care, or if the contract contains an indemnification clause which does not link defects in services to negligence, to which it must in order for the Professional Liability insurance to be in force.
- *Financial and payment.* Not being paid on time, or not at all, is obviously a significant risk. If a client is not forthcoming about his intentions for payment, then that should be discussed and understood prior to the submission of a proposal for services. Long time frames for payment can have a detrimental effect on the architect's ability to perform the work.

▶ See Architects and the Law (5.1) and Agreements with Owners (17.1) for more information about standard of care.

▶ Dispute Management and Resolution (16.4) and Risk Management Strategies (16.1) further discuss dispute and risk management.

THE PROFESSIONAL SERVICES AGREEMENT

Once the scope of services has been defined and agreed to, it is critical to memorialize it in a professional services agreement (design contract). No matter what form of agreement is used, it must include a section outlining and defining the services, and neither party should execute the agreement without thoroughly understanding those services. Agreements for architectural services can be prepared in three basic ways.

The AIA Owner-Architect Agreements

The AIA Document B101™–2007, Standard Form of Agreement Between Owner and Architect family of Owner-Architect Agreements, has four versions related to the size of the project and identified as B101, B102, B103, and B104. The B102 document is devoted to terms and conditions and is intended to be used with the B200 series of documents published by AIA, which define services. These can also be attached to any of the other B101–B105 agreements. These scopes include Site Evaluation, Value Analysis, Historic Preservation, Security Evaluation, Construction Contract Administration, Facility Support, Commissioning, LEED Certification, Interior Design, and FF&E Design. The 2007 AIA documents define additional services as "any service not listed as a basic service." There are two types of additional services: those known at the time the agreement is executed, and those that arise throughout the course of the project.

▶ See Table 17.1, AIA Contract Documents by Family, in Section 17.5, for a complete listing of AIA owner-architect agreements.

Other Standard Agreements

There are other standard types of agreements with which architects are often presented, such as those produced by the Engineers Joint Contract Documents Committee (EJCDC), those called ConsensusDocs, and those produced by the Construction Management Association of America (CMAA). All of these agreements have sections relating to the scope of services. Be sure to review this language carefully and don't be hesitant to make modifications to accommodate specific services.

Owner-Generated Agreements

These agreements can come in many forms and variations. They may be federal, state, or municipal government contracts that have not been updated for many years. Unfortunately, some government agencies take the position, "Take this contract or leave it" and will not entertain modifications in spite of out-of-date content.

Some owners have their attorneys prepare professional services agreements. Although some attorneys may not admit it, many have limited experience with the construction process, and the resulting contracts can be dangerous. In such cases, read these contracts carefully and have an attorney and professional liability insurance company provide reviews and advice. These contracts can use very broad terms like "as required" or "as necessary," and they can raise the standard of care of contracted services to an extent that may void protection by professional liability insurance policy.

When dealing with government agencies, request to speak to someone in authority (e.g., a state attorney general) who has the ability to make modifications to the contract. If this is not possible, send a letter to the client carefully outlining the scope of services and deliverables upon which the fee proposal is based. Good documentation will always come in handy should a dispute arise.

▶ Owner-Generated Agreements (17.3) presents a systematic approach to evaluating terms in agreements provided by owners.

CHANGES IN SERVICES

As a general rule, never proceed with services considered "additional" without first requesting and receiving approval for further compensation from the client. Although time may be short, a quick e-mail can inform the owner and document the request. If this rule is consistently followed, there will be fewer disputes about services and payments. Doing the work first and then asking for payment is never received well by clients—and for good reason. Clients want to know ahead of time if additional services and an additional fee are required.

Identifying additional services requires careful management. Project staff, and especially the project manager, should be intimately aware of services under the project contract. Any proposed changes should be communicated to and discussed with the client in a timely and professional manner. Here architects could take a lesson from contractors, who typically do not hesitate to submit change orders for work they consider not in their contracts. While professional services are harder to define and quantify than a set of bidding documents, architects should take the same approach to being compensated for additional effort.

When identified, additional services should be addressed with the same care as any other professional service. A contractual basis that the work is in fact additional should be cited. A reasonable proposal should be submitted in a timely manner, and work should not begin until approval is received from the client. Time spent on additional services should be invoiced separately, with a clear distinction between the original contract and the additional service.

In the event a dispute arises with the owner regarding whether or not a service was included in the original contract, make every attempt to immediately work out an amicable solution. Set up a meeting or meetings to discuss the issues with parties authorized to make a decision. State the case clearly and professionally and listen to the owner's position. Many disputes about services are caused by misunderstandings that can be cleared up quickly by discussion. Should this approach fail, follow the "dispute resolution" clause that should be contained in the contract. Act quickly, and do not let these issues linger until they become more contentious.

CONCLUSION

The effective determination and definition of project services includes identifying what work is required, proposing the services to be provided, negotiating the scope of services and fee, and getting approval from the client. The intent of this process is to ultimately have a clear description of services that match the client's expectations. The fee proposal must be clearly linked to the services proposal. Clear definitions and lists of "basic" and "additional" services are essential. Follow through with an agreement that adequately documents the understandings. Finally, remember to monitor and manage the scope of services as carefully as the design of the project. Doing so can help substantially reduce potential disputes, go a long way toward establishing a professional and productive relationship with the client, and help in bringing the project to a successful conclusion.

For More Information

The American Institute of Architects Official Guide to the 2007 AIA Contract Documents (Wiley, 2009) by the American Institute of Architects.

"Defining the Architect's Basic Services" (AIA, 2007) by AIA Best Practices: http://www.aia.org/practicing/bestpractices/index.htm.

"Explaining an Architect's Services: General Information on the Usual Tasks Undertaken by the Architect" (RIBA, 2008) by the Royal Institute of British Architects: http://www.architecture.com/Files/RIBAProfessionalServices/ProfessionalConduct/DisputeResolution/PracticalMatters/ExplainingServices.pdf.

15.2 Services and Compensation

David B. Richards, AIA, LEED AP BD+C, PMP

Architects consider many variables when determining the amount to charge for architectural services; ultimately compensation is based on the value of the service, the risk in providing the service, and the effort required to provide the service. Also discussed are various methods of compensation and strategies for getting paid.

BASIS OF FEES: VALUE, EFFORT, AND RISK

Compensation is based on three key factors: the value of the service, the effort required providing the service, and the risks in providing the service.

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Value

Compensation is directly related to the value of the services. Although value is ultimately defined by client perceptions, some successful firms have adopted overall business strategies and market positions based on the benefits their services can provide to clients. The principles are simple: Firms perceived to be the best in a particular arena or to offer unique services will be in demand, and clients will pay a premium for their expertise. Conversely, firms perceived to be "just like everyone else" often will be evaluated on price alone.

Value is based on many factors that may include the following:

- *Design preeminence*: a special talent for a particular type of project
- *Project expertise*: successful experience delivering particular project types, including in-depth knowledge of the detailed requirements for a special building type like a hospital, high school, or arena
- *Quality of service*: demonstrated success in delivering projects on time and on budget
- *Project management/leadership*: special ability to lead the project delivery process
- *Unique services*
- *In-depth understanding* of how buildings delight the user while helping the client

Effort

Compensation for services is also based on the effort required to deliver those services. Effort is often measured in the amount of time or the cost to provide the services. Whether measured in hours or dollars, the effort is based on understanding the scope of the project and the scope of services to be provided. Part of the process of setting fees includes a thorough analysis of the specific tasks that combine to make up the effort in each phase.

Review the scope of services with the client; understand their special needs and specific desires for the project. Will the client need to review multiple design iterations? Do they need full-time representation during construction? Are they particularly risk-averse?

Work to get to know the client while the proposal is being developed. Help the client understand the impact of their specific needs on the amount of compensation. Review the scope of services in the agreement with the client to foster a common understanding of the scope of services defined in the agreement. Define any special or additional services in the agreement for professional services.

See Figure 15.1 later in this chapter for a sample spreadsheet for use in developing a fee based on the effort required to provide services.

Risk

There are many risks in a construction project or when providing other professional services and, when determining compensation, an architect must consider the appropriate reward for working to resolve those risks.

Client

A client can be a significant source of risk. Clients are unique. They have different experiences and expectations. Different clients on the same project may very well require different levels of service.

Get to know the client. Work with them to:

- Understand the level of service that they will require for the project.
- Manage their expectations.
- Establish a common understanding of the services to be provided. Even long-term clients can evolve in their expectations and needs.
- Review the scope of services and risks with long-term clients for every project.

When setting fees, consider these and any other client risks that can be identified:

- *Do they really have the funding necessary—can they pay the firm?* An architect may be at risk of not getting paid if the client doesn't have funding. Retainers may give an indication of a new client's ability and intent to pay for services. Consider requiring a retainer prior to commencing services.
- *A client whose dreams exceed the reality of their funding can be a risk for the architect.* The client may require multiple iterations of the design as the client struggles to reconcile the funding available for the project to the realities of the project cost. Consider clearly defining the number of design iterations in the agreement and seek additional services if that number is exceeded.
- *Do they understand the limits in the contract, and do they have reasonable expectations for cost and schedule?* It can be helpful to review the terms of the agreement with the client to help improve their understanding of the architect's scope of services and deliverables.
- *Is the client able to make decisions to support his desired schedule?*
- *Some clients seem to expect nearly perfect, error-free documents—documents that exceed the standard of care.* This can be a risk if the client's perception persists throughout the process. An architect's professional liability insurance will not include coverage for services warranted to exceed the standard of care. Work with the client to establish a more appropriate expectation and a fee that reflects those expectations.
- *Client understanding of the construction process, the quality of documents, and the understanding that the client will benefit from the construction of the project.* More specifically, does the client understand that the scope of work defined in the documents is the scope of work they can reasonably expect—no more, no less—and that if it is not shown in the construction documents, then the client didn't buy it? So, all previous communication notwithstanding, the construction documents define the scope and intent of the project.
- *Client understanding of betterment vs. omission in the documents.* In this case "betterment" refers to the added benefit the client will receive from the addition of omitted items. An architect should not be responsible for the full cost of adding omitted items into a project; however, there may be consideration for the premium cost of adding items late in the process. A client that does not understand the limits of betterment with respect to omissions can be a special risk. To help reduce the risk, help the client understand, early in the process, that he should hold a contingency fund to cover this type of cost during construction.

▶ See Risk Management Strategies (16.1) and Architects and the Law (5.1) for further discussion of risk associated with standard of care.

Project Delivery Process

The project delivery process—design-bid-build, fast-track, design-build, third-party program managers—all have different risks, and each requires a different level of service.

Design-bid-build is the traditional project delivery method. This is often considered the base delivery process, and the Basic Services of the architect support this approach to project delivery.

Fast-track projects often require the architect to provide information for construction before the project is fully documented. The process of issuing documents requires more effort, and there is a significantly increased risk in providing early packages of information. The architect should be compensated for the increased effort and for the risk of rework involved. Discrepancies between packages are inevitable, and the fee should allow for the time to resolve those discrepancies.

Contractor-led design-build services can be easier to deliver, but depending on the relationship between the architect and builder, they can also be more encumbered. It is important to understand the contractual relationship with the contractor and the contractor's expectations for the architect's performance.

▶ Chapter 9, Design Project Delivery, covers the range of project delivery methods, processes, trends, and emerging issues.

Third-party program managers can also help or hinder the process. They can improve the decision making by the client, and they can clear the way for the architect to provide services. Some program managers can hinder the process by involving the architect in more in-depth study of issues and conditions that is necessitated by the standard of care.

Project-Specific Risks

Project-specific risks need to be considered when preparing a fee proposal. These can include:

- The public approval process
- Specific site conditions that can require special effort to resolve
- Unknown underground conditions
- Limits of the site for soil bearing and other restrictions and easements
- Especially difficult conditions on the site, contamination, previous construction—foundations

Schedule

The schedule for a project can be a risk, whether too fast or too slow. Fast-moving projects are subject to more risk. When moving to meet an accelerated schedule, the architect may not have the time to fully coordinate all aspects of the project before early packages are issued. Well-managed, fast-moving projects will have appropriate contingencies to resolve document completion issues.

Projects with overly long schedules may allow for ongoing exploration of design concepts far beyond the compensation for the project. Slow-moving projects may also experience code revisions during the process that require revisions to the design and documents.

Cost

Although the architect's responsibility for the cost of the work is clearly stated in AIA Document B101™–2007 Agreement Between Owner and Architect, clients often have different expectations and understandings. Take the time to carefully review the cost section with the client to foster a common understanding. Cost is a risk for projects in general, and the architect's responsibility for cost is a special risk. During the design phases, work to develop the project within the cost parameters set by the client to avoid costly rework if the project is over budget. If the client is especially risk-averse, encourage the addition of a cost-estimating specialist as an additional service.

▶ Defining Project Services (15.1) discusses definition of the scope of project services in further detail.

TYPES OF SERVICES

Architects most often provide basic services for projects. But projects are unique and often require additional services. Architects may also provide other services.

Basic Services

Basic services are described in AIA contract documents and include these phases:

- Schematic Design
- Design Development
- Construction Documents
- Bidding and Negotiation
- Contract Administration

Additional Services

Basic services are relatively common to most projects. But each project is unique and each client may require a different scope of services. Some additional services are agreed to in advance, and some arise as a need while providing basic services. Many additional services can be defined before the project gets underway.

The contract provides an opportunity to define the scope of work for these additional services, and the fee can be part of the total fee for the project or it can be identified separately in the contract and in the invoice to the owner.

It is not uncommon during the course of providing services that clients will need services beyond those defined in the contract. These kinds of additional services can be contentious. An open dialogue with the client is recommended. Help the client understand the scope of basic services in the contract. Clearly define the limits of services and the status of the project with regard to those limits as part of the ongoing dialogue with the client.

A client may understand an analogy such as this: If at a restaurant, they order a steak for dinner, then, after the order has been submitted, decide that they would prefer chicken. Depending on the status of cooking and delivering the steak, if they *really want* the change, they may need to pay for both, and it will take longer to get their meal.

Seek and receive approval for additional services before providing the service. Architects that remain in dialogue with their clients have much better opportunities for receiving fair compensation for all of their services.

Studies

Studies and reports are a service that may be provided. Often clients will want to begin to understand the scope and cost of a project without the expense of full Basic Services. A preliminary study may include programming, preliminary design, an estimate of probable construction cost, and a preliminary project schedule. Other studies may include site analysis that considers site conditions, zoning requirements, and the project to determine the maximum use of a site; test fits for interior development; or comparative site studies.

Other Services

Other services may include helping clients select artwork or plants, planning for temporary events, graphics for signage, environmental graphics, event planning, set design/stage design, product design, commissioning, and postoccupancy evaluations.

METHODS OF COMPENSATION

Compensation for professional services can be structured in several ways. Compensation can be based on a stipulated sum fee, percentage of construction cost, or on an hourly basis. The method of compensation should be fully reviewed with the client and should be fully described in the agreement for services. Any approach to payment should be reviewed with the client to come to a common understanding.

The AIA Document B101™–2007 Owner-Architect agreement allows any method of compensation. There is a place to define the amount of, or the basis for, compensation in Section 11.1.

Stipulated Sum

A stipulated sum fee is a fixed fee for a known scope of work. Stipulated sum fees are most successful when the scope of work is fully defined and the architect is familiar with the client, the project type, the local approval requirements, and the project delivery process.

Clients appreciate knowing the cost of services prior to commencing the design effort. It allows more accurate budgeting for the total project. A client can expect that, if the scope of the project remains constant, the fee will not change.

COMMONLY REQUESTED ADDITIONAL SERVICES

- Programming
- Multiple preliminary designs
- Measured drawings
- Existing facilities surveys
- Site evaluation and planning (AIA Document B203™–2007)
- Building information modeling
- Civil engineering
- Landscape design
- Architectural interior design (AIA Document B252™–2007)
- Value analysis (AIA Document B204™–2007)
- Detailed cost estimating
- On-site project representation
- Conformed construction documents
- As-designed record drawings
- As-constructed record drawings
- Postoccupancy evaluation
- Facility support services (AIA Document B210™–2007)
- Tenant-related services
- Coordination of owner's consultants
- Telecommunications/data design
- Security evaluation and planning (AIA Document B206™–2007)
- Commissioning (AIA Document B211™–2007)
- Extensive environmentally responsible design
- LEED® Certification (AIA Document B214™–2007)
- Fast-track design services
- Historic preservation (AIA Document B205™–2007)
- Furniture, furnishings, and equipment design (AIA Document B253™–2007)

► See Agreements with Owners (17.1) for more information about the architect's agreement with the client.

A stipulated sum fee offers a risk-reward opportunity to the architect. The architect has an opportunity to complete services in less time than anticipated with an increased profit. However, the opposite is also true—that if it takes longer than anticipated, there is no increase in fee.

Clearly define the scope of services with the client. Define the number of design alternates and revisions to the design; also define the number of meetings that are included in the fee. Architects can work to limit disagreements about additional services if the scope of services is clearly defined.

A stipulated sum fee can be determined by many methods. It can be built up based on the anticipated use of hours, the architect can determine the stipulated sum based on a percentage of construction cost, or it can be based on the effort required to produce similar projects in the past.

A cash flow schedule can be provided to the client based on the known fee per phase and the design schedule. The stipulated sum fee is often invoiced monthly based on a percentage of completion of each phase.

Percentage of Construction Cost

There is often a direct relationship between the construction cost of a project of a certain type and the cost of services. Fees can be determined as a percentage of construction cost, either as the basis of determining another type of fee, such as a stipulated sum fee, or as a rule-of-thumb guide to begin to build a fee. There are no predetermined or set percentages of construction cost for projects. Over time, architects learn that the value and effort required in delivering the services related to specific project types fall into a pattern of cost that can be expressed as a percentage of construction cost.

When fees are determined as a percentage of construction cost, interim fees may be invoiced based on estimates of the construction cost and the percentage of completion of the phase. When the cost of construction is known, fees are adjusted, up or down.

The percentage of construction cost can also be a good comparison when planning fees under other fee structures. Over time, architects will learn that the value and effort of services fall into a pattern for various project types in their practice. The percent of construction cost will likely fall into a pattern for specific building types and can be used as a guide in planning to check an analysis of the built-up hours required to produce the project.

The risk in a fee based on percentage of construction cost is the volatility of construction cost. There is risk for both the architect and the client in the fluctuating fee. Some clients believe that the architect is less inclined to seek economic solutions when the fee is based on a percentage of construction cost—that the architect will use expensive materials and solutions to drive up the fee. Other clients prefer to know the cost of services at the onset of the project.

► See The AIA Code of Ethics and Professional Conduct (1.1) for further discussion about the Consent Decree.

Although percentage of construction cost is not a favored way to set a fee, this was not always the case. Until the 1970s, the AIA published a percentage fee schedule that reflected building types and complexity. Due to the Consent Decree agreed to by the AIA in 1990, and in compliance with federal and state antitrust laws, the AIA has since been prohibited from suggestions of fee levels (AIA Antitrust Guidelines, http://www.aia.org/about/antitrust/). In a highly competitive professional environment, fees based on a percentage of construction cost are less common.

Hourly

Hourly compensation is simply invoicing for every hour worked on a project. Some practices use this approach almost exclusively. Hourly fees can be used for any project. Although this is when architects bill like lawyers, in some cases charging on an hourly basis may be seen as giving away value. Compensation is based on value, effort, and risk.

Hourly compensation clearly covers the effort, but the value of the architect's service is not just the cost of the time—it relates to skill, knowledge, and many other factors (see the section "Understand the Value," below).

Establishing compensation on an hourly basis is especially useful when the scope of the project is unknown and the hourly effort is related to establishing the scope. Then, when the scope is known, the fee may be transformed into a stipulated sum fee.

Many clients need to understand the total cost of services as they budget their project. An open hourly arrangement may not fill that need. Other clients will find an estimate of the cost of services sufficient for their needs. Many clients are hesitant to enter into an open-ended arrangement, preferring to limit the potential cost of services.

Hourly, Not-to-Exceed

Providing services on an hourly not-to-exceed basis may provide the client the desired limit of potential costs while offering the potential for lower-than-anticipated fees. The concept of compensation on an hourly not-to-exceed method can be used two ways.

In one approach, the not-to-exceed amount is a maximum limit, and regardless of hours used it is the maximum fee to be charged to the client. The amount of the limit would be at least the amount of the stipulated sum fee for the service. This method of compensation offers an opportunity for a client to limit his exposure while paying only for the services used.

In another approach, the not-to-exceed amount is offered as a limit of exposure that will not be exceeded without prior written approval. This method allows a client to know the status of fees as they approach a set limit. The client is offered an opportunity to exceed the limit if needed for the ongoing service.

Hourly fees are especially helpful when working with a client to determine the scope of a project. Services related to developing a preliminary design may be invoiced on an hourly basis and then converted to a different type of stipulated sum fee when the scope is set.

Unit Cost: $/SF

Compensation for some services is best determined on a unit cost basis. In this approach, the cost of services is defined by a measurable such as the area of the project—the cost of the fee per square foot of the project. Like all fees, this can be converted to a stipulated sum fee when the scope of the project is known.

In some industries, cost per square foot is a very common approach to determining compensation. It is especially prevalent in services related to the interior fit-up of a space.

SETTING FEES

Begin with the end in mind.

—Stephen Covey, *The 7 Habits of Highly Effective People*

Based on the scope of the service, an architect needs to understand the effort required, the associated risks, and the value of the services provided to set fees.

Understand the Scope of Service

It is essential to understand the scope of services to be provided. Most often, basic services are required, and based on input from the client additional services may be desired or needed. Work to establish a common understanding of the scope of service with the client, and help the client understand the services they will receive.

Some clients, such as those who frequently purchase services from architects, will be able to define the specific services required for their project; others will need to learn about the process an architect uses to design, document, and administer their project. Architects experienced in a project type will also know the effort required to provide the required service.

- Review the scope of services with the client; understand their special needs and specific desires for the project.
  - Will the client need to review multiple design iterations?
  - Do they need full-time representation during construction?
  - Define any special or additional services in the agreement for professional services.
- Review the scope of services in the agreement with the client to foster a mutual understanding.

Analyze the Effort

▶ Project Budgets, Work Planning, and Monitoring (10.3) further discusses the Work Breakdown Structure.

Based on an in-depth understanding of the scope of work needed for the project, the specific needs of the client, and the risks in the project, develop a detailed work breakdown structure (WBS) for the project. Define the phases the project will go through; develop task lists for all of the effort required in each phase. Consider and assign hours and/or dollars for each task.

Build up the fee based on all of the tasks and activities that will be required to deliver the completed project. Analyze the scope of work in a work breakdown structure. The WBS should divide the project into phases. Each phase is further broken down into the individual tasks required to complete the phase. Each task is budgeted with hours and/or dollars, and the totals are accumulated in a total net fee. Provide a contingency of hours to allow for variations from the plan.

Figure 15.1 is an example of an effort analysis. The analysis considers all staff and the hours they will work on the project, by phase and by task. The specific cost of staff at various levels is factored in to determine the cost of the services.

Review the Risks

Starting in the late 1970s, professional liability insurance industry providers encouraged professionals to avoid any risk in delivering services. But, as professionals, architects have responsibilities that are associated with risk. The key is to identify and understand the risks that are beyond what is normal, such as unknown or unpredictable project conditions.

Resolution of risks may mean additional effort by the architect or additional consultants added to the team. By analyzing the potential risk, the architect can include the hours/dollars in the fee to resolve the risk or pay the consultant. Fees for project-specific risks may be offered as an "if-needed" additional service but should be defined at the onset of the project.

Understand the Value

According to Frank A. Stasiowski, FAIA, an architect's services are more valuable than the cost of delivering the service. The value of services can be related to special talents, unique abilities, speed of delivery, specific project knowledge, or exceptional design ability. Unique specialized services or abilities are valuable to clients, and architects that offer these should structure fees to benefit from those unique abilities and services.

An architect should work to understand the marketplace to know the value of their professional services. Specialized knowledge of a building type may result in the services being worth 20 to 30 percent more than the cost of providing those services. The ability to deliver a project faster than the competition can be especially valuable to the client. It can save them project costs in many ways and may increase the value of services 10 to 20 percent. Other unique consulting abilities offer similar value to the client—value that is reflected in higher fees.

Sample Fee Worksheet

Project Data
- Small Commercial Building
- 20,000 SF
- $100 per SF: $2 million construction cost
  Anticipated net fee @ 3.5% of construction
  cost:$70,000

Fee Based on % of Construction Cost				***Fee Based on Anticipated Durations & Staffing***				
2E+06	70000	140	500		Weeks	Staff/week	Hours/week	Total
SD	10500	160	65.6	SD	2	1	40	80
DD	14000	130	108	DD	3	0.75	40	90
CD	28000	125	224	CD	5	1	40	200
BA	3500	140	25	BA	4	1	6	24
CA	14000	140	100	CA	40	1	2	80
			50	Contingency				50
	70000	134	522					524

Effort Analysis	Principal	PM	Design Lead	Tech Lead	Senior Arch	Int Arch	Junior Arch	Admin	
Hourly Billing Rate	200	180	160	160	140	120	100	90	
Schematic Design	***4***	***5***	***26***	***8***	***0***	***0***	***36***		***79***
Fee per phase	***800***	***900***	***4160***	***1280***	***0***	***0***	***3600***		***10740***
Evaluate Client Information	1	1							2
Develop Preliminary Design	1	1	4				12		18
Alternate Plans and Massing for Review/Selection			12				16		28
Develop Selected Design			8				8		16
Cost Estimate		1		4					5
Consultant Coordination				4					4
Review Meetings	2	2	2						6
Design Development	**1**	**3**	**8**	**18**	**0**	**68**	**0**	**0**	**97**
Fee per phase	***200***	***540***	***1280***	***2880***	***0***	***8160***	***0***	***0***	***13060***
DD Review Meetings		3							3
Site Plan				2					2
Floor Plan						16			16
Elevations						16			16
Ceiling Plan						8			8
Exterior Details						12			12
Interior Details						12			12
Door and Finish Schedules						4			4
Selection of Materials			8						8
DD Specifications				8					8
Consultant Coordination				8					8
Final Review	1								1
Construction Documents	**0**	**12**	**10**	**54**	**28**	**40**	**60**	**0**	**204**
	0	***2160***	***1600***	***8640***	***3920***	***4800***	***6000***	***0***	***27120***
CD Review Meetings		8		8					16
Drawings & Schedules			10	10	20	40	60		140
Specifications				20					20
Consultant Coordination				12	8				20
Review and Checking		4		4					8
Bid Administration	0	2	0	14	0	0	0	0	**16**
	0	***360***	***0***	***2240***	***0***	***0***	***0***	***0***	***2600***
Prepare Bid Documents				2					2
Pre-Bid Meeting		2							2
Review Proposed Substitutions				6					6
Review and Respond to Questions				6					6
									16
Construction Administation	0	4	0	56	0	0	0	0	**60**
	0	***720***	***0***	***8960***	***0***	***0***	***0***	***0***	***9680***
Field Observtion/Evaluations of the Work				10					
Field Reports				12					
Review Certifcate for Payment		4							
Review Submittals				24					
Resopnd to RFI				10					
Contingency									50
									6701
									506
									69901

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FIGURE 15.1 Sample Fee Worksheet

PART 4: CONTRACTS AND AGREEMENTS

SEEK COMPENSATION FOR THE VALUE OF SERVICES

Frank A. Stasiowski, FAIA, president/owner, PSMJ Resources, Inc., in his prediction of the future of design practice, emphasized the need to seek compensation for the value of services, noting that the value of the services provided by the architect exceeds the cost of the time to provide the service (*Impact 2020 Ten Giant Forces Now Colliding to Shake How We Practice Design in the Future,* 2010).

> How can you earn a living selling an hour? You can't.
>
> When you go to the dentist, you don't pay an hourly fee. What you want is a new tooth. Whether that takes the dentist ten minutes or two hours is irrelevant. The price doesn't change.
>
> The same thinking needs to be applied to the delivery of architectural services. Price your services based on the value that you bring, the institutional knowledge you have, the technology you can leverage, and the quality of your talent. Don't price your services based on the number of hours. Your ability to deliver projects quickly is a premium to clients that they will pay for. Charge strictly on time, and you're taking money out of your pockets.
>
> IBM doesn't do business by selling hours. They have an intellectual capital system that is constantly fed by its employees. It's filled with case studies and full details on the expertise of IBM employees. So now if clients have a problem anywhere on the planet, within five minutes you could get an IBM expert on the phone to help. Think of what power that gives IBM to charge fees. They are delivering the highest value to their clients. Their fees are higher than anybody else's, and they get them. They get them because they are not selling hours, they are selling absolute speed of delivery and the knowledge built up from years and years of feeding their intellectual capital system.
>
> Sell only on a value basis and fully abandon the tactics of selling time. Be bold enough to turn away clients who refuse lump-sum agreements. Those that do will not only prosper, but will also change to become consultants more than just plain old design firms.

Build Fees in Three Ways

After the effort, risk, and value have been considered, it is a good practice to build a fee three different ways. One is to build the fee bottom-up based on effort. Another is a top-down fee analysis based on comparable past projects or rule of thumb gross fee determinate. And a third is a duration-based analysis that considers that the effort will take *x* number of staff *y* weeks to complete the project or phase. Building a fee bottom-up, top-down, and from a side view provides a check comparison. When the three methods begin to result in the same fee, then the fee is likely appropriate for the project.

Bottom-Up Analysis

The bottom-up analysis is described in the effort section above. This analysis considers the effort associated with each task in each phase of the project, and it includes the effort to resolve risks. Bottom-up analysis tends to end up higher than other methods because all effort and risk is considered. If the situation is well understood and everything that can go wrong is taken into consideration, this fee will tend to be too high and noncompetitive.

Top-Down Analysis

▶ Project Budgets, Work Planning, and Monitoring (10.3) provides an example of top-down budget planning.

A top-down analysis takes a different perspective on the project. This approach is based on having an idea of what the total fee should be at the beginning. In a top-down approach, determine the appropriate fee for the project based on experience with the project type/past projects, the specific market, and the competition, and consider the fee based on a percentage of construction cost or other unit cost approach. The result of this effort is to determine the gross fee for the project.

Once the total fee has been determined, distribute that fee among the consultants, allow for contingencies, and then determine the total net fee available for the architectural work. Divide that fee among the phases, determine the total hours available for each phase, and apply hours to the task list; work backward from the gross fee into the hours available for the phases and tasks of the project.

A top-down analysis might verify a bottom-up analysis, or it might indicate a need to reconsider both approaches to find a common solution. Often the bottom-up analysis will result in a higher fee than a top-down analysis. Working the fee from two approaches and challenging the results of both approaches can help work the fee into the right place.

It is good practice to keep track of fees for different project types along with actual project performance. Metrics such as the fee as a percentage of construction cost, cost per square foot, hours per square foot, hours per construction cost, and project multiplier all provide historical input for comparison when setting a fee.

Staff Analysis

Another way to determine a fee is to consider the durations and staffing required completing a phase. One might consider that it will take two staff members four weeks to complete the schematic design phase. This can be used as another comparison to the bottom-up analysis of the effort and the top-down fee comparison.

Working back and forth among these fee approaches will work the fee into the right place. When the fees from all three analyses are very similar, then the fee is likely about right. It is important to consider value when determining the fee.

Consider the value of the services to the client: Does the firm compete to provide commodity-type services that are readily available from many firms in the marketplace, or are services offered that are unique to the market? Does the firm have a special edge in design? Or program management? Or unique project experience? Is there any reason that a client would pay in excess of the effort required to provide services? If the answer is yes, then increase the fee accordingly.

Contingencies

Include contingencies in the fee planning to allow for unforeseen events. Consider three types of contingencies:

- *A contingency that there is no intention to spend*. This may be a way to define the initial 10 percent profit in a project plan.
- *A contingency that there is intention to spend*. As the work effort is defined in terms of hours per phase per discipline, build a contingency of hours into the plan. These hours will be used to adjust the plan to actual, and to respond to variations in the delivery of the project. Ten percent of hours is a good starting point for this contingency. That allows for 2 to 4 percent variances in the planned hours in each phase.
- *A contingency that is there for special situations*—one that there is not an intention to spend but is there in case additional effort is required. This contingency might be about 3 percent of the fee.

▶ Developing Annual Budgets and Profit Planning (7.4) further discusses project profitability.

CHARGING FOR SERVICES

There are several ways to charge for services. These include retainers, percentage of completion, hours worked, payment per fee schedule, payment at project milestones, and, finally, a work-when-paid approach.

Retainers

It is a good practice to receive a portion of the fee at the initiation of the project as a "retainer." A retainer is an advance payment.

A retainer fee may indicate a client's willingness and ability to pay for services. Consider setting the retainer amount based on the cost of services provided from the onset of the project until the payment of the first invoice so that the architect's efforts are compensated until an invoice is paid. The retainer continues to cover the cost of services being provided throughout the project, and the amount is credited to the final payment for the project. A retainer may be used with any of the approaches below.

Based on the Percentage of Completion

Invoicing is often based on the percentage of completion of active phases. This method of charging for services can be used for stipulated sum fees, fees based on a percentage of construction cost, and fees based on unit costs. These services are often invoiced monthly, every 4 weeks per accounting periods, or on another regular basis.

One approach to determining the percentage of completion is to use the work breakdown structure that was developed when the fee was established to monitor the percentage of completion for each task. Those percentages are tabulated based on their value to determine the percentage of completion of each phase. Each phase is then invoiced based on this percentage of completion.

Monthly Based on Hours Worked

Hourly projects are simply invoiced based on the number of hours worked in a period, within the constraints of any not-to-exceed limits on the effort.

Monthly Per Fee Schedule

Some clients like to have a preset fee payment plan. The fee is set by determining the anticipated percentage of completion of the phases of the project based on the schedule for the project and allocating the fee as anticipated. Then, assuming that the project is progressing per the schedule, the fee is invoiced at the predetermined rate. This approach can help the client have funding for anticipated fees when the fees are due to be paid. See Table 15.1 for a sample fee schedule.

Project Milestones

Milestones in the design project schedule may determine timing of compensation. This type of payment is related to the completion of specified portions of the project or the phases of the project.

Milestone fees may be set up as 100 percent payment for a phase when the phase is complete and accepted by the client, or it may be arranged that payment of 80 percent of the amount due for the phase is made when the work is completed by the architect, and the remainder when the phase is accepted by the client.

Other project milestones may be the acceptance of the design, reconciliation of the budget at various stages of the project, the acceptance of a guaranteed maximum price (for construction), or the cost of the construction determined in bidding. Milestone fees are often required in government-funded projects. Whenever possible, the architect should work to keep the nature of the milestone within their control.

Work When Paid

This approach limits an architect's exposure for nonpayment. It is simply getting paid prior to providing services. At the initiation of the project, the client pays an amount that covers the architect's services until the next meeting or other waypoint along the process of project development. Then, throughout the project, the client pays for the next steps of the effort before those services are provided. This approach is reviewed with the client at the onset of the project so that the client understands and accepts the approach.

Being paid in advance or prior to delivery of product are ways to see that payment is made and that the architect does not get out of balance with payment related to service. It can also be very effective to include a requirement for payment prior to delivery of the work product.

This type of approach to getting paid can simplify practice. If the architect establishes "work when paid" as the firm's standard way of doing business and is successful in applying the practice to all projects, then the architect can eliminate the effort of chasing payments, potentially alleviating considerable headache and disappointment.

TABLE 15.1 Sample Fee Schedule

		Sample Fee Schedule								
		November	February	March	April	May	June	July	August	
Civil Engineer	$41,250	$774	$6,712	$6,712	$6,712	$6,712	$1,446	$465	$361	$41,250
Structural Engineer	$115,000	$2,159	$18,711	$18,711	$18,711	$18,711	$4,030	$1,295	$1,008	$115,000
MEP Engineer	$122,500	$2,300	$19,931	$19,931	$19,931	$19,931	$4,293	$1,380	$1,073	$122,500
Code Consultant	$13,781	$259	$2,242	$2,242	$2,242	$2,242	$483	$155	$121	$13,781
Lighting Consultant	$18,750	$352	$3,051	$3,051	$3,051	$3,051	$657	$211	$164	$18,750
Elevator Consultant	$8,750	$164	$1,424	$1,424	$1,424	$1,424	$307	$99	$77	$8,750
ADA Consultant	$9,375	$176	$1,525	$1,525	$1,525	$1,525	$329	$106	$82	$9,375
Landscape Architect	$18,750	$352	$3,051	$3,051	$3,051	$3,051	$657	$211	$164	$18,750
Graphics Consultant	$37,500	$704	$6,101	$6,101	$6,101	$6,101	$1,314	$422	$329	$37,500
LEED Consultant	$28,125	$528	$4,576	$4,576	$4,576	$4,576	$986	$317	$246	$28,125
Hardware Consultant	$6,250	$117	$1,017	$1,017	$1,017	$1,017	$219	$70	$55	$6,250
Specification Consultant	$11,263	$211	$1,832	$1,832	$1,832	$1,832	$395	$127	$99	$11,263
Low Voltage Consultant	$15,475	$291	$2,518	$2,518	$2,518	$2,518	$542	$174	$136	$15,475
Food Service Consultant	$30,500	$573	$4,962	$4,962	$4,962	$4,962	$1,069	$344	$267	$30,500
Reimbursable Allowance	$30,000	$563	$4,881	$4,881	$4,881	$4,881	$1,051	$338	$263	$30,000
Architect Net Fee	$491,481	$9,227	$79,966	$79,966	$79,966	$79,966	$17,223	$5,536	$4,306	$491,481
	$998,750	$18,750	$162,500	$162,500	$162500	$162,500	$35,000	$11,250	$8,750	$998,750

David B. Richards

GETTING PAID

No bucks—no Buck Rogers.

—The Gus Grissom character in the film The Right Stuff, 1983, written and directed by Philip Kaufman, based on the book by Tom Wolfe

Getting paid is a part of practice. Select clients carefully. Determine up front if they have the capacity to pay; get a retainer. Ask other service providers if the client makes timely payments. Make it clear up front, in the owner-architect agreement, that the provision of services is contingent upon payment. Reserve the right to stop providing services and to withhold deliverables if not being paid.

At the commencement of services, the specific nuances of payment should be defined with the client:

- Sometimes the "client" is several people. Who from the client's team will review the invoice and approve payment?
- What is the best date for the client to receive the invoice?
- Is any special information or format required on the invoice?
- After initial approval, what are the subsequent steps to payment?
- Determine how long it will take from receipt of invoice until payment.
- Review any penalties or consequences for lack of payment.

Make It Clear Up Front

Clearly define payment requirements in the agreement for professional services with the client. The agreement should define the payment timing/interval and the basis of the invoice. The basis might be the percentage of completion of the phase or milestones or an estimate of hours (see discussion in the section above).

Some approaches that help foster payment are to:

- Provide a fee schedule up front that relates to the project schedule (see Figure 15.1).
- The fee schedule can be used as a backup to the invoice. It is especially helpful for complex projects with overlapping phases.

Review Invoice upon Delivery

Architects may use the delivery of an invoice to review the status of the project with the client and to understand the client's perception of the quality of services. At regular intervals when the invoice is complete, take the time to sit with the client to explain the invoice and basis for the amount invoiced. Use this time to determine the client's satisfaction with the project and the progress made to date. Whenever possible, review the invoice with the client in person. If it cannot be reviewed in person, consider a phone call to confirm that the invoice has been received and to determine if there are any questions or objections to the invoice.

During the call, review the basis for the invoice; review the status of the project and the deliverables. Discuss project progress to date, and review approvals, issues, and next steps. Ask about the client's perception of the quality of services provided to date; has the firm met their expectations?

When Payment Is Not Coming

In spite of all best efforts, sometimes a client will not pay for services provided. Architects should review the terms of the contract before proceeding. There are often several possible actions to take:

- Make deliverables contingent on payment.
- Remain in dialogue with the client.
- Determine why the client is not paying. Are they not satisfied with the services provided? Do they have financial issues?
- Charge interest and insist on payment.
- Develop and agree to alternate payment terms—say, to fit their cash flow needs.
- Resolve outstanding issues.
- Provide additional information in support of the invoice.
- A good stern letter from an attorney can help a client come to payment.

Other Actions

Sometimes an architect will need to consider other actions to get paid. The architect should review the contract for professional services and proceed in accordance with the terms of the contract. Options may include the following:

- *Withhold services when other alternates have been exhausted*. (It is a good practice to include this option in the contract.) Be up front and direct about the action being taken and why it's being taken. It may be necessary to inform the client of this action in writing.
- *Hold other approvals and signatures*.
- *File a lien*. If, in spite of all best efforts, the architect is still not paid, then the architect may file a lien against the client's property. A lien is a legal claim on the client's property for the project for unpaid services. Laws vary from state to state. There may be a limited window of opportunity from the completion or cessation of services to when a lien must be filed. Know the timing and watch it carefully. Then, even while in dialogue with the client, file the lien.
- *Seek a legal remedy*. Consult an attorney and initiate the dispute resolution process agreed to in the contract for services executed with the owner.

AN EXAMPLE OF DRAWING THE LINE ON PAYMENT

A large, solvent client was a very slow pay on a very large project—for no apparent reason. As the DD phase was being completed, the client clearly needed the DD documents to develop a cost estimate for the project. Project funding and the future of the project relied on the estimate. But the architect, in spite of all best efforts, had not been paid for several months and was owed over $1 million.

At the conclusion of the DD phase, the documents were reviewed with the client and found to be satisfactory. The architect had made it clear for the prior month that payment was required for the release of the DD documents. No payment was received. So, at the conclusion of the DD review meeting, the architect simply stated, "And you can have copies of the DD documents when you pay me up to date through the DD phase." The client was surprised and not too happy, even though they had been warned in advance, but the client paid a couple of days later. They paid on a timely basis thereafter, and they hired the firm to do their next project.

CONCLUSION

As much fun as it is being an architect, it's even more fun to get paid to be one. Compensation is based on the value, risk, and effort required to deliver the services. Keeping those in balance and maintaining clear communications with the client will help make sure that the architect is compensated fairly and gets paid.

For More Information

A Guide to the Project Management Body of Knowledge (PMBOK® Guide), 4th edition (Project Management Institute, 2008).

The Architect's Guide to Small Firm Management: Making Chaos Work for Your Small Firm (Wiley, 2010) by Rena M. Klein, FAIA.

How Firms Succeed: A Field Guide to Design Management (Greenway Communications, 2004) by James P. Cramer and Scott Simpon.

Impact 2020: Ten Giant Forces Now Colliding to Shake How We Practice Design in the Future (PSMJ Resources Inc., 2010) by Frank A. Stasiowski, FAIA.

"Monitoring Earned Value" (AIA Best Practices, 2012) by David B Richards, AIA: http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab092063.pdf.

The Ultimate Project Management Manual, 2012 edition (PSMJ Resources Inc., 2012).

15.3 Negotiating Agreement

Ava J. Abramowitz, Esq., Hon. AIA

At its core, negotiation is problem-solving, the development of enticing options that meet the critical interests of disparate parties in a special and appropriate way. Like design, negotiation is a skill that can be learned and mastered.

Nothing is more surprising than the fact that most architecture schools don't teach negotiation. Lawyers and MBAs intent on practice don't graduate without a negotiations course, yet architects are expected to pick up these skills by osmosis. It has never made sense. Architects negotiate daily and with everyone: partners,

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clients, users, consultants, contractors, inspectors, building officials, government employees—the list is endless. And though practice issues are negotiated, much of the time, if not most of the time, architects are negotiating design issues. Yet there is an ethos—shared by many in and out of the profession—that negotiating is somehow unseemly, potentially combative, a touch unethical, and all too often unwarranted. After all, if the architect is looking out for the client and the integrity of the client's design, what is there to negotiate?

The answer in today's business climate is "everything." At its core, negotiation is problem-solving, the development of enticing options that meet the critical interests of disparate parties in a special and appropriate way. Viewed this way, negotiation should be the architect's forte. Architects have the very skills that solid negotiation demands: the ability to analyze problems, create options, and design solutions that meet a multiplicity of interests and needs—as inconsistent and conflicting as those interests and needs may be.

Comprehensive research on modern negotiating techniques confirms that the most effective negotiators are steeped in creative and principled problem-solving. As reported by researchers nationwide, the best negotiators simply do not bargain over positions. Rather, they enter into "principled negotiations" by distinguishing the people from their problems and dealing with each, often separately, concentrating always on the underlying interests of the people at the table, and thus reducing the possibility for personal conflict. This helps negotiators identify common ground, disarm potential tensions, and use differences to develop options that address each party's interests. Using this approach, all parties gain as a result of the negotiating process.

The Harvard Project on Negotiation (PON) is universally recognized as the creator of principled negotiations. Founded by the authors of *Getting to Yes: Negotiating Agreement Without Giving In*, PON and its leadership have produced some of the best treatises on negotiations.

Sure, there are limits to negotiation. No approach to negotiation—for even the best negotiator in the world—can succeed in persuading the government to sell the White House. Nevertheless, principled negotiation can be put to work in the toughest of situations. What is needed is thorough preparation by, and the unwavering conduct of, a negotiator committed to the basic premises of this method. Fortunately, principled negotiation can be learned.

NEGOTIATION CONCEPTS IN BRIEF

Principled negotiation evolves from certain core premises. People are people, and they have the strengths and weaknesses, intellect and emotion, needs and interests, and internal consistencies and inconsistencies common to the human species. At the same time, each person is unique, with a distinct personality and internal drumbeat. Effective negotiators recognize the global realities as well as the unique realities of the individuals at the table—and respect them both.

Make no mistake. Respect does not mean acquiescence. Understanding does not mean concurrence. Negotiators need not debase themselves or others to win an agreement. In fact, "winning" an agreement at that cost may only sour a working relationship, making future agreements even harder to come by. Worse, debasing oneself may evolve into the norm in working with a client. Instead, respect means accepting others' realities as real and dealing honestly and openly with those realities—as well as one's own—so that a mutually advantageous agreement can be achieved.

The question then becomes, how is this done?

Principled Negotiators Know Their Interests

Of all the weaknesses architects bring to the negotiating table, their most undermining is their failure to know their interests. (Don't take this personally. Of all the weaknesses lawyers bring to the negotiating table, their most undermining is their failure to know *only* their interests.) What is an interest? An interest is the hodgepodge of needs, wants, desires, emotions, insecurities, and certainties that lie behind a person's position. A teenage girl wants to go to the prom? Her interests most likely are a night to remember, to be the belle of the ball, to be proud of everything that happens that night, to have fun, to not get into trouble, and most certainly to not be yelled at when she gets home. A teenage boy's interests differ, of course, but many of their interests overlap. Their positions quite likely are the same: "We are grown-ups, and no one needs to tell us anything about how to handle ourselves tonight, thank you very much." The parents of these two most probably share the majority of their child's interests, but, one can safely bet, have an entirely different position. If the parties fight over positions, no one's interests will be met. If the parties focus on interests, they may find that their positions can readily be met. Bottom line? Principled negotiators know their interests and keep them in mind—always. It is new information that makes them reconsider their interests, not the mere demands of the Other.

YOU DON'T JUST WANT TO DO THE PROJECT

If there is one easy way to fritter away the power and leverage you have, it is to enter negotiations with one goal: getting the project. Know your interests. Even in a recession, you are not that desperate. You want more than just to do the project. What that "more" might be will differ by architect, but I venture to say most architects I know want a project that is good business, a project where they:

- Provide the client valued and valuable services.
- End up with a happy client and a solid reference.
- Do good design.
- Manage the tensions of design and construction well.
- Make money or at least break even (or bring in new business as a result of having consciously taken a loss-leader project).
- Have a claims-free experience.
- Feel ethical about the entire experience.

In other words, if you are like the architects I know, you are not a johnny-one-note. You enter negotiations with many interests and the hope that you will achieve most, if not all of them.

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Principled Negotiators Do Not Bargain over Positions

Negotiating over positions usually ends a negotiation before it has a chance to begin. The owner wants to pay the architect one amount; the architect wants to be retained for a higher amount. If the parties both "stick to their guns," both of them get shot. One may "win" the battle only to lose the war, and the project may suffer in the long run.

Play it out. If the owner "wins," the architect may not have enough fee to manage the project scope—and project risks—effectively, with the owner paying later anyway. Moreover, the owner may doubt the architect's ability to look out for the owner's interests in light of the architect's inability to look out for his or her own. Alternatively, if the architect "wins," the owner may feel bullied and view every future conflict as an opportunity to get back at the architect for the "wrong" done to the owner at the outset. Or, the owner may question the architect's commitment to the owner and the project, and every recommendation the architect makes in the future may become a major problem for the owner to resolve—alone. In other words, with one party "winning" on positions, both parties can lose the opportunity to develop the working relationship essential to project success.

Principled architect negotiators don't get caught up in that trap. Instead they think it through: What interests are behind the Other's unswerving commitment to that one dollar amount? Is that all the money they have? Or maybe they're loaded, just afraid I won't respect their budget? Or maybe cash flow is their problem? Hey, what if their stance has nothing to do with money now, but money later. Maybe return on investment is winding their clock. If that's the case, we can explore together what mix of budget, quality, and scope will give them the best return. Or maybe it's not today's cost of construction that is troubling them. Maybe it's life cycle costs and storing up money for that rainy day when something is bound to need fixing. The principled architect negotiator asks all these questions and then some, all with one goal: to understand the interests of the Other so the parties can figure out mutually beneficial ways to meet them.

OTHER THAN WHAT

I refer to the "Other" and not the "other side" when talking about the people with whom you negotiate. "Other side" implies the people are opponents of yours. "Other" implies they are just not you. It is hard to build common ground with opponents, but a bit exciting, invariably challenging, and sometimes even fun to build common ground with people who, although they want a solution to a shared problem as much as you do, view that problem differently because they have different sets of eyes and experiences. A small change in mindset, but it's an important and useful one to use and remember. Not a friend. Not an enemy. Just an Other.

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In other words, the principled negotiator joins with the Other in their struggle, asking the tough questions, not to confront, not to persuade, but to fully understand the reality facing the Other. With that new understanding, the architect can explain their reality and with that shared understanding the two can confront the problem, mindful of each other's interests, intent on designing a solution both want to buy.

Look at the People as People, Not as the Problem

If someone obstinately sticks to a "take it or leave it" position harmful to you, the firm, or the project, it is only human to regard that person as an obstacle to be overcome. The goal of principled negotiation, however, is not to win over the Other. Rather, it is to win the Other over. To do that, it is best to attack the problem the Other is facing—and not the Other themselves.

Solid negotiators do this by asking questions. They force themselves to step outside of their own emotions and positional correctness and enter into the realities of the Other. What is behind the other person's position? Why is it so attractive to them? What's stopping them from letting it go? What problem do they think it resolves? What are they trying to achieve? The easiest and best way to get answers to these questions is by asking them directly in a non-confrontational manner: "Help me understand your needs. What about your position is important to you? What problem of yours does your position resolve? How will it affect the project?"

Asking questions this way not only insulates information seekers from inappropriate (and all too human) responses on their part, it also conveys caring and respect for the other party's perspective, thus building the goodwill necessary for a lasting result. Equally important, asking questions helps build an information base, allowing negotiators to make sure they are dealing with the Other's problems and not their (quite possibly wrong) perception of those problems. And questions by truly interested people are appreciated by the Other. Interviews with many architects and owners show that most participants remember a negotiation more by the quality of the interaction than by the specific outcomes.

For these reasons, architects will want to ask still other questions: What does the Other want to get from the negotiation? What do they want from the negotiation process? What do they want from the relationship? Answers to these questions may prove vital to making your participation in the negotiation constructive. Remember, issues of substance, process, and people can advance—or impede—a negotiated result.

Talk About Interests, Not Positions

While learning the Other's interests and needs, you will want to tell them yours—clearly and convincingly—so that both parties can focus their collective energies on meeting their own and each other's interests. You want a 5 percent raise? The firm can't afford it? Ask what the firm is concerned about. If it is only a matter of money (and not performance, status, and the like), you can ask yourself how much new business the firm must bring in to be able to afford that raise. Alternatively, how much in expenses need to be saved for such a raise to become reality? What can I do to increase revenue or control expenses? What can the firm do? Goal-oriented negotiations can ensue only when each party knows the other's interests and the problems they are facing in achieving those interests.

To achieve your negotiation goals, it is essential that you participate actively in this process. The Other cannot read your mind any more than you can read theirs. If you do not make your interests clear, they cannot be addressed. Suppose that a contractor wants to substitute a material, and you know the owner is committed to the specified finish. Unless you convey that knowledge to the contractor—and your overriding interest in being responsive to the owner's needs—the negotiation between you and the contractor can go nowhere productively.

A corollary to speaking out is taking in. It does no good to speak without also listening. And it does no good to listen without also hearing. Active involvement requires all three.

Proving active listening is not that difficult. You need only summarize what you heard and ask the Other if you heard correctly. With the Other's sign-off, you can confidently proceed. Using the information the Other gave is also a powerful listening tool. Both work to convince the Other that what they said was important and heard.

Identify Shared Interests

Owners, architects, engineers, contractors, and subcontractors share one key interest. They each want the project to succeed. They also share a common definition of project success: They want the project to come in on time, on budget, and claims-free, with some level of profit for all. And each wants to accomplish this success with a minimum of headaches and strife. Where they may differ is in their definitions of "on time," "on budget," and "claims-free," with "some level of profit for all." Expert negotiators do not shy from differences; they use them to strengthen common ground. They find that exploring differences can produce new understandings and develop even stronger shared interests as all the players come to understand how to help each other succeed.

Work Together for Mutual Gain

With a clear understanding of the interests of all, creative problem-solving can begin. Brainstorming is a good first step, as it allows everyone to place ideas on the table without having to commit to any of them. The better the brainstorming effort, the more likely you are to uncover alternative ways to serve people's interests.

The brainstorming process has many benefits. It puts all parties on the same side: How can we work together to solve the problem? It helps people distance themselves from their initial positions without forcing them to take ungainly face-saving measures. And, as minds melded often produce better ideas than a single mind struggling alone, the chances of finding creative solutions improve. Finally, the more the parties are involved, the more likely they are to buy into the solutions created.

When Stuck, Look Outside for Objective Criteria

At some time in the negotiation, a little backpedaling can be expected and people may resort, if only temporarily, to their original positions. There are many reasons for this. Some people want to win for the sake of winning. Others perceive negotiation as "giving in," and they do not want to be perceived as weak. Still others fear overstepping their authority and do not want to jeopardize themselves with their bosses. And there are others who may see option building as a waste of time and decide to cut through the process by demanding their way.

Principled negotiation teaches this: Concentrate on the merits of the problem, not the mettle of the parties. Be open to reason but closed to threats. The easiest way to do this is to look outside the argument to objective criteria that are mutually respected and independent of each party's will.

Architects do this routinely without consciously realizing it. In negotiating owner agreements, they start with AIA Document B101™–2007—the standard in the profession and the custom of the trade. Owner-suggested alternative language is evaluated against that standard, and the reasons for and against the alternative language are explored in that light.

Similarly, in resolving many contractor problems, architects look to the general conditions of the construction contract—signed by the contractor—to ascertain who should do what, when, and at what cost. In other situations, they look to the specifications and technical standards to find solutions available to the parties that can address the problem. These uses of outside criteria allow the parties to depersonalize arguments and maintain a focus on merit, principle, and the general good.

OWNER-ARCHITECT AGREEMENTS: FERTILE GROUND FOR NEGOTIATION

When negotiating owner-architect agreements, architects often harbor at least two beliefs that are just not true. The first is that the entire negotiation process is (and some think is supposed to be) riddled with conflict. While some level of disagreement has to exist—or else there would be no reason to negotiate—it is more often the case that you and the Other have been brought together by common ground. The better you are at locating that common ground and building on it, the more likely it is that both of you will want to live there.

The second myth is that the only thing architects and owners can negotiate is the fee. In fact, these days there is not much in any business relationship that is not open to negotiation. What to ask for, how, and when is as much a matter of strategy as anything else. Following are some examples of subjects open to negotiation:

- Scope of services
- Additional services
- Project schedule
- Responsibility for engaging consultants
- Owner's responsibilities
- Coordination responsibilities and fees on consultant services
- Coordination of owner consultants and fees on those
- Specific limits of professional liability insurance
- Project insurance
- Limitations of liability
- Ownership and reuse of the documents
- Rights to publicity about the project
- Contractor selection
- Excessive contractor requests for information
- Record drawings
- Reimbursable expenses
- Initial payment (retainer)
- Prepayment of fee
- Hourly rates
- Allowances (e.g., for reimbursable expenses)
- Frequency and timing of invoices and payments
- Project restart fee if there is an interruption
- Share of equity in the project
- Termination procedures and expenses

One fight easily avoided is the fight over the value and fairness of the AIA contracts. It's not in any architect's interests to lose goodwill over them. Moreover, it is not the architect's job to improve people's perception of the integrity of the AIA contracts. It's the AIA's. Let the Institute do it, not you.

Adapted from The Architect's Essentials oçf Negotiation (Wiley, 2009) by Ava J. Abramowitz

Develop Solutions That Provide Mutual Gain

By now, all parties should well understand the interests of the other. They will have uncovered and identified their shared interests. Possible resolutions have been put on the table and discussed in the light of different interests. Some problems will have resolved themselves, others will need tinkering with, and a few will remain outstanding. Now is the time to put forward cogent, concrete proposals—in short, to design the solution. Effective negotiators find they have the best results when they put their reasoning first and their proposal second. "This is the problem we're facing. For you, it is important that any solution does . . . . For me, any solution has to . . . . What if we do this? There are a few disadvantages to this solution, but there are more advantages, especially . . . . What do you think?"

In this way, principled negotiators are saying to each other, "We are in this together. What you want is important to me. What I want is, I assume, by now also important to you. This solution is one way to address both of our concerns." By the way the proposal is laid on the table, the negotiator is communicating that, if the Other says "no," the two can keep negotiating. In other words, the negotiator is creating an ambience and a proposal to make it easy for the Other to say "yes"—or to come up with a better, *mutually* responsive solution.

Notice the stress on *mutually* responsive. Principled negotiators know that to be effective, they must balance empathy and assertiveness appropriately. They recognize that satisfying the Other's interests will not help meet their own goals unless their interests are satisfied also. Thus, skilled negotiators make their interests known, and they do so in ways that ensure they can be heard by the Other, most often by aligning their needs with the needs of the Other.

NEGOTIATION STRATEGIES

No matter how one negotiates, certain strategies can be useful. Mastering these will give you the added ego-strength necessary to ease the tension of even the most difficult negotiations.

Prepare for the Negotiation

If there is one strategy that expert negotiators will tell you is more important than any other, it is to prepare for the negotiation. You cannot wing a negotiation. No one can. You have to analyze your interests and the Other's interests before you sit down at the negotiation table, if only to have the freedom to listen to the Other unencumbered by fear of being bested. And in that process, you will more readily be able to locate common ground.

When the preparation approaches of expert negotiators were compared with those of average negotiators, the key difference was that expert negotiators *strategize* before their negotiations, while average negotiators *fret*, beating themselves up in the process. As a result, average negotiators enter the negotiation with no confidence and no capacity to listen and react flexibly. To avoid that scenario, you may want to address the following questions before you walk into your next negotiation. It is not important to know the answers to all these questions before the negotiation. Just using these questions can get the negotiation conversation going:

- What are the needs that bring you together?
- What's your position? What's their position?
- What are your interests? What are their interests?
- Where's common ground?
- Where are discrepancies?
- What options would resolve the discrepancies?
- Are there any real deal breakers?
- What's your goal, your target point? Why may they say no to your goal?
- What would make you walk away?
- Are there any objective standards for you to rely on? For them?
- What gives you leverage? What gives them leverage?
- What's your Best Alternative to reaching a Negotiated Agreement (BATNA) with the Other? What's their BATNA?
- Given all that, what's your starting point?
- Can you think of elegant options to make the pie bigger?

You can use these questions to prepare for the negotiation, applying them to all issues, not just the ones that involve money. You may even want to have a trial run at the negotiation with someone else, asking the person to play the Other. Do it not to pin down the dialogue, but to free yourself up so that at the negotiation table you can listen and react appropriately to what you hear. In time, you will find that the better you get at preparing, the better you get at imagining the many ways the negotiation can be successful, the better you will get at negotiating.

Identify Your Interests

To prepare well, the first step to increasing your power is to know your own interests. As an example, suppose that an architect wants to design a specific project for a certain sum, but the owner wants to pay less. At the fee the owner is suggesting, the project cannot be achieved as the architect is conceiving it. The architect's *position* could dictate an argument and maybe even walking away. More likely than not, though, the architect's *interests* are to have the commission and not the precise scope first imagined. Focusing on interests, the discussion can more readily turn away from fee—the position—to the owner and their program, to design, user involvement, community reaction, and other scope elements. When there is a meeting of minds on scope, then the discussion can return to fee. Perhaps there can be mutual agreement on a lower fee in exchange for a modified scope or a more efficient design approach. Or perhaps the owner will see the need for additional services. Better yet, the owner may appreciate the return on investment that good architecture will bring to her bottom line. Regardless, both the owner's and the architect's interests will be understood and shared, and as a result, negotiations should flow more logically.

Learn the Other's Interests

In negotiating with a new client, consultant, or contractor, architects recognize that each new player is different. However, architects sometimes forget this is also true about people with whom they have worked before. Experience changes both parties. As a result, preconceived notions about the other's interests have to be evaluated continually—by both parties. The only way to test preconceived notions and ascertain interests is to explore them, which includes listening attentively. The more you ask, and the more you listen and hear, the greater your power and leverage.

This notion was borne out in a survey of 800 clients who had worked with architects on commercial and institutional projects. Asked what they expected and wanted from their architects, these clients reported that having the architects understand and respond to their interests as clients was first on their list.

Second in importance was the "ability to manage zoning requirements." This was followed by the architects' ability to adhere to schedules and budgets, and the architects' design experience and quality of design. Architecture fees were ranked relatively low on the scale of selection factors. Clients seemed to feel that, while fees can be negotiated, chemistry, responsiveness, and an ability to listen to the client cannot.

Any given client may differ in interests and expectations from those in this survey. What will not differ, however, is the requirement that client interests be understood for negotiations to succeed. And once you understand what is important to all at the table, you will be in the comfortable position of being able to think of alternatives for satisfying the Other's interests without compromising your own.

The single most important skill in negotiation is the ability to listen and to hear, as it is that ability that allows one to put oneself in the shoes of the Other. Moreover, it builds trust. People trust people who listen, hear, and ask questions or provide new information based on the information the person just gave them.

Increase Everyone's Focus on the Problem

When focusing on interests isn't enough, refocus everyone's attention on the problem. Asking questions such as these helps: "What are we missing? What's the root cause of the dilemma we're facing? Is there another way to analyze the issue?" By refocusing, new options should arise. Architects do this all the time with a design problem, peeling away one challenge after another. The same skills can be brought to bear on a negotiation problem.

That is why expert negotiators enter a negotiation with more than twice as many options in mind than the average negotiator. They know that one problem can have many solutions. And they listen hard to the Other because they also recognize that no one idea (not even one design idea) is ever the cure-all. The more you remember that, the more you will give yourself and the Other the degrees of freedom necessary for an effective negotiation.

Listening is a powerful tool: It proves to the speaker that the listener is concerned about them and their needs, and not the self-serving needs of the listener. Indeed, if architects want to get rid of that old canard of "arrogance," the easiest way to do it is to *stop* listening for the purpose of *designing* for the Other better, and *start* listening for the purpose of *understanding* the Other better.

Listen While You Are at the Negotiation Table

Active listening is much praised as a negotiation strategy, but at its core, active listening is the antithesis of a strategy. Active listening has nothing to do with *your* next steps. Rather, it says to the Other, "I am listening to you because what you are saying is important to you, and therefore it is important to me. Moreover, I will not pursue my thoughts—even about what you are saying—until you tell me that I have understood your thoughts." In other words, you have not actively listened to the Other until the Other demonstrates he has been heard. The importance of the Other knowing he has been heard cannot be minimized. It ensures understanding. It facilitates all discussion, and it permits you to say, "I listened to you and now I need you to listen to me."

Understand the Role Trust Plays

Everyone has stories of being hurt by people they trusted, or of not being trusted by people they so want to trust them. Trust is much sought after because it helps build working relationships and affects power and leverage. It is key, therefore, to understand how trust works and how it affects negotiations.

As a first step, it helps to recognize that trust is a matter of choice. Moreover, whether you choose to trust someone or not is often more a reflection of you than of the Other. So it's always wise to extend your trust to people worthy of receiving it.

The converse is also true. If you want the Other to trust you, you must be worthy of being trusted. In that regard, you will want your behavior to be predictable, your communications reliable, and your word honest and dependable. Teaching others that you are trustworthy may mean seeking out—even creating—moments for trust building and trust tests.

At the same time you are building trust, you will want to assure yourself that you are right to trust the Other. This does not mean putting the other party to a moral test; trust is not a moral issue. Rather, you will want to evaluate their trustworthiness in the same way you evaluate any exposure, and then manage the results. Do they need more information to make you trust them? Then give them that information. Are they acting in ways that make you shy away from them? Suggest things they can do to increase your comfort zone. Their reaction (both immediate and long-term) will outline the parameters of your trust and dictate productive courses of conduct available to you.

The bottom line is this: Principled negotiation recognizes that, at some time, you will be negotiating with people you do not trust, and it gives you tools to handle those negotiations. The working relationship may not be as close and the project may not be as much fun as you would like, but you can achieve mutually profitable business relationships even in these situations.

Develop Elegant Options

There is power in the elegant option. Learning how to develop elegant options and when to present them helps increase leverage in a negotiation.

As an example, suppose that a group of developers wants to build 135 single-family houses and sell them for upward of $1 million each. They ask an architect to design nine model homes and three variations on each model. They are willing to pay $100,000 for this effort and to consider retaining the architect on a lump-sum basis for construction contract administration, but for the nine models only.

The architect, of course, recognizes that the developer could potentially gross somewhere between $135 million and $255 million if each house sells at the asking

TRUST IS A DOUBLE-EDGED SWORD

Trust is a question of choice. You choose to trust people. They choose to trust you. You can build trust. You can destroy trust. And you can give the Other opportunities to prove to you they are worthy of your trust.

The easiest way to build trust is by being trustworthy. Research conducted by Neil Rackham of Huthwaite Inc., a negotiation and sales performance consulting firm, found that, the more professionals proved themselves to be *concerned, candid*, and *competent*, the more the client judged them to be trustworthy. You can use those three components as guides for building trust.

- *You can build trust in little ways.* You say you're going to be there at 9 o'clock in the morning? Be there at 9 o'clock in the morning.
- *You can build trust in big ways.* As soon as you know something's going to go against client expectations, you can call and tell your client about the changed situation.
- *You can build trust in bigger ways.* If the client is concerned about something, you can be concerned about that something too.

In other words, choose to build trust as much as you choose to trust and expect to be trusted. Let your clients see you working to address their concerns. Give them a reason before and after you get the commission to build on the common ground that is there for you both. In this way, the two of you can come to rely on each other's judgment—and rightly so.

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price. Consequently, the architect believes that a $100,000 commission is out of kilter with the value the firm is bringing to the effort. At the same time, the architect reasons that if every house had a $10,000 to $30,000 problem—an unlikely possibility, but one a firm can calculate—the firm's potential exposure could range from $1,350,000 to $3,950,000, a huge amount unsupported by the $100,000 fee.

Stepping into the developer's shoes, the architect recognizes that design fees come directly from the developer's own pocket, unlike construction fees, which usually, for all intents and purposes, are "paid for" by the bank. Hence, having the developer pay more money up front is probably not an option.

Under these circumstances, what is an elegant option? One is to pay the architect one lump-sum fee for all design services, an hourly fee for construction contract administration services (but for all 27 models), and, finally, another fee calculated at 1 percent of the gross sales price on the sale of each house.

Why is this option elegant? The developer pays the architect (1) a reasonable, though tightly guarded, amount for design services and (2) an amount for construction contract administration services sufficient to help contain basic exposures for both the architect and the developer, while (3) profit can be enjoyed by both parties when profit is realized.

Keep Your BATNA in Mind

The Harvard Negotiation Project teaches negotiators to develop for themselves a "best alternative to a negotiated agreement" (BATNA) before they enter a negotiation. Knowing you have a solid alternative available should the negotiation not pan out increases your personal sense of power and, therefore, leverage throughout the session. The absence of a solid BATNA is what makes the architect's scope and fee negotiations so difficult in recessionary times. The sense that "If I don't get this project, what will I do?" limits even the strongest willingness to risk.

The importance of developing a BATNA cannot be underestimated. All that is needed is one solid, tangible "best alternative" to have the freedom to walk away from a bad deal or push for a good one. What BATNAs are available if you don't get this project? That's up to your personal business and practice goals. Perhaps it's merging with another firm. Perhaps it's reallocating staff to expedite the completion of other projects and improve your cash flow. Perhaps it's associating with a contractor friend to pursue a design-build project that's yours for the asking. Don't limit your imagination or your value. To flourish, BATNAs demand your full creative support.

Ultimately, you may find that one of the easiest ways to increase your power and leverage is to increase your efforts to develop your BATNA. Indeed, you may find you opt out of a negotiation not because you are losing, but because your best alternative is winning.

Recognize and Respect the Power and Leverage You Have

In any negotiation you have power and leverage by virtue of the fact that the other party wants you to agree to something with them. Power and leverage, however, can be frittered away if they go unrecognized or are not respected.

It doesn't take much to lose power and leverage. Their value can be diminished if you refuse to be engaged in a debate in which you have something to offer. "Being fair" to the detriment of your own interests can undo you. Standing mute while others decide what responsibilities you should have and how much authority you need to manage those responsibilities can set you up for failure. Concessions on substance can deny both you and the Other the chance to build the working relationship without which you will fail. None of this has to happen. All you need to do is speak up and say what interests are important from your perspective for the endeavor to succeed.

At the same time, like anyone else, no architect can say "yes" all the time. An impatient contractor unreasonably demanding that the architect approve a change order "right now" has to be reminded that, no matter how responsive the architect would like to be, the architect owes a duty to the owner to evaluate the change order first. Even then, only the owner's final approval can trigger implementation. Admitting limitations to one's power can help ease a stressed negotiation.

Appreciate the Extent of the Other's Power

People often say "no" to a proposition because it is not within their power to say "yes." Unless the proposer appreciates that the rejecter lacks the power to agree, the proposer may wrongly conclude the rejecter is not committed to a successful negotiation. Armed with this misdiagnosis, the proposer may become disenchanted with the process and unwittingly—through body language, lack of energy, inartful reactions, and the like—help the negotiation falter further.

This phenomenon is commonly experienced in government and institutional settings in which the contract officer lacks the authority to bend the rules, no matter how much project success dictates those rules should be bent. "We do it this way because we do it this way" is a hard position for any negotiator to dislodge, particularly when the rejecter believes it is in his or her personal interest that the position succeeds unchallenged. The first step in getting the rule changed is to get the rejecter to understand that the success of the project—and, consequently, of the rejecter—requires that a higher, supervisory authority evaluate the rule's applicability.

Be Open to Alternatives to Saying "No"

In a negotiation, anyone can ask for or demand anything at any time. Sometimes it is necessary to say "no" to win the trust and respect of the other party. More often, however, saying "no" ends the negotiation prematurely—or at least derails it for a while.

This is most unfortunate, especially when disagreeing could have been avoided altogether. "Yes, I can do it for you, and it will cost you this much" is a far easier way to get an owner to reconsider a misconceived scope. Asking "How does that help you?" gives you time and information to determine alternative ways to address the Other's concerns. "Will it help you if we agree to this?" shows you are intent on responding to their needs. "Perhaps there are alternatives we should consider as well?" serves much the same purpose, as does offering an alternative or two for the Other to think about. "Can I get back to you on that?" proves you are listening while buying you time to consider and develop more workable responses. Finally, you can reframe what you are hearing into an option acceptable to you both. In short, saying "no" works only when it is wise to do so.

Think Acceptable Ranges

Expert negotiators approach the negotiation table with acceptable ranges in mind. Average negotiators don't. They have a fixed figure in their head, and if they don't get that figure, they have, by definition, failed. Expert negotiators don't defeat themselves that way before, during, or after the negotiation. They come to the negotiation table prepared to craft a wise outcome that meets the long- and short-term interests of the parties—an agreement that will stand the tests of time. They know that standing in cement with one fixed goal in mind puts too much stress on an already fragile process. Expert negotiators want room to move.

Not only do expert negotiators plan ranges, they also plan their concessions. Indeed, for them the issue is not so much who made the first offer, but who made the first concession. They know that research shows that the first conceders are often the losers in the negotiation process, especially if they drop fast and far from their starting point to stay in the game. Hence, each concession the expert negotiator makes is reasoned, and that reason and the basis behind it is communicated when the concession is made. Further, whenever possible, a *quid* is exacted for every *quo* conceded. "In light of what you just told me (new information), if you can do *x*, I can do *y*." In this way, expert negotiators protect themselves from the feeding frenzy surrounding inartfully made concessions.

Budget for Negotiation

Build negotiation costs into your project's budget, just as you include profit in that budget. When the time and funds you have set aside for negotiation run out, you can assess options, knowing that the next increment of time—and money—you put into the negotiation will be coming from your profit. Doing this can keep you from unknowingly starting a project at a loss.

Increase the Merit of Your Arguments

As one-sided as the other party's proposal may be, arguing fairness rarely works to resolve a situation. To many people, indicating "it's not fair to me" is evidence that it must be good for them. A better approach is to increase the merits of your own solution to the problem and to explain these in language the Other will understand and appreciate. In this way, they see your solution as the best solution to their problem.

One way of doing this is citing external standards the other party respects and should, accordingly, accept, such as code-mandated performance criteria in response to technical dilemmas. On matters of design, however, or on issues involving laypeople, conveying the responsiveness of architecture solutions may prove more daunting.

As a first step, it may help to recognize that the sanctity of a design or a design solution may not be a value to someone else. More likely, they would cherish having their interests served. Perfecting your skills at explaining why your suggested solutions meet their interests is the key. Better yet, ask competent questions that convey your commitment to meeting their interests and prove, in the process, how capable you are in using design to meet their needs. Expanding your ability to fine-tune your solutions in light of client interests brings you even more power and leverage.

You can ask the Other for help in this process. They know where and how your proposal does not respond to their interests. They may even have ideas on how to modify it to make it more responsive. Consulting with them for solutions puts you both on the same side, making it easier for everyone to come to an agreement.

Another way to increase the Other's appreciation of the merits of an argument is to use analogies to explain your reasoning. For example, if you are negotiating with a doctor-client who wants perfection, you can explain that no doctor can guarantee the results of an operation. Or, if you are dealing with a law firm that insists you negotiate with the firm instead of your client, you can explain that both of you are agents of the owner—you for design, the Other for law. Thus, both of you are on the same side—the client's—and only the client itself can resolve any impasses between the two of you. In other words, when you can find similarities between your experience and that of the other party, use those similarities to bridge gaps.

Increase Your Mettle

A 2006 Harris Poll reported that 91 percent of the people interviewed responded that architects were worthy of prestige, so having the respect of your clients, as well as the respect of others dependent on those clients (like contractors), should not be an issue.

Quietly knowing that the respect you need to negotiate is already yours should make any negotiation easier.

There is, however, a difference between confidence and arrogance, and between respect and obedience. While confidence and respect can facilitate negotiations, being arrogant or otherwise demanding obedience can just as readily undermine them. This is so regardless of who is doing the overreaching. In such cases, the Harvard Negotiation Project encourages negotiators to address the overreaching openly.

Here's an example: You may choose to ignore the threat of "Take it or leave it," or you can choose to respond by saying, "Look. You will have to make many decisions in the course of this project. Each decision will have trade-offs. Some will be truly hard to make. I promise I will give you the latitude to discuss and negotiate these trade-offs. Right now, I need the same latitude from you." From there, as a principled negotiator, you can return the discussions to the problem at hand.

Control Yourself

While you may have power and leverage in a situation, it is rare that you have control over the other party. As much as you may wish the Other won't get angry, distance themselves, or decide something contrary to your hopes, you cannot make them live up to your wishes. No one's will is that strong. You can, however, control yourself—and you should.

To that end, you will want to develop "mindfulness." Are you getting too tired or too angry to think straight? If so, ask for a breather. Go for a walk around the block by yourself, or if you think it would help more, try to diffuse the situation, perhaps by suggesting the group go out for a cup of coffee. Then talk about non-architecture topics so the group can regain the sense that it can work together easily and successfully.

By all means, feel free to tell the other party how you feel, if you think that would help and not be used against you. "I feel discouraged [angry, perplexed, or confused] and would appreciate any ideas you may have on what we can do together to put these negotiations back on track." The Other may not know how you feel or what you are thinking. They may be misreading you. Information, directly given, may be just what they need to retool their negotiation effort.

This method allows you to be what the Harvard Negotiation Project characterizes as "unconditionally constructive," that is, doing only those things that are both good for the relationship and good (in the case of architecture) for the firm—whether or not the Other reciprocates. This approach to enlightened self-interest is conducive to overall negotiation success, as it allows both parties the opportunity to empathize with each other's needs and assertively state their own. It also gives everyone the best opportunity to develop the options that create value for all.

Studies show that the most stressful stage of a buying process can be just after the decision to buy is made. Buyer's remorse and doubt may set in. A call confirming your commitment to successful implementation of the agreement may be just the reassurance the other party needs.

Finally, Make It Easy for the Other

Negotiating can be difficult and exhausting. Many people feel they may have lost something in the process—even in a win-win situation. They may wonder if they should have asked for more or held out longer. That ambivalence—and even fear—of being gotten the best of is one reason it is often wise to come to closure gradually. This allows the parties to get comfortable with the results—to try them on, so to speak.

This ambivalence is also why it is often helpful for parties to be generous with each other at closing. Sometimes when the deal is close and the Other is having difficulty buying in, giving something the Other values that has no cost to you may be just the ticket to encourage the Other to join in the agreement. You will seal the deal, and with goodwill. This is particularly important in architecture, where risks can be high, decisions are final, and change—and thus the need for future negotiation—is the only thing that truly can be guaranteed.

For More Information

The Architect's Essentials of Negotiation (Wiley, 2009) by Ava J. Abramowitz.

Getting to Yes: Negotiating Agreement Without Giving In (Penguin Books, 1991) by Roger Fisher, William Ury, and Bruce Patton.

The Trusted Advisor (Free Press, 2000) by David H. Maister, Charles H. Green, and Robert M. Galford.

Beyond Winning: Negotiating to Create Value in Deals and Disputes (Harvard University Press, 2000) by Robert H. Mnookin, Scott R. Peppet, and Andrew S. Tulumello.

Spin®Selling (McGraw-Hill, 1988) by Neil Rackham.

Difficult Conversations (Penguin Books, 1999) by Douglas Stone, Bruce Patton, and Sheila Heen.

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CHAPTER 16

Risk Management

16.1 Risk Management Strategies

Peter Gifford Longley, AIA, CSI CCS, LEED AP

Being in the business of architecture means taking risks. But any good endeavor, like the privilege of practicing architecture, is worthy of some risk. The best approach is to know the risks, and then know how to manage them.

HOW DOES THE ARCHITECT MANAGE RISK?

The word "risk" derives from the archaic Italian word *riscare*, which means "run into danger," or to imperil, endanger, or jeopardize. All choices in life entail some risk; for example, play and risk injury, or pass and risk boredom. When a decision is made to risk one thing or another, security lies only in *managing* the risk.

There are four classic strategies, all used by prudent firms to manage risk. These are manifested in the practice of architecture as shown in Table 16.1.

Identifying Sources of Risk

Some aspects of the practice of architecture are, by nature, more likely to create unmanageable risk—risk of claims that place a firm's reputation, even its existence, in jeopardy. Professional liability insurance companies track actual claims by category, frequency, and cost. These data are used to determine premiums—costly for customers servicing areas of greater risk, and less so for those where risks are low.

Peter Longley is an architect with more than 35 years of experience. He has developed and authored firm standards for documentation and quality control. As director of operations for Tsoi/Kobus & Associates, he is responsible for the firm's risk management and quality assurance/quality control practices.

TABLE 16.1 Strategies to Manage Risk			
Avoid Risk	**Transfer Risk**	**Assume Risk**	**Control Risk**
Marketing selects project types that fit with prior experience, working for clients with excellent reputations.	Contracts transfer risk appropriately to the client, or downward to a consultant. Insurance transfers risk to a business financial partner.	Accept appropriate work, but maintain enough cash to responsibly satisfy insurance deductibles.	Adopt best practices, and educate staff. Seek good counsel to prevent or reduce losses when claims emerge.

Measured liability losses, organized by category, form a quantifiable basis for decoding areas of greatest risk. Professional liability insurance provider XLGroup identifies nine such categories in its Risk Drivers research:

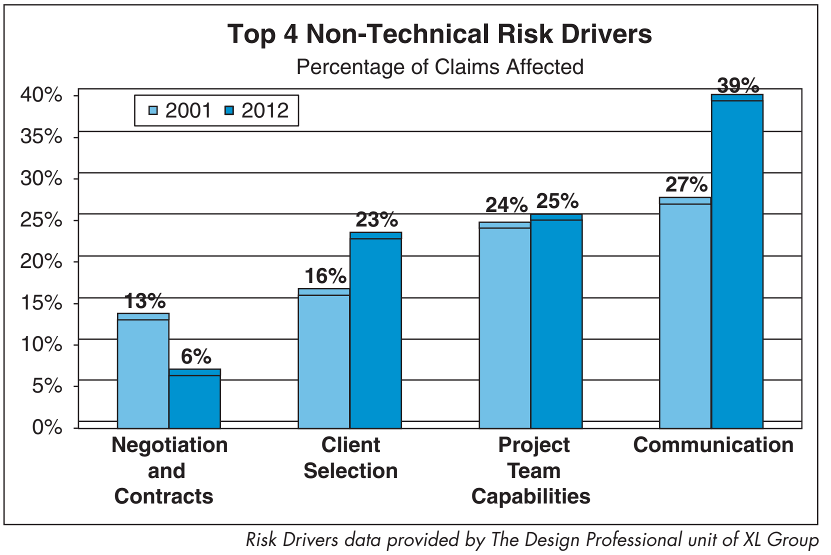
1. Communication
2. Project team capabilities
3. Client selection
4. Negotiation and contracts
5. Budget control
6. Schedule control
7. Loss prevention issues
8. Construction phase services
9. Billing procedures

XL Group's Risk Drivers research reveals that one or more of areas 1 through 4, shown in Figure 16.1, were present in 93 percent of all claims. Therefore, a focus on these four areas will address most causes of risk to architects—to determine best practices to avoid, to transfer, or to control risk…reasoning, alternatively, which risk is reasonable to assume.

The four greatest areas of risk that architects face are examined below, with potentially effective means to manage each of them also discussed. The order is to build to a key risk factor.

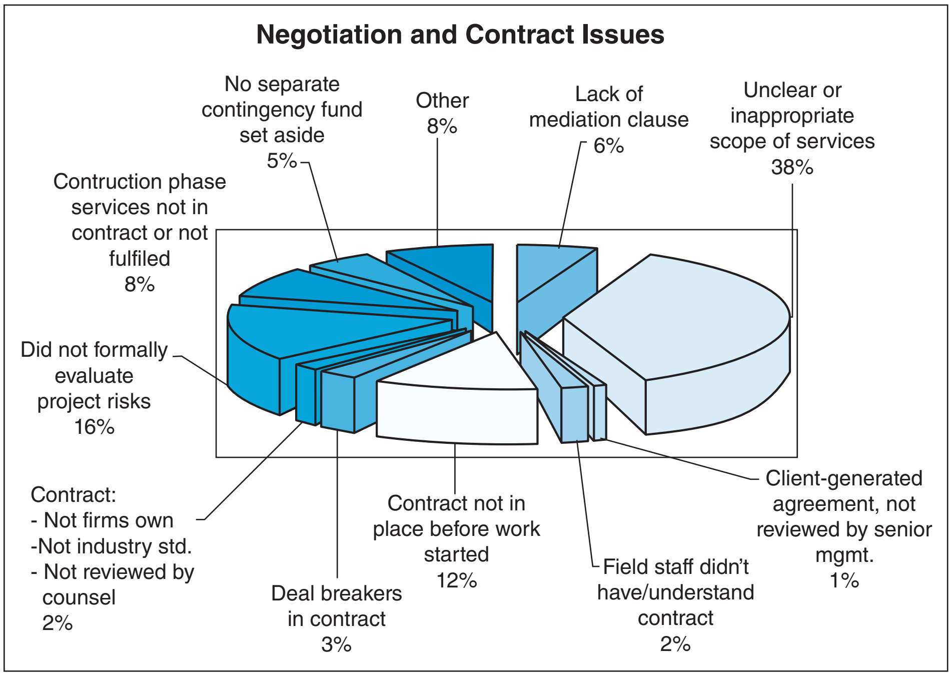
NO. 4: NEGOTIATION AND CONTRACTS

Claims almost always appear in a legal form, targeted directly at the failure of the architect to comply with some term of their design services agreement—the document that set forth the responsibilities now in dispute. (See Figure 16.2.) Not surprisingly,



Risk Drivers data provided by The Design Professional unit of XL Group

FIGURE 16.1 Chart Depicting the Four Greatest Areas of Claims



Risk Drivers data provided by The Design Professional unit of XL

FIGURE 16.2 Chart Depicting Negotiation and Contracts Claims by Type

the contract is the first piece of paper consulted when a claim comes to light. Designers frantically examine it to learn if the claim has any basis in reality. Copies are requested by attorneys and insurance companies. Everyone scours it for the magic words that prove their perspective, supporting or refuting the claim.

Long before the claim emerged, times were happier. At the beginning of the project everyone is excited about getting started. Still, the project is, after all, a business deal—a contract—a fee paid for services rendered. Central to both the client's and architect's mind are the large matters: the project description, the site, the program, the schedule, the budget. Next come the means to get there: the team, the consultants, the services needed, what's included, what's not, and the fees. Finally come the terms and conditions: all the legal fine print governing everything mentioned, and then some. The main characters typically lose interest at this point—the prime reason projects often begin without a contract in place. They turn over the business of sorting out the details to other people.

These main characters are the same ones who frantically reach for the contact (if it was ever executed) once the claim notice arrives. They need to see what was previously agreed. That day's conclusion will likely be determined by how well the agreement was negotiated.

Deal Makers and Deal Breakers

From the architect's perspective, the key issues in agreements are profitability and insurability. Simply put, if a profit can't be made with the deal as stated, the commission shouldn't be accepted. Likewise, agreeing to take on responsibilities excluded by a firm's professional liability insurance policy could leave the firm uninsured when a claim emerges. Either issue can put a firm out of business. Both present unmanageable risk. Both are deal breakers.

▶ Negotiating Agreement (15.3) discusses negotiation as a skill that can be learned and mastered.

Negotiation is the time to identify and remove deal breakers. If they can't be removed, some way must be found to offset the risk—something that would instead be a deal maker. Finding the deal makers are theoretically possible (e.g., a large enough fee can compensate for increased risk), but require willpower and skill to negotiate.

Below are noteworthy deal makers and deal breakers.

Working Without an Agreement

Working without an agreement is an unmanageable risk. If a claim emerges before the contract is executed, there are no clear rules for settlement. The party due something may have to walk away without anything, perhaps even having to pay. In the case of the architect, that means real trouble. The effects of working without an agreement are many. Foremost concerns include:

- Difficulty in getting paid, or getting paid all that the architect believes it is entitled to be paid
- Claims of architect responsibility for any and all things not the firm's fault—such as the client's consultants' negligent services, the presence of hazardous waste on-site, inaccuracy of client's budget, changes in the code, bad construction safety, poor performance of the builder
- Claims of architect responsibility for broader scope than may have been intended or understood by the architect
- Claims of the architect causing delay due to a lack of written schedule, or definition of the schedule approval or amendment process

▶ Architects and the Law (5.1) further discusses the standard of care in architecture practice.

Most architects would probably never work with just a handshake, wink, or nod. But exchanging draft agreements that never get signed has the same net effect—no written agreement. There are too many skilled attorneys and different-minded judges that would dismiss those unsigned pieces of paper, regardless of arguments about payments made ("course of conduct"). Architects need to get the agreement negotiated and signed before issuing documents for use by the client or the builder. Once the work product is delivered, the architect loses the leverage necessary to get the client to the signing table.

Textbook definition of standard of care: Rendering services with the ordinary degree of skill and care that would be used by other reasonably competent practitioners of the same discipline under similar circumstances, taking into consideration the contemporary state of the art and geographic idiosyncrasies.

Heightened Standard of Care

The standard of care is the basis against which architects are measured to determine whether they are performing to a level of legal competence. The standard of care does not require performing services perfectly. Rather, when errors and omissions occur, they are judged against a standard consistent with the work of other architects doing similar projects. Errors and omissions that fall short of this "norm" constitute a failure to meet the standard of care, amounting to legal negligence. The key to the concept is that there is a norm—and the norm is not perfection.

The standard of care flows from a concept in English law that recognizes that professional services—from doctors, lawyers, architects, and engineers—are rendered based upon learned opinion. Such professional opinions are provided by gifted human beings who have plied their trade over time, developing varied pathways to success. There isn't always a single solution.

▶ Owner-Generated Agreements (17.3) covers a systematic approach to evaluating terms in agreement provided by owners.

To determine whether an architect has been negligent, performance will be measured against what architects would typically have done in the same situation.

The problem with nearly all client-developed agreements is that they seek to prescribe a standard for care that is higher than the norm. Problematic words abound that define the architect's enhanced performance level, including "best," "better," "high," and "higher." These words are red flags and should be stricken not only from agreements but also from marketing materials and proposals.

MARKETING MATERIALS: SINGING OUR PRAISES

A professional carefully negotiates an agreement and then, unwittingly, attaches the proposal to it—too lazy to retype the scope. There, lurking in the proposal, are the promises of performing among the best in the nation or region at one thing or another. Plaintiffs' attorneys can take those promises to the bank.

What is the problem with being contractually required to perform at a higher standard of care? Professional liability insurance does not cover such a higher performance level. Architects are insured against acting negligently in performing their services. Beyond that, they are on their own.

How does establishing a higher standard lead to claims? When architects are required to be near-perfect, the client will expect them to pay for every problem on the plans, everything missed, every mistake that the typical architect would be forgiven. *Everything*.

Thankfully, most clients will accept pushback on this negotiation issue and will agree to take out the words "best" and "highest." As businesspeople, they understand the limits of insurance. They also recognize that if the policy does not cover their claim, the only other assets the architect has are used desks and computers—which don't amount to much.

THE LIABILITY BUCKET

Sophisticated clients may try to come up with ways to quantify or measure the standard of care. One such attempt is to express the barrier in terms of construction change orders. For example, any amount of error and omission (E&O) change orders in excess of, say, 1.5 percent means that the standard of care has been breached. So each time an E&O change order is classified, it is dumped into a "liability bucket." When the amount in the bucket rises to the established rim, in this case 1.5 percent, the architect pays for the rest that spills over.

The liability bucket is a noble idea. It has its basis in facts, as expert witnesses often quote normal change order percentages, such amounts varying by project size, complexity, new or renovated construction types, and the like. This seems like a fair and reasonable way to establish expectations of performance. Doesn't it?

The problem is that there is no statutory or judicial percentage threshold for an across-the-board definition for the standard of care. None.

The standard of care must be argued before the finder of fact (arbitrator, judge, or jury) and legally established for each element in every claim. Plaintiff's experts opine as to how bad the services in question were, how the mistakes were so egregious that, regardless of change order amount, "no other competent architect would have made *that* mistake." Then after hearing the charges, defendant's experts explain why everything that happened on the job was no different from any other project. In the end, the decision by the finder of fact will boil down to how convincing the arguments were, considering the credentials of the opposing experts—it's the proverbial "battle of the experts." The fact remains: There is no clear legal definition of a breach of the standard of care.

Therefore, there is a problem in trying to establish a contractual measuring stick for the standard of care. Doing so removes the insurance company's ability to argue against claims that breach the contractual standard, but might arguably *not* have breached the standard of care. That is why underwriters specifically exclude "contractual breaches" from coverage. Check the firm's policy. The liability bucket may be uninsurable.

Indemnities

Almost every client-furnished agreement comes with a professional services indemnity provision—most are horribly written. The AIA has addressed client demands for such contractual indemnities in the major 2007 versions of the AIA's standard architectural services agreement forms. The AIA's language was reviewed by professional liability insurance carriers and determined to be insurable under typical professional liability insurance policies.

The principle of the professional services indemnity is that the architect ought to reimburse the client for claims brought against them by a third party—claims arising from the architect's negligence.

Indemnities of other types actually benefit the architect:

- Client indemnity to the architect for claims arising from the presence of hazardous materials on the job site
- Client indemnity to the architect for claims from the client's misuse of the architect's drawings
- Mutual indemnities between the architect and consultants, making each party legally responsible for their own mistakes and *not* for the mistakes of the other

Problems with professional services indemnities occur when they become too broad, holding the architect responsible for performance beyond professional liability insurance policy coverage. Common examples include:

- Indemnifying persons or entities not a party to the agreement
- Indemnifying the client from their own mistakes
- Indemnifying for errors and omissions not rising to the level of legal negligence
- Defending the client against third-party claims—providing legal defense—prior to legally establishing negligence

Overbroad indemnities provide unmanageable risk. Therefore, read every proposed indemnity carefully. Use the AIA version (e.g., AIA Document B101TM–2007, section 8.4) as a good model. Always seek legal advice before agreeing to the client's version of an indemnity clause.

► The AIA Documents Program (17.5) details the range of AIA contract documents that capture and convey the expectations, relationships, responsibilities, and rules that bring parties together for the design and construction of buildings.

Construction Means and Methods

The architect designs the finished project. How it gets built, the "means and methods" to get there, are determined by the builder. Construction means and methods ought not, and generally are not, the responsibility of the architect.

Means and methods claims examples include excavation cave-ins, scaffolding failures, and crane collapses. Fortunately such claims are rare, but the result is almost always tragic, with property damage, personal injuries and death involving workers and members of the general public. These accidents turn into media events, with plaintiff awards that amount to tens of millions.

AIA standard agreements have effectively managed this issue for decades, with carefully considered language in the architectural services agreements and the general conditions for the contract for construction. Take advantage of this language in AIA agreements—language tested in the courts.

▶ See Agreements with Owners (17.1) for more information related to the contract with the client.

Guarantees and Certifications

Architects are often asked to guarantee or certify the quality or completeness of their design. There is real danger here. The only guarantee that the law typically requires, and that professional liability insurance policies cover, is a guarantee to perform to the standard of care. Beyond this, guarantees and certifications are excluded from coverage.

The words *guarantee* and *warranty* should either be stricken from the agreement, or at least used properly—for example, "Architect makes no guarantee of performance." Other terms take on the same meaning—"ensure," "assure," "insure," "confirm," "verify," "thorough," "any," all," and even "100% complete." Each may be placed in a context requiring that the architect perform at a level of perfection—to provide any and everything needed at the architect's expense.

Certifications are far more common than guarantees, and cannot realistically be avoided. Building officials and jurisdictions require certifications stating that drawings have been prepared per code, or, after construction, that the project was completed per plans and specs. Other common certifications are requested by project financiers, banks, and lending institutions—all requesting the same thing: that architects promise that they didn't make any mistakes.

There is a simple solution to any certification. Remember the standard of care—that the architect is a professional who exercises judgment. An architect should only certify "in my professional opinion" or "to the best of my knowledge, information, and belief." The contract should give the architect the ability to review and reasonably limit certifications before signing them. Do not certify perfect performance.

Proper Scope

▶ Defining Project Services (15.1) further discusses the centrality of scope definition to effective agreements for professional design services.

Badly written scopes of services lead to claims and lost revenue. Unclear scopes can make architects responsible for the performance of someone not under their direct control. Overbroad scopes rob architects of the ability to invoice for extra services. Bad scopes can ruin a firm, damaging its relationship with the client.

Good scopes of services set forth with precision the services the architect will provide, and exclude those they won't. Spend time getting it right. Review it with the client and other members of the team; include the junior staff that will work on the project. Getting the words right will clarify everyone's expectations and may eliminate later disputes.

▶ Construction Phase Services (10.9) covers the architect's evaluation and reporting of the progress and quality of the work and its conformance to the design intent expressed in the contract documents.

Administration of the Contract for Construction

During the construction phase, the task for the architect is to "administer the contract for construction" between the owner and builder—various services that collectively are commonly referred to as "CA." These CA tasks include field observations, review of contractor's payment applications, answering contractors' questions about the drawings and specifications, review of contractors' submittals, review and approval of change orders, issuing revised documents for changes, and inspecting for substantial completion.

Clients sometimes want to save on professional design fees by eliminating CA services. They reason that after the construction documents have been prepared, that the architect is done with design.

But "design" is not done until the project is built. Changes occur during construction, brought about by contractor substitutions, products and systems purchased off of performance specifications, unanticipated field conditions, modifications to accommodate construction means and methods, owner changes, and errors and omissions. Plans are never perfect, nor are they "complete."

With these change forces at work, the architect must continue to protect the client's core interest—the design. In protecting the design, architects also protect their own reputation and liability. Costs from fixing systems not properly integrated, not meeting code, or not functioning could become a basis for claims.

Professional liability insurance providers recognize a rise in claims among firms that do not provide CA services—because the architect is not around to correct their documents or to defend them, to interpret and explain them, to preempt or minimize costly construction mistakes. Some underwriters will not insure firms that take on commissions for construction that does not include CA services.

Limitation of Liability

Without a limitation of liability (LOL), there is "no limit" to an architect's liability. If a professional liability insurance policy has a per-claim limit of $10 million, a firm is not protected for any claim in excess of that limit. A $20 million claim, if enforced, could put a firm out of business. Uninsured loss is an unmanageable risk.

A limitation of liability is an agreement not to seek damages in excess of a pre-established and agreed-upon amount. To be legal, the limit must provide fair payout in relation to the value of the services; unreasonably low LOLs have been struck down by courts. An enforceable LOL can be an effective way to manage risk. Most underwriters offer a break in premiums if all the insured's projects, or at least a significant percentage of them, have an LOL.

What is a reasonable value for an LOL? Some advise that it should equal the compensation received on the project. But that can amount to a big number, exceeding policy limits. A reasonable target is to set the LOL at the "proceeds of available insurance." Doing so will ensure that the firm never has to pay out of pocket, even if the annual policy limit (aggregate) has been eroded by claims on other projects. [Note: Savvy clients may require that eroded limits be replaced with the purchase of add-on coverage. Even so, that is a better deal than no LOL.]

Significantly, LOLs should apply to the full sum of any and all claims on the project. Otherwise, the LOL may not do what it is supposed to do—set a limit on liability.

LIMITING THE LIABILITY OF A CONSULTANT

Jay S. Gregory, Esq., founding partner of the Boston office of LeClairRyan, PC, tells the story of an architect he represented who had unwittingly agreed to certain fine print in the contract of a structural engineering consultant. When the structural design of the project turned out to be defective, resulting in repairs totaling several million dollars, his client turned to the engineer to make good. The engineer immediately produced the contract and turned to the fine print, which stated a limitation of liability in the amount of $100,000. The engineer freely admitted guilt—"Here, I'll get my checkbook and write you a check for one hundred thousand."

The architect, holder of the prime agreement with the client, was responsible for the rest of the damages—damages arguably not his fault.

▶ Insurance Coverage for Business and Professional Liability (16.2) covers the terminology and necessary considerations and alternatives when selecting insurance for one's firm.

Making Better Agreements

Establish Standard In-House Practices

There are firms with no standard approach to developing, executing, and maintaining design services agreements. Almost anyone can authorize work and sign contracts, committing the firm to situations of unmanageable risk.

Consider these tips to address this risk:

- Appoint a single person or, for larger firms, a team of individuals, to review and negotiate all contract terms and conditions. People who review contracts all the time know what to look for, acquiring the skills to effectively negotiate with difficult clients and attorneys. It takes years of training and experience to develop these skills. Consider hiring someone with a legal background or a licensed attorney to perform this role. Contracts legally obligate a firm and should be reviewed and approved by select firm members only.

- As part of the review process, the project manager (PM) should review their own contracts. They will manage the project and ought to play a role in shaping what the contract says. However, the PM should not be the *only* person reviewing the contract.
- Provide access to signed agreements for review by the entire project team.
- Save electronic copies of every agreement with the electronic project records. Also save a copy in a general office directory of the firm's contracts. When a problem emerges on a project, perhaps several years after the records have been archived, there will be a dash to find the contract. Make it readily available on that day.

Get Professional Support

If there is a claim, a firm will need support from an attorney, but attorneys can also help avoid a claim before it happens. Attorneys specialize in areas of legal expertise; contract law is one such specialty, and construction contracts a subset within it. There are attorneys that work with owners, builders, or design firms. Finally, there are attorneys that specialize in developing agreement text, and others that are called in to resolve disputes. At times, help may be needed from both of these subspecialties.

To find the right attorney, ask other architects in the area or a professional liability insurer for recommendations, or attend seminars in risk management conducted by attorneys to get a glimpse of what they know. Take time to make the right choice. Architects should select an attorney with relevant experience, clients, and references.

A qualified attorney can help with the review of contracts, or perhaps just with difficult agreement clauses. Some architects use outside counsel to negotiate contract terms—speaking attorney to attorney to the one representing the other party. While this is an extra expense, it could avoid a far more costly contract claim later that stems from improper review.

In addition to paid attorney consultation, many insurance providers offer contract reviews. These reviews best address matters of insurance and insurability. Using both outside insurance and legal counsels will combine to make the contracts best suited to preserve the interests of the firm.

Use Standard Agreement Forms

Most professional liability insurance carriers offer discounts to their clients that use standard agreement forms, such as AIA documents. AIA forms have been tested by the courts. In addition, clients recognize and respect these forms, making the negotiation process with these as a starting point much easier.

Standardized forms can be used "as is," but it is more typical that they be modified beyond project particulars and changes to common services, to include technical edits to the legal terms and conditions in response to the advice of legal and insurance advisers.

One way to use outside legal and insurance counsel is in the development of a suite of standard agreement forms customized for use by the firm. These documents may seldom be adopted as is by the client, but they will be very useful as a reference to a firm's preferred language. There will be many times when client's counsel is pushing for certain text in the client's standard form. In that situation, an architect can transmit the firm's preferred paragraph for consideration—a good negotiation strategy.

There are several key customized agreement forms to have on hand:

- *Full services agreements* of the types most frequently used.
- *Small or limited-scope agreements*: Short-form terms and conditions for projects where there is no construction involved, such as feasibility studies, programming, and planning services.
- *Notice to proceed:* Brief letter agreement used to get a project going until the final agreement is executed. Such notices include limited items to agree on quickly: definition of limited scope and payment, intent to execute the final agreement, and rules to terminate or extend.

- *Consultant agreements:* These should always be tied to the terms and conditions of the prime agreement between the architecture firm and the client. Never sign the consultant's proposal—and avoid attaching it to a consultant's agreement form—where its terms and conditions might conflict.
- *Common exhibits:* Rate schedules, reimbursable expenses schedules, sample invoices, standard scopes of services for each type of consultant regularly hired, consultant standards.

NO. 3: SELECTING THE CLIENT

The third most frequent source of claims comes from client selection. (See Figure 16.3.) It is the client that most frequently sues the architect for failing to fulfill their duty. A client who is unsophisticated, or short on the cash needed to fund the project, or has a record of litigation, or is completely unknown to the architect, is one to avoid.

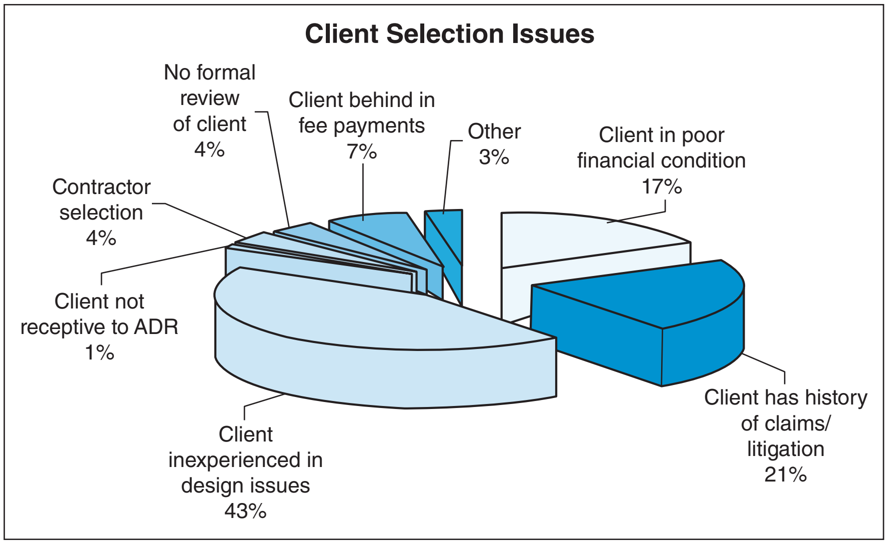
Know the Firm's Expertise—Know the Market

An architect that keeps designing the same thing, over and over again, necessarily develops an expertise in that one thing. The purest example of this is the prototype building. Examples include box stores and fast-food outlets. Each successful franchise solves a series of problems very effectively—established brand recognition, optimal layout for both customer service and product preparation, predictable construction cost and schedule, and significant reduction in errors and omissions. These prove a simple principle—if an architect were given the opportunity to design a project just like their last one, they would likely expect to do a better job. We see that specialization helps mitigate risk, while establishing a record of accomplishment.

Sophisticated clients want to select firms that have successfully designed and completed projects similar to theirs. Such is their means of managing risk.

Know the Client

Before beginning to work with a client, an architect should know them. Are they an experienced developer, having previously done projects like the one proposed? Can they afford the project? Do they have a reputation for negotiating fairly? Do they have a long list of architects they have hired—and if so, who? What is their track record for paying? Do they have a history of litigation?



Risk Drivers data provided by The Design Professional unit of XL Group

FIGURE 16.3 Chart Depicting Client Selection Claims by Type

PART 4: CONTRACTS AND AGREEMENTS

ONE GOOD LAWSUIT DESERVES ANOTHER

A design firm completed a commission for a major institution and received popular recognition for a job well done. The client was happy. There was good publicity. Awards were given. But not everyone on the team was satisfied.

Several years after the project was completed, three of the major trades filed suit over change orders that were long denied and never paid—three separate suits in three different jurisdictions. Whom did they sue? The architect.

The subs each lost money on their contracts, primarily because there were unanticipated changes to the schedule that led to labor overruns. Despite these facts, the basis of the suits alleged that the plans were incomplete and uncoordinated, leading to their losses. This basis quickly faced an important legal obstacle: the architect, a third party to the construction contract, does not have a legal duty to save the builder's subcontractors from economic loss due to defective plans. Only the owner, through the general contractor, has this legal duty. But the builder did not want to sue his client to aid his subcontractors—the same client he wanted to work for again in the future. The subs didn't want to sue the builder for the same reason. At this point in the claim, summary judgment, with dismissal of the claims against the architect, seemed possible.

Ensuing legal discovery exposed the faults of all team members—not surprisingly, no one had been perfect. Meanwhile, both the general contractor and owner, neither a defendant in the suits, watched with interest from the sidelines. Both suspected that at any time, they could get pulled into the fray.

In the end, the owner and builder, the ones with legal agreements relevant to the claims, succumbed to pressure to do right by the subcontractors. Both volunteered to participate in mediation and settlement with the parties. The architect settled for six figures, about one-tenth of the stated claim value. The owner also kicked in seven figures. The parties agreed to settle, ending what could have been a much costlier trip to court, where anything could have happened. There is no justice in settlement—only conclusion.

The lesson that the architect learned was this: People to whom you owe no legal "duty" can sue—and they may obtain something for their effort, even in claims lacking merit.

PART 4: CONTRACTS AND AGREEMENTS

The more that is known about a potential new client, the better equipped a firm will be to make a proper decision. Seeing the potential pitfalls and negotiating with these in mind helps avoid a bad client relationship. This information is often available in the community of architects or from the firm's insurance agent.

Condominium Projects

Condominium projects begin with a client, the developer. But the moment that the developer sells the first unit, there is a new client—an owner of the design product. With each unit sold, the architect acquires another new client—one whom they didn't select and have no relationship with, and who might have unreasonable expectations.

As a result, condo projects are notorious for claims. Professional liability insurance companies will charge substantial premiums for covering this project type.

Repeat Clients Are Like Gold

Surveys of architectural firms across America indicate that most current clients are repeat clients. The repeat client rate can vary between 60 and 85 percent, and for a few firms, be even higher. There are two messages in these data: (1) It's very hard to break in with a new client who has previously worked with another architect, and (2) clients and their designers, after they've worked together, generally like and trust each other. Respect is key to these relationships. Where there is respect and clear expectations, there is a reduction in claims.

Get the Right Builder

A good builder can make a project a big success. Likewise, a bad builder—one that causes delays, can't follow the plans, or charges extra for everything—can make a project into a financial disaster, and not just for the owner. When a builder fails to perform well, everyone pays in one way or another. To the extent that architects have a voice in the decision, they should help their client choose a builder that is well organized, understands and respects the architect's role, and appreciates the value of all of the relationships involved.

Impact of the Project Delivery Method

How the project is contracted for construction is known as the delivery method. Some of the most common alternatives are explained below, with an eye toward identifying risk.

Hard Bid

► Project Delivery Methods (9.1) provides an overview of the available models for project delivery.

Hard bid is the so-called traditional method, or design-bid-build method (DBB). Under this option, the architect (design team) completes the plans and specifications (construction documents) and puts them out to bid. Regardless of the many options for selecting bidders, the bottom-line goal of the bidder is to get low and win.

On the surface, the hard-bid scenario sounds like it should be the best approach for reducing claims. The design process is linear, flowing uninterrupted from schematics, through design development, and then finishing with construction documents—suggesting no impediment to completing and coordinating the documents before they are put out to bid. The true difficulty is that no set of documents is ever fully complete or perfectly coordinated. This fact plays right into the hand of a skilled estimator—one that is looking for any advantage it can find over the competition. In the bid situation, the goal is to get low—quality in construction is *not* a priority for those that plan to win. Missing information in the bid documents affords opportunity to achieve the low bid. The real payday comes later, *after* award, when the seed of missing information yields a harvest in change orders. Mounting change orders—uncontrolled project costs—puts undue strain on the owner-architect relationship.

Claims histories show that there are more claims by percentage of type of project delivery method on DBB projects than any of the other project delivery types.

▶ Bidding and Negotiation (10.8) discusses the processes involved in selecting a contractor.

Negotiated Contracts

Negotiated contracts are said to produce the best quality for the lowest price. In this option, the owner interviews and selects the builder independent of a bid process. Qualifications may include the cost of the builder's services, but more important drivers will be reputation for quality, on-time delivery, and effective cost management.

Negotiated contracts come in a variety of forms. The builder might take on a purely advisory role (construction manager, adviser) with all of the "subs" under separate contracts direct with the owner; or the builder may build the project with their own forces and subcontractors. The cost model may be in the form of reimbursement for all costs plus a fee, a fixed fee, or a guaranteed maximum price (GMP).

Regardless of the many combined options, negotiating a contract with a good, qualified builder is most apt to bring the best results, and produce the lowest risk to all involved.

Fast-Track

Fast-track construction involves phasing of design activities to overlap the construction process—construction commences in one phase before design is complete for the next. Under this option, a series of "bid packages" are organized and scheduled.

Throughout the fast-track process, the biggest (highest-cost) decisions are made first, the smallest (lowest-cost) decisions last. The risk in the process is that decisions are always made and implemented without complete information, and may later need to be changed at some expense. This risk is an outfall of the owner's decision to speed the construction process. The need for speed, over quality and first cost, is the owner's choice—and the owner ought to weigh the decision carefully. Architects should attempt to highlight this point in the contract. At minimum there should be a record of discussion with the client regarding the increased risk of change orders. Managing this risk is mostly about clarifying expectations in advance. AIA Document B103™–2007 contains good cautionary language for the fast-track method.

▶ For further discussion of these fast-growing project delivery methods, see Contractor-Led Design-Build (9.4); Architect-Led Design-Build (9.5); and the accompanying backgrounder, Architect-Led Design-Build and Architect as CM for Small Firms and Small Projects.

The Architect's Role in Construction Manager-Constructor Project Delivery (9.2), Integrated Project Delivery Overview (9.3), and Project Team Agreements (17.2) cover further dimensions of project delivery.

Other Project Delivery Methods

A number of other delivery methods are available, including contractor-led design-build (CLDB), architect-led design-build (ALDB), construction management (CM), and integrated project delivery (IPD). In each of these, the traditional roles of the architect, builder, and owner are modified to some degree, creating the potential for increased risk. In each case, understanding and clearly limiting the responsibilities of the architect, while maintaining insurability, is one way to keep the risk model from crumbling into disarray.

Public vs. Private Clients

There are many opportunities to compete for public design contracts. However, public contracts offer significant problems over private client relationships:

- Terms and conditions are often one-sided against the architect, with little or no room for negotiation.
- Profit margins are tight. The parties that fund the project have to answer to their taxpaying constituents.
- The press often has a field day with public projects, magnifying and misstating problems that leak out—sometimes without fact checking, and without understanding the construction or design trades.
- Public officials owe more to their constituents than they owe to the design team. This can make it hard to establish a normal designer-client relationship.
- Public officials come and go. After an election, an architect could be working for a person who previously opposed the project.

Any of these issues can increase risk on public projects. Understand the risks and figure out how best to manage them.

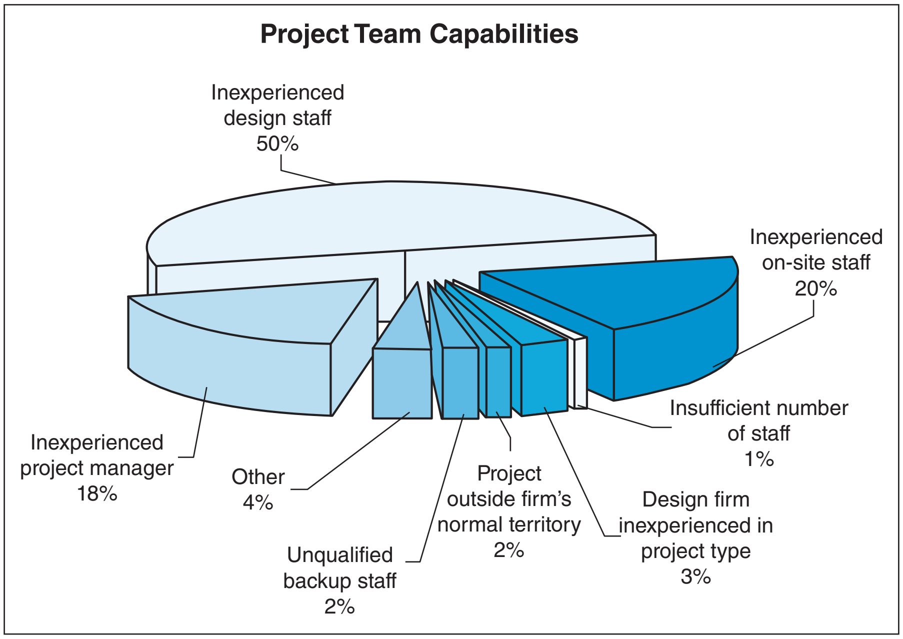
Establish a Reasonable Fee

▶ Services and Compensation (15.2) covers the variables when determining what to charge for services, methods of compensation, and strategies for getting paid.

Examine a client's expectations and degree of sophistication and take into account the real level of risk inherent in the project. Then formulate the processes needed to prevent anticipated problems. After quantifying these processes, determine the real cost of taking the commission. Add profit to that figure to establish a fee. If the client consents to that sum, then, and only then, will it be known that the project constitutes a manageable risk.

NO. 2: PROJECT TEAM CAPABILITIES

The second most frequent source of claims comes from the risk category known as project team capabilities. (See Figure 16.4.) Dominating this category are claims arising from the use of inexperienced staff. Coming in a close second and third are similar issues—inexperienced staff on site, and an inexperienced PM. To proactively help avoid



Risk Drivers data provided by The Design Professional unit of XL Group

FIGURE 16.4 Chart Depicting Project Team Capability Claims by Type

these kinds of claims, hire or train qualified staff and, as much as possible, have the most qualified people working on each project and each phase of the project. This includes a thoughtful division of labor, taking advantage of the lower billing rates of less-experienced staff for tasks that are appropriate to their skill level. A successful work plan requires enough senior level experience to balance the inexperience of youth. Managing this risk, while turning a profit, requires finding the right mixture of less-experienced interns and experienced architects.

Use of Technology

In the "old days," when drawings were prepared by hand, the plans were almost always drawn by the most senior staff. The plans required more depth of experience; more things had to be known to draw them properly—the program, the structural grid, the clearances for a toilet, what the walls are made of (how thick), the code, what's going on overhead, how to label, how to dimension. The details, on the other hand, were far more one-dimensional. With a small amount of coaching, and reference to prior projects' working drawings as examples, an intern could in short order be equipped to become productive at drawing the details. Thus interns began their drawing careers with exciting tasks like door schedules and toilet room details.

In the current day, drawings are prepared entirely on the computer—increasingly in 3D. The older experts are often less computer-savvy, becoming hands-off. The new generation, however, uses the computer with great familiarity, but lacks expertise in design and construction—they don't know what to draw. Neither can operate effectively entirely on their own. This can create a significant risk. Both generations need the skill that the other possesses.

Below is a series of ways to manage the multigenerational approach:

- Train senior level staff to draw again—on the computer, to become hands-on in the building information model being created in the computer. There are things in the model that cannot be seen on a print. Senior staff need to be able to see them.
- Train junior level staff to know what they should draw, and why.
- Manage the generational differences. Break down barriers between old and young so they can communicate effectively, respecting the different but needed value each brings to the team.
- Foster mentoring. Senior staff possesses a wealth of experience to share with the next generation. Some will share, but only if asked. Effective mentoring happens when mentor and mentee both see the value. Both must be motivated to make it happen.
- Hire and maintain a good mixture of staff at the various levels.

Firms should invest in training staff of all ages in the proper use of technology.

▶ Professional Development and Mentoring (8.4) discusses the training, mentoring, and appraisal programs that can support a firm's strategic plan.

Staff Continuity on Projects

People come and go for a variety of reasons. Whatever the cause, their departure creates a void in the knowledge base of the project team—the perfect opportunity for unresolved issues to fall through the cracks. Take these steps whenever someone leaves:

- Obtain a written "to do" list from the person leaving, documenting unfinished items and design decisions yet to be made.
- Get commitments from remaining team members to pick up and close out the loose ends that result with the departure.
- When appropriate, bring in the right replacement. If the position vacated was senior, the client may want to interview or review qualifications of the replacement; obtaining client approval might even be a contractual obligation. Regardless, make the client aware in a timely fashion of the change. Demonstrate intent to fulfill contractual commitments.

Office Standards

Standards exist for good reasons. They portray the signature of a firm, its image, its attitude. They establish a quick solution to a problem, avoid reinventing the wheel, and save money in the process. They also exist as a repository of firm knowledge, a reference in how to avoid failures in quality. Standards are indeed great, but only when they are used.

Firms can now host their quality plans online—available for reference by every employee as their home page. These online documents set forth the firm's policies and procedures for how to do almost everything—providing instant access to checklists, templates, and forms. They can provide handy links to resources, such as online building codes, industry standards, an electronic library of past project drawings and specifications, image databases used for marketing, case studies, white papers, and lessons learned. Company intranets and online quality plans have become essential tools for today's architecture firms. These require significant investment of time and money, both to develop and then to maintain. But this investment is returned many times over by improving quality and reducing risk.

▶ Origins and Development of Quality Management (12.1) discusses quality management as a system that supports and improves a firm's performance.

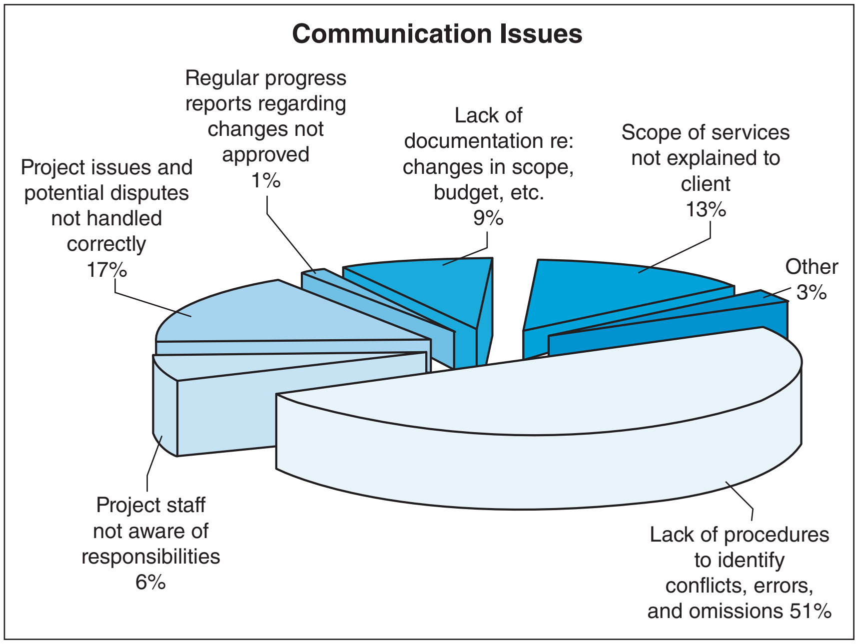
NO. 1: COMMUNICATION

The most frequently cited cause of claims is poor communication. (See Figure 16.5.) More than half of communication complaints arise out of a lack of procedures to identify conflicts, errors, and omissions. Secondarily prevalent are the problems that happen when people don't follow procedures that are in place. For the project to proceed without problems, people must communicate effectively.

Peer Reviews: Quality Assurance/Quality Control (QA/QC)

One sure way to prevent mistakes is to check the work—the benefit best characterized in the carpenters' saying, "measure twice, cut once."

On any given project there are hundreds, even thousands of decisions that have to be communicated. Any decisions not made by the design team will be made by



Risk Drivers data provided by The Design Professional unit of XL Group

FIGURE 16.5 Chart Depicting Communication Claims by Type

someone else, and the architect may not like that decision or its impact on the project. This situation is less likely when a system is employed for managing or controlling quality.

Here are several practical ways to manage quality:

- Self-checking: Each team member must be responsible for the quality of their own work. They know their piece of the project better than anyone else. They can use checklists from the company standards, or a list developed by their immediate supervisor. Either way, expectations and communications need to be clear.
- In-house third-party review: A "fresh set of eyes"—experienced eyes—can be a big help. Third-party reviews ought to occur at the conclusion of every major project phase, *before* deliverables are issued. Project leaders should see written proof that the reviews have occurred before they issue the documents.
- Peer reviews: Some jurisdictions require independent, outside consultant "peer" reviews before they will issue a building permit—at least for some critical portions of the work. For projects with which a firm does not possess significant prior experience, or when working with a new consultant, it might be prudent to have a peer review. Some institutional clients may even require it. Small firms can greatly benefit from a peer review.
- Building information models: BIM can take advantage of electronic checking, employing clash-detection software. These software add-ons produce reports that still have to be reviewed by humans to determine which clashes are real and which are incidental. Nonetheless, the thoroughness of the reports is a remarkable benefit.

Remember the simple goal of checking: to identify and correct a mistake before it becomes too expensive to fix. Checking, regardless of which tool or method is employed, helps members of a project team learn to communicate better—to provide better design.

▶ For more information on peer reviews, see Construction Drawings (10.6).

Know the Contract

Nothing is as disappointing as a failure to meet expectations. Clients readily become dissatisfied because the architect didn't do things the way they had expected. Likewise, many project leaders become dissatisfied because the members of the team didn't complete tasks as they expected. Why does this happen? Bad communication.

One simple way to address this concern is to review the services agreement—the written expectations—with everyone. Sit down with the client and go over the scope of work. Show examples of the deliverables that will be produced. Listen to the client. Their preferences might alter the standard approach.

Likewise, review the agreement with the team at the beginning of the project. At appropriate times, pull out a copy of the agreement to confirm the written rules—expectations—for key deliverables.

It is always better to discuss matters and review a change of strategy or approach in advance. The alternative, which is to make assumptions, often results in disappointment.

Conduct Proper Meetings

Meetings should never happen just because they're on the calendar. Meetings should be organized to complete a set of distinct decisions along the road to finishing the project. Each meeting deserves attention to the advanced development of an agenda, planning who should be there, and the topic of necessary decisions.

The written outcome of meetings is the minutes. Minutes need not be lengthy. They just need to record date and location, attendees, a summary of each item discussed, decisions made, and identification of action items, assigning who is responsible for each. The key in this record is decisions.

The architect is often the one responsible for preparing and issuing minutes during the design phase. Once construction commences, this responsibility often shifts to the builder. Regardless of formal responsibility, it is essential that the architect take written notes of some form at *every* meeting. Minutes issued by other parties should be reviewed promptly. If there is any disagreement, write and send a record of comments or corrections right away.

In the ebb and flow of the project, often spanning several years, the minutes represent a key record of who said what, what they knew, and when they knew it—documenting the involvement of people no longer around or available for comment. These become the means to affirm prior decisions, dissolve disagreements, or to resolve claims.

Document Control

▶ The backgrounder on Project Documentation (5.1) discusses one of the most essential elements of communication in the construction industry.

Every paper document issued by the architect needs several points of identifying information: the author, who it is being issued to, the date issued, and, in the case of contract documents, a reference number. Documents that are revised and reissued, such as drawings, need a revision date. Last, copies of each document issued must be saved in the project record.

In resolving disputes, the resolution hinges on who knew what and when they knew it. For example, change orders arise over information added or subtracted from the contract documents. Reference to copies of the documents of the two dates in question, before and after the change, will support or disprove the claim.

Practice throughout the entire construction industry is moving toward a paperless exchange of information. E-mail is used to transmit documents of modest size. The courts now accept electronic records as a means of storing data for use in litigation. The benefit of this decision saves significant money on printing and delivery. In addition, re-access to the data is improved, since many document storage systems are databases that can be electronically searched.

▶ Information Management and Services (5.12) further covers today's robust information management practices and technology-based information services.

Regardless of the system in place, access to important project records must be preserved long after the project has been completed—until the statute of limitations or repose (if any) precludes litigation. If project records are saved remotely during the life of the project, obtain a copy for safekeeping. If appropriate, convert the files into an electronic format that will still be recoverable by computer systems toward the end of the potential litigation period—some 6, 10, or 15 years from now.

Warning Signs of a Claim

▶ Dispute Management and Resolution (16.4) covers strategic and effective use of mediation, arbitration, and litigation.

When someone has made a mistake, the human tendency is to hide. This is true in all relationships, including that between architect and client. Sooner or later mistakes will come out. Though difficult, it's always better to face one's own mistakes head-on—to tell the client about a problem before they hear about it from someone else. That, at least, gives the architect some measure of control.

See It First

Many claims begin with the architect being among the first to know of a problem. If they aren't among the first, it's likely because they're not listening or paying attention to what is going on.

The discovery of an error often begins with denial. After this comes the realization that the problem needs to be fixed.

Start with fact checking. Speak to the people involved with the situation; find out everything about it. Check out the timing on the issue; who knew or did what, and when. At the same time, formulate what has to change to resolve the matter. Is a change really needed? A partial change? What are the options? What is the cost? How would the schedule be impacted?

Any serious mistake can damage the relationship with the client. If a claim could erupt, call in outside legal and insurance counsels for advice. Don't wait for the claim letter from the client's attorney. After the problem and its implications are understood, and good advice received from insurance providers or legal counsel, the next step is to tell the client.

How to Preserve the Client Relationship

It is important to be open with clients. At the same time, this is a business relationship, based on a contract. If the architect *believes* they are at fault, they should resist the first tendency to admit fault. First seek the advice of outside counsel, before taking responsibility for a repair.

On examination, the facts could well prove the architect caused the problem. But that doesn't necessarily mean the architect has a legal obligation to fix it. Remember the standard of care. There may also be contractual or legal bases for excusing compliance with the standard of care (e.g., a force majeure clause). The law does not require the architect to be perfect, and hopefully the contract does not require perfection either. Do not offer to remedy the situation without approval from the insurer. Professional liability insurance policies exclude from coverage situations in which they are not involved in authorizing a settlement.

CONCLUSION

The practice of architecture involves risk—risk that has the potential to strike directly at the ability of the professional to remain in business. Much risk can be avoided or transferred by simply being savvy, making good contracts, and getting good advice, then following through on it. The balance of the risk stems from being human, being fallible—architects do make mistakes. Architects need to manage this risk.

Errors and omissions are never planned, and many could have been avoided. Reducing human error requires nothing less than hard work, a commitment to excellence, and getting serious about improving the process by which services are rendered. A firm that is disinterested in risk management "processes" may feel invincible, but it is wise to beware. When risk isn't being carefully watched, claims will rear their ugly heads.

BACKGROUNDER

RISK IN DESIGN

Mary Johnston, FAIA, and Ray Johnston, AIA

Although it is difficult for architects to take creative risks, their embracing of innovation and experimentation can provide answers to design challenges. Strategies for calculated risk-taking involve developing fresh attitudes toward program, materials, and collaboration and can allow architects to make bold design moves while solving practical problems.

Mary Johnston and Ray Johnston, AIA, founded Johnston Architects in 1991. For over 20 years they have designed projects that have received local and national recognition. Mary and Ray Johnston hold master's degrees in architecture from the University of Washington College of Built Environments and continue their association with the college as frequent studio reviewers.

It is difficult for architects to take creative risks. The execution of the work is ever more complex, and the consequences of failure, whether material or functional or aesthetic, are severe. The added responsibility of not only using dwindling resources wisely but reversing degradation and depletion of the environment causes anxiety. But the embrace of risk and an experimental, even rebellious way of thinking about design can help resolve rather than inflame

(continued)

that anxiety. To take risks is to be optimistic, and optimism in design is exactly what is required in this era of doubt and instability.

NO RISK MEANS STANDING STILL

The forces working against risk-taking are both internal and external. The internal fears that designers have include the suspicion that risk and pragmatism are antithetical. Architects struggle between the desire to surprise and provoke and the desire to provide serviceable buildings. It takes a conceptual leap and some courage to believe that something untested and innovative can also be practical. Also, there is comfort in the known and it is tempting to think that what worked last time will surely work again.

These internal apprehensions join with external forces of orthodoxy and constraint operating outside of the design process. With rare exceptions, clients prefer predictability. Programs can be strict and inflexible, and the shadow cast by a tight budget is long. Codes, regulations, and design guidelines encourage the status quo, and LEED checklists reward even the most mundane structures. Restraints, both self-imposed and imposed from the outside, are hard to resist, but if architects pay for taking risks, the penalty for standing still can be even greater.

STRATEGIC RISK-TAKING

It is clear that standing still is not an option, and that we cannot afford what Charles Moore, in his 1990 essay "Triple Threat Heritage," calls the "luxury of fixity." Moore says, "What our new architecture can't do is allow itself that luxury of immobility. It has always to be ready to move, to change, to be different from what it has been before."

Although Moore was writing almost 20 years before Steven Holl, in Holl's book *Urbanisms: Working with Doubt* he channels the same vision of design as a dynamic system. Holl writes, "Instead of simple and clear programs we engage contingent and diverse programs. Instead of precision and perfection we work with intermittent, crossbred systems, and combined methods." In other words, working with doubt is normal.

The ideas of complexity and forward motion suggest some strategies for calculated risk-taking in design. One tactic is to turn oppositions into collaborations. Pragmatism becomes the ally of innovation when logic guides the search for solutions. It is brave to cast off assumptions and mine the logic of a problem, especially when the new logic seems to defy conventional logic. If architects don't work with simple and clear programs, as Holl says, how can they use "contingent and diverse programs" to produce thrilling new places? The Seattle Public Library designed by Rem Koolhaas and his firm OMA is an example of the application of fresh logic on a seemingly strict program. Koolhaas analyzed the trends in library circulation, the demographics of the city, and the bones of the Dewey decimal system to turn the traditional library program inside out. The result is an entirely new way of experiencing a library, and yet the design grew out of that exploration of data. The "architecture" is the consequence of the logic train.

Another technique for subverting expectations is allowing and encouraging the transformation and manipulation of space by the user over time. Letting architecture be less of a spectator sport can produce spaces that delight and surprise. Although it takes some trust to design a building that can be easily altered by its users in practical as well as playful ways, the risk is offset by the likelihood that such spaces will be well-loved and cared for.

The inventive and unexpected use of materials is part of the risk-takers toolbox as well. At the beginning of his career Frank Gehry used cheap and commonplace materials like chain-link fencing in unconventional applications to define and enliven his buildings. Samuel Mockbee and his students at the Rural Studio, out in front of the trend toward using recycled and repurposed materials, scavenged carpet tiles to make walls and old car windshields to make a surprisingly ethereal church roof.

A last strategy for creative and calculated risk-taking is collaboration. Great architecture comes out of an open process that encourages an exchange of ideas that build on one another. It is a traditional and organic way of practicing and is sometimes overlooked as the powerful innovative tool that it is.

THE NEXT GENERATION OF RISK-TAKERS

A common complaint among instructors in design schools is that most students are risk averse. They produce with derivative solutions for fear of ridicule or having a portfolio that will be frowned on by prospective employers. But if students cannot learn to be bold in school, they surely will not be bold in the real working world. It is up to instructors and practitioners who mentor and critique student work to encourage and reward original and even defiant thinking. This is where innovations will come from and this is how architecture will be not just relevant but essential. Students themselves can use all of the strategies mentioned in the studio context to strike out in new directions: logically critiquing the idea of program, loosening the hinges of design and opening schemes up to manipulation and unpredictable outcomes, rethinking materials, and working collaboratively with other designers.

MOVING FORWARD

If "working with doubt" is, as Steven Holl says, a given, then architects can learn to use doubt. To doubt that convention is the correct choice, to doubt that there are no new solutions, to doubt that asking different questions will not yield new answers is risky, but it is risk in the service of optimism. If in all other aspects of the profession architects must manage and suppress risk, then it is in design that they can embrace it.

16.2 Insurance Coverage for Business and Professional Liability

Ann Casso and Fredric Schultz, CPCU, ARM

There are many risks that can jeopardize the future of one's practice, one's firm, and one's own financial well-being. This article is intended to familiarize the architect with terminology and the necessary considerations and alternatives when selecting business and professional liability insurance for one's firm.

RISKS FOR ARCHITECTS

Architects face a wide range of risks every day. They must protect their firms against litigation alleging negligence, protect their offices against theft or destruction of property, protect against personal risks ranging from health and disability to life and retirement—and share similar concerns regarding their own employees. Newer and perhaps lesser-known but nonetheless virulent risks also exist—such as those inherent in unproven sustainable products and design, the changing standard of care, hidden electronic "metadata" in our offices, contracts that imply a fiduciary duty, and others.

What are all of these risks that can jeopardize the future of one's practice, one's firm, and one's own financial well-being? And once aware of possible risks, what actions should one take? What are the major considerations—including the cost of mitigating those risks—or the cost of ignoring them?

For architects, one of the most devastating professional and business risks is from litigation alleging negligence in performing professional services. These alleged negligent acts, errors, or omissions may cause damage to owners, contractors, or other third parties, and the architect's firm may be found liable for these damages.

There are also a growing number of newer and lesser-known risks, inherent in the growth of technology and sustainability. With new innovative products, processes, and performance expectations in projects where there are no precedents, the standard of care must now also be defined anew. Because architects contract directly with owners, an architect may be exposed to the risk of a suit for breach of fiduciary duty. There are also important issues now raised by electronic data—including the requirements of the rules of discovery and what must be produced in the event of litigation. In addition, the existence of metadata or hidden data in documents can divulge information detrimental to one's firm. There are new liabilities associated with the protection of client confidential data and information as well.

Architects must also protect their own property, including their offices, intellectual property, and technology. The risks range from fire and theft, to a disaster forcing business interruption, to an accident injuring employees or clients, to an employee suing for harassment. Architects must protect themselves personally as well, looking after their own health and welfare, including that of their families. This includes the immediate considerations of health and dental insurance, ongoing concerns for disability and life insurance, and long-term considerations such as retirement planning and long-term care insurance.

When you stare into the abyss, the abyss stares back at you.

—Friedrich Nietzsche

▶ Risk Management Strategies (16.1) discusses how to know one's risks and how to manage them.

Modern-day design professionals are constantly expected to find new ways of building projects better, faster, cheaper, and greener, while at the same time they are too often viewed as professionally and financially responsible if those new methodologies and materials do not succeed to the full extent of their hoped-for results.

David A. Ericksen, Esq., Severson & Werson, "A Sustainable Standard Of Care?" (AIA Trust white paper, 2011)

▶ Risks and Emerging Practices (16.3) covers the risks entailed in sustainable design, building information modeling, and integrated project delivery.

Ann Casso, executive director of the AIA Trust since 2001, has 30 years of experience managing marketing and member services, including member insurance programs at several national associations.

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As an employer, a firm owner must share similar concerns for employees in order to ensure a healthy, productive, and dependable workforce. These concerns extend to legal requirements regarding national health care legislation requirements, worker's compensation requirements, and liability regarding employee bonding and employment practices. In addition, any benefit provided to employees must conform to mandated regulations such as required filings for retirement programs.

Insurance is one means to manage risks by transferring them to an insurance company. Other methods of managing risks include transferring risk by contract and avoiding the risk entirely if it is judged potentially too costly. As a firm owner and licensed professional, an architect obtains insurance coverage for professional liability, property loss, business income loss, liability arising from use of automobiles, and exposures arising from personal risks. As a firm grows, it is useful for the well-being and longevity of the firm to consider staff benefits, which impact staff recruitment and retention, such as various insurance and retirement plans.

Take calculated risks. That is quite different from being rash.

—General George Patton

TERMINOLOGY: WHAT DOES ALL THIS MEAN?

It is important to understand the terminology in professional liability insurance—what each element means and how it will affect an insurance policy and a firm.

Admitted or licensed. An admitted carrier is an insurance company licensed and authorized to do business in a specific state and subject to regulation by the state insurance commissioner. Non-admitted carriers are not subjected to such scrutiny nor included in coverage by the state guarantee fund. Many states require brokers to seek coverage from admitted carriers first, placing coverage in an excess and surplus (E&S) market only when admitted carrier coverage is not available for the specific firm. Some states even require brokers to warn the insured person or firm that they are placing their coverage with a non-admitted carrier by stamping the policy to that effect.

Claim is a demand for money, services, or property based upon a right usually found in contract or by operation of law. The claim expense is the cost associated with the handling of a claim, such as defense-attorney fees, investigation costs, and expert witnesses. There are policy triggers to report a claim, such as when one receives a demand for money or services with an allegation of a wrongful act. Importantly, the threat of an action or any troubling circumstance requires alerting the insurance company to a potential problem that may not necessarily become a formal claim—and failure to report a claim in a timely manner may jeopardize coverage.

Claims-made policies for professional liability insurance mean that the date the claim is finally made is the triggering event for coverage.

One of the unique aspects of professional liability insurance for architects is that the coverage trigger differs from most liability insurance. For example, with general liability or automobile liability coverage, if there is an occurrence such as an auto accident that results in a claim made in the future, the coverage trigger is the date that the "occurrence" or "accident" takes place. In other words, if the date of the accident is January 1, 2013, and a lawsuit is brought July 1, 2015, it is the policy in force on January 1, 2013, that will defend and pay any subsequent judgments. In some cases, depending on the statute of limitations in different states, the claim may be made several years after the date of the occurrence.

With claims-made coverage, in the above example, the "claims-made" date that triggers the coverage will be July 1, 2015. In the above case with professional liability insurance, the date that the claim is finally made is the triggering event. Therefore, if there was an event that an architect was unaware of prior to the firm's current claims-made professional liability policy period, it is critical that the architect continue to maintain professional liability coverage with no restriction as to a "retroactive date." A fairly typical definition of a retroactive date is the date on or after which any alleged or actual act, error, or omission must have first commenced in order to be considered for coverage under the policy. A declarations page of a professional policy might indicate "full prior acts," in which case there is effectively no retroactive date and thus no restriction as to the date of the alleged or actual act, error, or omission.

Claims-made insurance requires that the claim be made while the insurance policy is in force for coverage to apply. A claims-made policy without retroactive coverage does not cover claims arising out of services performed prior to a date stated in the policy that defines when the coverage commences.

Deductible is a provision requiring the insured to pay a specified portion of the loss on each claim; this amount could be as low as $1,000. Increase the deductible to lower the premium cost. It is important to consider the balance between deductible, premium, and coverage. There will be a new deductible obligation with each claim.

Endorsements and exclusions modify coverage. An endorsement is a written amendment or rider affecting the declarations, insuring agreements, exclusions, or conditions of an insurance policy, and records a change to the insurance contract. An exclusion specifically eliminates coverage for a certain hazard from an insurance policy.

Hold harmless, synonymous with "indemnify," is a contract provision whereby one party assumes another's legal liability, a legally acceptable practice as long as the contractual transfer of liabilities is not against public policy and can be covered by insurance or available assets. Refer to AIA Document A201™–2007, General Conditions of the Contract for Construction.

Look for hold-harmless provisions before signing any contract for professional services. If the promise is a contractual obligation, the promise may not be covered by insurance. Note that a hold-harmless provision could be of limited form, where a party reaffirms responsibility for its own negligent acts, thus protecting another party from vicarious liability; an intermediate form, where a party reaffirms its responsibility and agrees to share responsibility for joint and concurrent negligence of both parties; or a broad form, where a party assumes responsibility for all liability, including that arising out of the sole negligence of the other party.

▶ See Construction Contracts (17.4) and Owner-Generated Agreements (17.1) for related information.

Indemnification is essentially a hold-harmless provision, an agreement by one party to pay certain specified losses or damages incurred by another party.

Licensed carriers are those insurers admitted or licensed to write insurance business in a particular state. Each insurer must apply to be licensed in each state, and each state has certain minimum financial requirements for each carrier. There is regulation by each state as respects policy forms and rates charged. Also, if a licensed or admitted carrier becomes insolvent, there are generally insolvency or "guarantee" funds that agree to replace the insurer and pay claims on behalf of those insured in that state. Each state has different limits of liability and coverage which are included in such guarantee funds. See the definition of "Admitted," above.

Prior acts is an insurance provision to consider when changing carriers or buying coverage for the first time. Firms can buy coverage for professional acts and services that took place *before* they first became insured or when they were insured by another carrier. The scope and availability of prior-acts coverage varies from insurer to insurer. Often prior-acts coverage is available to eligible firms after they have been covered by a carrier for some specified amount of time.

Surplus lines refer to insurers that are not licensed in a particular state but are non-admitted or excess and surplus lines insurers. Policies are written by surplus lines insurers because licensed or admitted insurers will not provide the needed coverage. Licensed carriers may not want to write the coverage because the coverage line presents catastrophic loss exposures, unique risks, or professional liability risk, similar to architects and engineers professional liability. As a surplus lines insurer, there is little regulation relating to pricing or policy forms. Most A&E professional liability coverage is written by this market.

Tail insurance addresses the question of protection upon retirement or withdrawal from practice. Some programs offer professional liability coverage to continue the protection needed by architects who withdraw from active practice. Typically, an architect who retires may purchase an extension to a firm's policy to be covered for all prior acts, even if claims are made in the future. Usually this "tail" coverage is arranged by endorsing the basic policy. In most cases, the coverage is available to architects who have been insured for a minimum number of consecutive years with their insurer prior to retirement; the policy then covers the retired architect for prior acts. Some states require admitted carriers to provide some level of tail coverage at an extra cost to the insured. Coverage is similarly available to protect the estates of deceased architects if this is warranted.

PROFESSIONAL LIABILITY INSURANCE

A professional liability insurance policy (sometimes called errors and omissions, or E&O, insurance) agrees to defend and pay on behalf of the architect for claims alleging an error or negligence in the performance of professional duties, in exchange for the premiums paid to the insurance company. Some firms decide not to purchase professional liability insurance, a business decision usually based on the cost of the coverage that could ultimately put the firm and its architects in jeopardy. However, it is important to note that even with professional liability coverage a firm continues to retain some risk, such as expenses within their deductible, costs exceeding their policy limits, or costs for claims that are excluded from the scope of coverage.

There are many reasons why an architect should consider the purchase of professional liability insurance:

1. *Business survival.* Defense costs alone plus potential damages can easily bankrupt an architecture firm due to the liability loss potential.
2. *Continuing operations.* If an architect is involved in a professional liability suit, professional liability coverage provides the financial resources to defend such a claim while preserving the firm's reputation and maintaining cash flow in order to remain in business. The firm should also have earnings stability to continue working during suit proceedings.
3. *Contract requirements.* Many projects include a requirement for professional liability insurance subject to a certain predetermined limit. Certain projects require separate project professional liability insurance for the project work alone, independent of any other work done by the architect.
4. *Social responsibility.* A properly designed professional liability policy can protect the architect, the architect's employees, customers, and others against losses and provide an avenue of resources for those entities that are harmed.

Basic Considerations

There are a number of considerations when selecting professional liability insurance for a firm. The coverage limits, deductibles, and cost of the insurance are the most obvious, but also important are the endorsement options, exclusions, and the core policies themselves. The first step in assessing professional liability insurance needs and selecting coverage is to consider a firm's exposures.

A broker can help firm owners evaluate the basic policy forms and endorsements and how suitable they are to their practice. It may be prudent to conduct a cost-benefit analysis for the extra expense of add-ons such as increased limits or lowered deductibles. The stability of the insurance carrier is paramount—think about a low-cost insurer like a low-bid contractor. The carrier's size, rating, and years in the AE business are all valid criteria when assessing the stability of an insurance provider.

TOP CONSIDERATIONS WHEN SELECTING AN INSURANCE CARRIER

In an AIA Trust survey, architects were asked what every firm should use as its top consideration when selecting professional liability insurance coverage for the firm:

1. The carrier's reputation in facilitating and reaching fair settlements
2. Understanding all of the various coverage options and choosing based on the architect's priorities
3. Claims service of the insurance carrier
4. Specific knowledge of the AE professions
5. Experience
6. Strong Best's rating
7. Outstanding customer service

It is paramount to review the claims support services offered—this is when firm leaders really need their insurer to be great. A professional liability carrier may be best defined by its claims handling process and by whether they have specialized expertise, with a claims manager who is familiar with architectural practice along with defense counsel who have the knowledge, interest, and sensitivity needed to be effective.

Other information a broker can provide include whether an insurer has excellent claims and customer service specifically relating to contract review and pre-claims defense assistance. Additional support services such as educational and risk management assistance programs, contract review, and first dollar defense (a coverage option offered by insurance carriers that allows the design professional to have the deductible payment apply only to damages) all contribute to a valued insurance carrier.

Who Are These Insurers?

While a broker will be able to provide bids from various insurers, it is good practice to also evaluate all the potential insurance carriers available. There are more than 50 professional liability insurers providing coverage to architects throughout the United States. How does an architect know which one to approach and which is the best carrier to use for their firm? A simple way to do this is to consult the AIA Trust Database of Professional Liability Insurers, which lists the top 30+ insurers in the AE marketplace. The database provides the basic facts about each insurer to serve as background information for the architect to develop important discussion points with a broker. The database includes information ranging from financial size category and A.M. Best rating, to the states and countries where coverage can be obtained, to specific benefits and coverage offered. Importantly, the architect can see what kinds of practice restrictions there may be on coverage and other limits.

In addition, the AIA participates in an Annual Professional Liability Insurance Survey with the National Society of Professional Engineers (NSPE) and the American Council of Engineering Companies (ACEC), the results of which are also posted on the AIA Trust website. While the annual survey attempts to secure as much information as possible, carriers are reluctant to disclose anything considered proprietary. While that survey provides some interesting information and comparisons between the carriers, only about 15 carriers respond on an annual basis.

Another approach is to work with an independent insurance consultant who does not sell insurance but can offer professional advice to guide a firm. These consultants help clients manage risk in a cost-effective manner, including tasks such as broker selection, insurance audits, risk identification, claims management, and the development of loss control programs; they may also be able to improve a firm's coverage. The Society of Risk Management Consultants (SRMC) serves as a referral source for those who need a risk management, insurance, or employee benefits consultant, including generalists and those uniquely credentialed in specific industries.

In a recent survey commissioned by the AIA Trust, the Trust asked architects their top considerations in purchasing professional liability insurance. The top three considerations are premium price, relationship with local brokers, and excellent claims service, with premium price being the most important motivation for a change. It is clear that architects rely heavily on their insurance broker in the selection of a professional liability insurer. Therefore, a critical step in choosing the best insurer for professional liability exposure is in the selection of the broker to access the marketplace.

KEY ADVICE FOR SELECTING PROFESSIONAL LIABILITY INSURANCE

1. Get as many quotes as possible.
2. Research the broker with the best reputation in the area.
3. Research an insurance carrier's claim service and longevity in the market.
4. Ask other firms for their recommendation and experiences with brokers and companies.
5. Look for a history of long-term relationships with the broker.
6. Select knowledge, service, and track record over price.
7. Work with a broker in whom you have confidence, and interview current clients of the carrier that you consider using.
8. Consult professional literature and insurer surveys that benchmark policies and carriers before making a decision.

AIATrust Broker Survey, March 2012

A CASE STUDY: PROFESSIONAL LIABILITY

An architect was retained to provide architectural and engineering services for a sports facility in a northern state. The prime architect then retained a local architect and structural engineer. The design team provided a performance specification for a standing seam metal roof.

About three years after substantial completion, a section of the dome blew off during a windstorm. The roof was repaired for $250,000. The sports dome's property insurer paid for the repairs and two years later filed suit against the prime architect. The city filed their own lawsuit, claiming $5,000 in damages, which was the amount of their deductible, and other unspecified damages. Both suits alleged negligence, breach of contract, and breach of warranty.

Shortly after the claims were filed, and while warranty work was being performed on the dome, it was determined that there were structural problems with the standing seam roof. In addition, the city identified problems with the parapet walls, the placement of the vapor barrier below the roof, and the attachment of the standing seam metal roof. The city also raised concerns about snow accumulation and resulting avalanches. The city subsequently increased the amount of their lawsuit to $8 million. The contractors and the roof manufacturer were added as codefendants.

The city later decided that they would pursue a complete replacement of the roof structure and installation of snow fences, ground-level roofs, and landscaping to address avalanching, and recover their out-of-pocket expenses of $1.7 million, and made their total claim for $6.7 million.

The design team argued that as much as $2.5 million of the city's replacement costs amounted to betterments or improvements. The design team also raised some legal defenses such as the contractual statute of limitations in AIA Document B141, Standard Form of Agreement Between Owner and Architect. Using standard form agreements such as those developed by The American Institute of Architects (AIA) and the Engineers Joint Contract Documents Committee (EJCDC) may help reduce risks.

After negotiation, the design team settled the city's claim for $2.4 million. Legal fees, experts' expenses, and the policyholder's deductible added $1,270,000 to the cost, bringing the total cost for the claim to $2,670,000. The case and settlement was covered and paid by the firm's professional liability insurance carrier, less the firm's deductible.

Large public-use centers can result in severe claims. Clearly, there should be some reevaluation of the design team's risk management practices. Whether they adequately assessed their risks prior to taking on this project, had sufficient experience with this project type, gave adequate consideration to the geographic and weather considerations that might increase risks; and whether it was the right or appropriate design, performance specifications, and materials for such a structure, all should have been thoroughly considered. In the end, implementing good risk management practices, while ensuring adequate professional liability coverage and an appropriate deductible, will protect the firm.

Choosing a Broker

A broker should represent the interests of the insured. An agent represents the insurance company. Some brokers may also be agents for different insurers. It is important that the architect knows the difference and which role an agent or broker is fulfilling when speaking with them. As a practical matter, most insurance placements for professional liability for architects are made with a broker as the intermediary—not an agent. Since the broker represents the architect, they cannot speak for the insurer. Note that if a broker says a policy is bound, the broker must secure evidence of that from the insurer since the broker is not in a position to speak for the insurance company.

When considering which broker or brokers to use, the architect needs to carefully scrutinize their qualifications, services offered, cost, chemistry, and commitment. An architect needs to ask every broker under consideration about which carriers they use, their relationship with each carrier, and the total premium volume that they handle with each carrier. An important question is whether architects should use one broker or several brokers to approach the insurers on their behalf. The brokers would prefer that only one is selected and then allow that broker to access the available markets. However, that overlooks the special relationships some brokers have with certain insurers, as well as the fact that brokers do not have relationships with every potential insurer. How does each broker then differentiate themselves among several brokers who are interested in proposing on a firm's professional liability policy?

Once discussions have taken place with two or three brokers, review with them the list of questions below, and compare each broker's list of carriers for overlaps and conflicts. Where there are conflicts, it is important to know the relative relationship each broker has with a carrier to determine which broker should be assigned that market. An architect can and should control which insurance companies are used by competing brokers for the professional liability quotes. An architect can assign insurance markets to the insurance brokers by issuing a broker of record letter telling an insurance company which broker can approach the insurer for a quote. This process guarantees that brokers do not block competing insurers and ensures competition for the architect's business. It is critical in this process that the architect control which broker is assigned to which markets in order to receive the best possible offers. It is also possible that, based upon a firm's risk profile, only one broker should approach the marketplace on its behalf. That can be determined by a review of the brokers' responses to the questions below and by knowing which markets they wish to approach.

The AIA Trust recently prepared a broker survey with several questions about marketing professional liability insurance. The broker respondents recommended that an architect ask the following questions of a prospective broker in order to determine the broker's ability to secure the best product:

- Does your company specialize in professional liability for architects and engineers?
- What services does your agency provide other than the procurement of insurance?
- What architects do you represent that are similar in stature and practice to my firm?
- Which insurance companies do you have access to, and which do you use regularly?
- How many other architectural and engineering clients do you represent (give references)?
- What is your approach to marketing professional liability insurance for our firm?
- How much architects and engineers professional liability premium volume do you place with various insurers?

FINDING A QUALIFIED BROKER

There are specialty insurance broker networks that include as members only those brokers with architect and engineer professional liability expertise. Two of the most well-known and respected networks are A/E Pronet and PLAN. Certain professional liability insurers and/or managing general agents that act as underwriters also have expert agent and broker networks. Victor O. Schinnerer & Company, Inc. (VOSCO) underwrites for CNA (the AIA Trust-sponsored program) and can recommend brokers in all areas of the country that have the necessary expertise. VOSCO calls them A/E Choice Brokers. XLDP, a large architect professional liability insurer, only assigns one broker in each state to market their products.

IMPORTANT TIPS TO REMEMBER

- The policy form, claims services, pricing, and length of time writing AE professional liability insurance is most important.
- Non-admitted carriers often have flexibility of rate and form filings that can prove useful in customizing coverage.
- A downside to the flexibility of form filings is that coverage forms can sometimes have serious shortcomings that may not be revealed until there is a claim.
- Price should not be the sole reason for an architect to select a surplus lines insurer.
- Having a "licensed" carrier as the professional liability insurer is not as critical as in years past.

The Devil Is in the Details: Completing the Application

A good broker is an extension of an architect's staff and provides a very valuable function. One of the frequently overlooked functions is assistance in the completion of the professional liability application. The application is critical to the underwriter being able to provide a comprehensive quote. Applications can be as simple as one page and as long as 10 pages or more. Applications for small firms (firm less than $1,000,000 in billings) are generally shorter and fairly simple. Applications for midsize firms ($1,000,000–$5,000,000 in billings) and large firms (> $5,000,000 in billings) are more complicated. They ask very specific questions regarding the percentage of billings in different practice categories, specific questions about contracts, sample contracts, questions concerning subconsultants, etc.

Warranty Statement

The difference between the application for professional liability insurance and other potential applications, such as for property and general liability insurance, is that the professional liability insurance application includes a warranty statement—which generally involves two statements. The first is whether or not any claims have been made or legal action brought in the past 10 years against the firm, its predecessors, or any past or present principals, partners, officers, directors, shareholders, or employees. If there is a "yes" answer to any of those, the insurer will request supplemental information. Per the terms of that question, research into the past practices of any current employee, officer, partner, principal, etc., who has been with the firm less than 10 years, is required. However, to secure any information about those past claims and practices may be difficult.

The second warranty-related statement asks whether any of those same principals, partners, officers, employees, etc., have knowledge of any act, error, omission, fact, incident, situation, unresolved job dispute, accident, or any other circumstance that is or could be the basis for a claim under the proposed insurance policy. Again, a "yes" answer will require significant details. It is this last question that has the potential to present significant difficulty if and when a subsequent claim is presented. One of the first questions that the insurer's claims adjuster will ask the architect is whether or not they were aware of the act, accident, error, etc., prior to the current claim being made, and whether they had that knowledge prior to signing the application. A broker's experience in assisting with the completion of the application, and their ability to explain the intent of various application questions, is very important. While they will not complete the application for the architect, they will be of great assistance in completing it appropriately.

When to Seek Alternatives

One question often pondered by architects is how often they should request alternative proposals for professional liability insurance. When asked, one broker responded that an architect "should never have to seek alternative proposals. A high quality A&E broker is always going to be engaged in that activity on behalf of their clients." There are any number of issues that could necessitate an architect seeking proposals, such as changes in professional practice, poor claims history, a change in the Best's rating of an insurer, a change in personnel at the brokerage, a change in underwriting practices by the insurer, an unwarranted increase in premium, or reduction in limits or other coverage restrictions—all are reasons to seek alternatives.

The insurance market for professional liability remains competitive, although pricing may be on the increase. There has been an extended period of very competitive pricing for architects and engineers professional liability insurance, with significant growth in the number of insurers participating. The key is to know when it is time to seek alternatives. ***Periodic discussions and seeking proposals from other brokers are in the firm's own best interest.*** The end result may be discovering that the current broker has adequate representation in the marketplace—or that alternative proposals would be useful. Either way, it is important to investigate.

Even if alternative proposals are not sought and secured from different brokers, or from different insurers with the same broker, it is critical that an architect and the broker or brokers do a side-by-side comparison of the policy forms of the different insurers. The wording of one may be preferable to another, and while forms are generally similar, they are not identical. Exclusions may appear in all forms in different fashions. When considering switching carriers, it is critical to understand the "claims-made" feature of the contract and whether a new carrier will insist on a new "retroactive date." If a new carrier is much less expensive than the firm's current carrier for the same limits and deductibles, but has a retroactive date that is the same as the inception date of the new policy, then the policy is not of much use.

It is critical when replacing carriers that the retroactive date, if any, be no later than the retroactive date on the prior policy. In a claims-made policy for A&E professional liability, the insuring agreement agrees to pay on behalf of the insured damages and defense expenses for claims made during the policy period caused by a wrongful act committed on or after the retroactive date identified on the declarations page. In other words, the architect's work, advice, plans, etc. must have taken place after this date. If the work took place prior to that date, the policy will not cover the claim. Retroactive dates are extremely important for an architect considering a switch in professional liability insurers. As the market becomes harder, or if the firm reports incidents which may result in a claim, then policy provisions may become more restrictive and move forward a retroactive date. The brokers should discuss the implications of any such restriction with the architect and make an appropriate recommendation.

It is important to be aware of some of the issues that underwriters will want to review prior to making a proposal and that will need to be discussed with the broker. These include the following:

- Size of total billings
- States of operation
- Professional liability claims history
- Use of written agreements on all projects
- Other firm services, including pollution cleanup, remediation, or containment
- Percentage of billings in various professional categories such as architecture, construction management, interior design, landscape architecture, etc.
- Whether the firm is also involved in providing civil engineering, structural engineering, mechanical engineering, etc.
- Billings applicable to feasibility studies, master plans, construction management or program management, facilities, or operations
- Percentage of all project types, such as airport facilities, apartments, bridges, condominiums, hospitals, single-family residential, parking structures, schools, etc.
- Project requirements
- Contract requirements

Policy Limits

An important question not often addressed in any literature or articles about professional liability insurance is what limits of professional liability insurance a firm should carry. There is no easy answer or standard that can be applied to the firm's size or location or type of practice that will give an architect an exact answer. In some cases, the fact may be that a firm cannot purchase high enough limits to cover the potential exposure of a project. When an architect is dealing with high-value locations, such as stadiums, dams, or any large construction project, the potential professional liability limits that an architect can purchase usually will not be sufficient to cover all of the potential bodily injury, property damage, and loss of use claims that could arise from a major disaster.

Small firm insurers generally offer a minimum of \$500,000 or \$1,000,000. That limit of liability, shown on the declaration page of the policy, is generally a per-claim limit as well as an annual aggregate limit. Claim expenses such as defense costs are generally subject to and included within the overall aggregate limit of liability. This means that the costs of lawyers in defending a case will reduce the amount of limit available to pay damages. It is not unusual in the event of a serious case that the cost of defense and expert witness fees could be several hundred thousand dollars.

Other factors regarding professional liability insurance coverage limits that should be considered are:

- Limits required by client contracts
- Contracts that limit an architect's liability for damages by gross negligence, the architect's fees, or limits of insurance coverage

IMPORTANT ATTRIBUTES OF PROFESSIONAL LIABILITY INSURERS

In a recent survey, the AIA Trust asked several well-known national insurance brokers that specialize in architects and engineers professional liability several questions about the most important attributes of a professional liability insurer. In order of priority, they answered:

- Policy form
- Claims-handling expertise
- Product price
- Longevity in the professional liability market
- Financial stability
- Loss control services
- Knowledgeable underwriting staff
- Ability to redesign coverage for design-build, building information modeling (BIM), and integrated project delivery (IPD)

He who is not courageous enough to take risks will accomplish nothing in life.

—Muhammad Ali

AIA MEMBERS SUGGEST SOME PROFESSIONAL LIABILITY PITFALLS TO AVOID

- Premium price too high
- No multiyear policy offered
- Level of coverage too high
- Too loyal to prior agent

- What other similar size firms with similar practices carry for limits
- Limits of liability equal to annual billings
- Quality control practices the architect may employ on projects to guard against loss
- Loss frequency for the type of projects for the firm
- Potential loss severity for the firm's project types

Most brokers would suggest that a minimum of $1,000,000 is appropriate for a small firm, with minimum limits of $5,000,000 for a midsize firm. It is also important to remember that umbrella liability coverage purchased by the firm does not apply to professional liability claims, but only to automobile liability and general liability.

Plays Well with Others

Consultants are routinely retained by design professionals. Their relationship means that the design professional has vicarious liability for any damage caused by the consultant's negligence. Insured design professionals will want to review their consultants' insurance status, since they will serve as the consultants' insurer if that status is inadequate. If a design professional agrees by contract to limit the liability of a consultant, the design professional may find that the risk of the consultant's negligence has been shifted to the design professional and the design professional's insurer. When design professionals serve as subconsultants to other professionals (or subcontractors to construction contractors), it is important to examine the primary design professional's coverage or the construction contractor's coverage to determine where there are gaps in coverage that could result in the subconsultant becoming the target of a claim.

Joint ventures, from a legal standpoint, are similar to partnerships, the main difference being that a joint venture usually has a more limited scope or purpose. If a professional liability claim is filed against a joint venture, one or all of the members can be held liable for any judgment rendered against it. Some broad policies provide automatic joint venture coverage, while other insurers exclude joint ventures from the basic policy. Coverage for joint ventures with other design professionals may be available by special endorsement for specific situations to provide for the insured's legal liability for professional services performed on behalf of the named joint venture. Coverage for other participating firms in the joint venture would not be provided by such an endorsement. Each member of a joint venture should obtain evidence from the other joint venture partner(s) that their policies have been properly endorsed as needed to cover participation in the joint venture, usually accomplished by obtaining a certificate of insurance and a copy of the joint venture endorsement.

▶ Project Team Agreements (17.2) discusses agreements with consultants and establishment of joint ventures between firms.

In any joint venture situation where firms rely on their separate policies, it is best for the policies to be with the same carrier with similar limits and deductibles for all firms. Otherwise, some firms may serve as "deep pockets" for others.

Strategic alliances are business ventures and must be protected by insurance with the same concern as for any joint venture or partnership. Clients or other parties claiming harm from the actions of a strategic alliance may be able to recover from any member of the alliance. From the injured party's perspective, the alliance may be viewed as one integrated responsible entity. Whenever a contractor's responsibility and liability goes beyond construction to project design or construction management, the need for contractors to carry professional liability insurance becomes more critical.

All strategic alliance partners may be held liable for the actions of all parties, but each looks to the others to be responsible for their own areas of expertise and obligations. From a professional liability perspective, care must be taken to match final liability with eventual responsibility. It is far more practical and better protection for the interests of the strategic alliance to be covered by a separate professional liability insurance policy. As a result, coverage disputes and internal indemnification or contribution obligations can be minimized.

Project professional liability insurance covers the design team participants, even those who are uninsured. The policy covers the design professional and named professional consultants for the term of the project plus a predetermined discovery period after completion of construction. Depending on the insurance carriers of those firms covered by a project policy, coverage may then revert to the individual firms' professional liability policies.

Project insurance is intended to cover only one project and is usually paid for by the owner who wants coverage beyond that normally carried by the firms. A project policy ensures that a separate annual aggregate limit is available for that particular job and that the limit is not reduced by claims against a firm arising out of other design work. Project insurance is useful when the project is of such increased scope that it drastically affects the cost of basic coverage, and as a way to get coverage for underinsured or uninsured consultants. From the design professional's standpoint, the billings associated with a project-insured project (and the cost of any claims) do not affect the premium set for the firm's practice policy. A broker is necessary to compare coverage.

Expanded project delivery approaches have begun to receive coverage for design professionals practicing in roles such as design-builder, construction manager, and land developer. While some companies offer endorsements for these services to the basic policy under some conditions, potential gaps should be investigated to prevent uninsured liability. For example, a construction manager acting as adviser (CMa) to the owner is covered under most professional liability policies; the construction manager constructor (CMc)—acting as a general contractor—is not.

Integrated project delivery (IPD) is another new concept and thus exposure in the architect's potential risks today. Insurers are determining how best to approach this new collaborative multidimensional approach to projects. The concept of sharing more information and cooperation between unrelated entities flies in the face of traditional boundaries between owners, architects, engineers, and construction companies. Insurers are still trying to assess the new risks presented by IPD.

Settlement issues require both the insurer and the insured to be involved. Professional liability policies generally require consent of an insured before the insurer can settle a professional liability claim against an insured. An architect may strongly believe that there was no negligence or error in the design or supervision work performed, but the insurer may still want to settle. If the architect refuses to settle and a judgment is subsequently entered against the architect for an amount greater than the suggested settlement, the architect may have exposure for the excess amount. This is often called a "hammer" clause, and an architect needs to be aware of its implications. In many cases, the insurers will either limit the architect's exposure to a percentage of that excess amount or may eliminate the exposure entirely.

Similarly, an architect cannot negotiate the terms of any settlement without the insurer's permission. Any attempt to settle a case in this way will result in no coverage for the claim because the policy requires the insured to cooperate with the insurer. In any attempt to settle a potential claim before a suit is filed, be sure to get the permission of the claims adjuster from the insurance company even if the amount is less than the deductible.

A COMMON PROBLEM WITH INSURERS

It is common when submitting a potential professional liability claim to an insurer that the insured will receive back a "reservation of rights" letter from the insurer. That letter basically points out exclusions or other conditions of the policy that might preclude coverage of the claim presented. It will say that they will defend all allegations of the claim unless and until it is evident that an exclusion will eliminate coverage entirely. The insurer is "reserving their right" to deny coverage later, once all the facts are uncovered affecting the claim.

Commercial General Liability

Almost every architectural firm or component office depends on some kind of specialized property to do business, such as an office, valuable documents, or equipment. Property and casualty coverage (often referred to as P&C) is insurance for specific business exposures, such as computer equipment, laptops and cell phones, valuable papers and media, accounts receivable, and even business property off premises. Property coverage protects against loss of or damage to essential pieces of the business, as it can take just one disaster to wipe out all documents and equipment.

For a firm to cover their own technology exposure, computer virus coverage may be included as a sublimit to their P&C policy. Cyber liability coverage may be available as a separate policy, but it would be expensive and limited. A firm's best protection is always through solid risk management practices (virus and security protection, backing up computer memory and storing off-site duplicates, redundancy for critical operations, etc.).

Commercial general liability insurance covers liability from *incidents* that occur on or off the policyholder's premises or that arise from nonprofessional aspects of the insured's practice. The three basic coverage areas of this type of policy are property damage, bodily injury, and personal and advertising injury (such as libel, slander, or copyright infringement). Also included are premises and operational liability, medical payments, and contractual liability.

General liability coverage is the most basic type of commercial insurance and one of the most important—it may even be required by a landlord. General liability coverage immediately protects the firm from injury and property damage claims that could seriously and detrimentally impact the business. Every claim can cost money, either in paying the legitimate ones or in defending against the fraudulent ones. General liability coverage protects a business from these lawsuits and provides the kind of basic peace of mind needed to be an effective businessperson. General liability policies set definite dollar limits on the amounts an insurance company is obligated to pay for each type of claim—for example, bodily injury and property damage combined, or personal injury—and on the total dollar amount for all claims.

Employment practices liability coverage helps to protect against claims brought by employees, such as discrimination, sexual harassment, and wrongful termination. Coverage should pay damages and defense costs; look for policies which include staff educational resources as well.

For those operating out of a home office, a modification is required to the homeowners policy. All basic homeowners policies include physical damage coverage to the home itself and liability protection. However, the policy will also include a business exclusion, meaning that there is no coverage for business property or for liability claims arising out of business pursuits. A separate endorsement will be necessary to provide coverage for both exposures.

Workers' compensation is insurance providing wage replacement and medical benefits to employees injured in the course of employment, in exchange for mandatory relinquishment of the employee's right to sue his or her employer for negligence. Workers' compensation laws are designed to ensure that employees who are injured or disabled on the job are provided with fixed monetary awards, eliminating the need for litigation. These laws also provide benefits for dependents of those workers who are killed because of work-related accidents or illnesses. Some laws also protect employers and fellow workers by limiting the amount an injured employee can recover from an employer and by eliminating the liability of coworkers in most accidents. State statutes establish this framework for most employment. Recovery for medical claims is limited to what is set in each state's medical benefit schedule. Similarly, coverage for lost wages is limited to each state's indemnity payout schedules. There is no specific recovery for elements such as pain and suffering.

Intellectual property insurance coverage protects companies for copyright, trademark, or patent infringement claims arising out of the company's operation. Generally, this insurance will pay defense costs and any judgment up to the policy limits. Intellectual property insurance protects the firm from suit by a competitor for infringing on an idea belonging to someone else. It is important for architects and other design professionals to know about principles of intellectual property law relating to the creation, reproduction, and use of original drawings and documents, as well as issues regarding compensation, professional credit, and professional liability.

Business interruption insurance reimburses the architect for ongoing expenses and loss of profits in the event of a fire or other casualty that interrupts normal business operations. This insurance can be written to cover fire, windstorm, extended coverage perils, computer crashes, and other hazards. Coverage is available for an agreed-upon limit or for actual gross earnings based on the firm's history. There are usually options available for reimbursement of the extra expenses associated with continuing business at another location while the damaged premises are being repaired.

Fidelity bond is appropriate for all persons involved with the custody or disbursement of funds, management of firm finances, authorization of payments, purchasing, and other activities requiring the use of funds. A blanket form of bond covers all employees for the theft of funds. Comprehensive bonds or blanket crime policies are available. These combine coverage for loss of money, securities, and other property under a blanket fidelity bond and a check forgery bond. Crime insurance can insure money, securities, checks, and other negotiable paper both inside and outside the insured's premises under a broad-form money and securities policy to include loss by robbery, burglary, theft, and disappearance and destruction by fire or other causes. A professional liability policy does not cover claims and losses from the dishonest acts of associates or employees.

Technology liability coverage in some form and sometimes by different names is now offered by most professional liability insurers. The policy agrees to defend and pay claims on behalf of the architect for claims arising out of an alleged negligent act in managing the security of a computer system. If network security is compromised, causing a network or data breach, then there is protection from subsequent suits alleging injury or damages. Lower sub-limits and separate deductibles normally apply to such claims. There are no standard forms for this coverage, so every competing form should be reviewed prior to making a final decision. A broker or consultant's expertise can help greatly in comparing policy forms.

Disciplinary, regulatory, or administrative expense reimbursement is a frequently overlooked protection afforded in many architect professional liability policies. Generally written with a separate and lower sub-limit, this coverage agrees to reimburse the architect for reasonable legal fees and expenses incurred in any disciplinary, regulatory, or administrative action commenced directly against the architect. These actions could include those brought by a state licensing or regulatory board, or a federal agency under the Americans with Disabilities Act, the Fair Housing Act, or the Occupational Safety and Health Act. Defending against such actions can be quite costly.

Contractual liability. Business contracts, including office leases, purchase orders, and service agreements, may contain a hold-harmless provision that will contractually transfer another's legal liability to the architect. One of the most important lessons to learn in an architect's business life is to understand contracts and their importance to insurance and risk management. Whether the contract is an office lease, a purchase order, an insurance policy, or a contract for architectural services, each has potential hazards for the architect. There is contractual liability coverage in a general liability policy, but that assumption only applies to bodily injury or property damage. Some policies may extend to personal injury but most do not.

Most professional liability policies exclude liability of others assumed under any contract or agreement except if the architect would have had the liability in the absence of the agreement. In other words, if the architect assumes risk in a contract for services beyond their negligence for services rendered, there would be no coverage for that assumed risk. Thus, contract review for an architect is extremely important. Certain insurers will actually give a premium credit for firms that have a policy of having signed contracts for every client which include certain agreed-upon indemnification language.

Coordination of liability insurance. Professional, general, automobile, and other liability policies are interrelated. It is important to verify insurance coverage and amounts to avoid gaps in protection or duplication of coverage, as well as to correlate insurance limits. Umbrella or excess liability policies may sometimes be needed to provide higher limits than those the basic liability coverage offers.

A CASE STUDY: COMMERCIAL GENERAL LIABILITY

Commercial general liability (CGL) insurance provides coverage primarily for liability arising out of nonprofessional acts (violations of the personal, business, or property interests of private citizens) that result in bodily injury, property damage, or personal and advertising injury. CGL insurance is designed to cover an insured's liability arising out of incidents on the insured's premises or from the nonprofessional aspects of the insured's practice.

An example of bodily injury/property damage, one component of CGL, involved a surveyor working on an airport runway. The surveyor left his tripod and prism standing upright on the side of the runway when he left for lunch. A small Falcon 900 airplane came in for landing and the leading edge of the right wing, which was extended over the edge of the runway, clipped the equipment. The surveying equipment created a dent in the leading edge, but there were no injuries. However, the repairs to the plane and other expenses, such as down time, parts, and labor, totaled more than $114,000. This claim illustrates the importance of having an established risk management program—and having adequate general liability coverage.

A design firm's professional liability policy provides coverage for that firm's *professional negligence*. A design firm's CGL policy provides coverage for the firm's *nonprofessional negligence*. In the surveyor's claim example, a compelling argument could have been made that the damage arose out of the surveyor's professional services and, therefore, should have been covered by the PL policy. The surveyor's claim example illustrates a situation where the CGL insurance carrier could argue that the claim should have been covered by the surveyor's PL policy, while the PL carrier could have argued the same against the CGL carrier. One way to minimize the risk of this situation is to have both the CGL and PL policies with the same insurance carrier. The focus would then shift to resolving the claim instead of debating which policy should respond to the claim.

Another example of a general liability claim would be if a visitor walks into an insured design professional's office lobby and slips on the marble flooring after a rainstorm and breaks her ankle. The injury occurred on the named insured's premises, and the injured woman would make a claim against the insured for her medical expenses resulting from her broken ankle. This example illustrates the importance of maintaining safe building premises and CGL coverage. It should be noted that this coverage does not cover the insured or the insured's employees, since those claims would likely be covered by workers' compensation insurance.

Business automobile liability should also be considered, since architects are also exposed to auto claims, and business use of automobiles by the policyholder, by employees, or by others may extend to the firm. Whether the architect uses a personally owned vehicle or a firm-owned auto or has employees using their own vehicles, at some point each is driving on business. Whether it's an owned, non-owned, or hired vehicle, the architect or the firm can be liable for auto accidents while the autos are operated within the scope of employment.

Sometimes auto accidents can also be the most catastrophic exposure faced by an architect. If an employee while on business has an at-fault accident, the employee's personal auto policy will be primary and will protect the architect and the firm as well—but only up to the limits purchased, which may only be the minimum limits as required by each individual state. Once the employee's limits are exhausted, then the architect's or the firm's limits are at risk. Auto liability limits are often overlooked, whether on a personal auto or a business auto policy. An architect or a firm should carry sufficient auto underlying liability limits so that an umbrella liability can be purchased in excess of the primary auto limits.

Umbrella or excess liability policies provide higher limits in conjunction with underlying general liability, automobile, and employer's liability policies. Umbrella policies are usually written in multiples of $1,000,000. They generally do not apply excess of a professional liability policy. An umbrella should be purchased on both a corporate and individual level.

CONCLUSION

Managing risk is part of the practice of architecture. Professional liability insurance brokers were asked what they saw as emerging trends in this marketplace over the next few years. Some highlights of the future:

- Carriers will seek to push to raise rates and restrict capacity as they continually seek a 15 percent return on equity, which has not been achieved in the A&E market segment for many years.
- New products will be developed to address full-blown (pure) integrated project delivery (IPD) projects.
- Additional coverage extensions on policies will be developed for cyber liability.
- Rates will trend up, with a new focus on claims service.
- Clients will require higher limits for their policies.
- The impact of broader use of building information modeling (BIM) on professional liability exposures for architects is unknown at this time. Insurers will respond once claim activity begins. Some carriers may provide sublimits on their exposure until they see some claim results.
- State guaranty funds will continue to limit their exposure.

The AIA Trust is a *free risk management resource* for AIA members. In its role as a risk management resource for members, the AIA Trust develops tools to help AIA members manage their firms effectively. These include current reports on liability issues addressing the standard of care, sustainability, metadata, fiduciary duty, and others; data on professional liability insurers and claims trends; and tips on buying liability insurance and starting a firm. In addition, the AIA Trust offers a wide variety of risk management products that include professional liability and business owners protection insurance.

For More Information

The AIA Trust: www.TheAIATrust.com.
The Society of Risk Management Consultants: www.SRMCSociety.org.
Victor O. Schinnerer and Co.: www.schinnerer.com/risk-mgmt/Pages/RM-homepage.aspx.
A/E Pronet: www.aepronet.org.
Professional Liability Agents Network (PLAN): www.plan.org/.

16.3 Risks and Emerging Practices

Peter G. Longley, AIA, CSI CCS, LEED AP, and Sue E. Yoakum, Esq., AIA

Three emerging practices—sustainable design, building information modeling, and integrated project delivery—have the potential to alter liability for architects. This article will identify possible risks and the means available to help architects manage those risks.

INTRODUCTION

Since the turn of the twenty-first century, three ideas have emerged with the power to significantly alter the way architects do business and deliver projects. These emerging practices are fostering new understanding as to how risk management ought to respond. They are:

1. Sustainable Design
2. Building Information Modeling (BIM)
3. Integrated Project Delivery (IPD)

This article will address how these three topics alter liability for architects and identify means available to help architects manage those risks.

SUSTAINABLE DESIGN

Sustainable design has its roots in the collision between the environmental movement and the rapid rise of the cost of energy, both beginning in the 1970s. What started as a countercultural movement has matured and emerged as not only fashionable to developers but worthy of being enforced by government agencies.

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Mainstream architects, who initially hesitated to embrace the movement, have at last determined a palatable pathway to adoption—first accepting and then espousing the notion that sustainable design is actually just one aspect of good design. They are poised to garner the many new commissions where sustainable design is in demand.

On the way toward full adoption, architects are faced with new challenges regarding sustainable design. These include:

- Changes to owner expectations
- Adoption of new rating systems, such as LEED
- Changes in governmental regulations
- Development of new building materials, systems, and technologies

Owner Expectations for Sustainable Design

The most effective risk management tool for all projects, especially those involving sustainable design, is proper management of owner expectations. One frequent theme in litigation and claims against architects is failed owner relationships, including unrealistic, inappropriate, or un-communicated expectations.

Owners considering sustainable design hear much about the benefits. They imagine reductions in energy costs, reductions in life cycle costs, tax credits, and favorable financing and insurance for the completed project. The marketplace is telling them these things are possible, and some architects might even be promoting these benefits in their marketing materials—indicating how *they* can help owners achieve these outcomes. The sound of these benefits can establish a whole new wave of expectations.

The problem with these expectations lies in what it takes to deliver on them—the reality that the architect often has little control over these outcomes. And unmet expectations equal an unhappy owner.

Therefore, it is critical to manage the owner's expectations relating to the architect's services, and, most important, what services architects cannot provide or control. With sustainable projects, more explanation is necessary than on traditional projects. Sustainable projects offer a new dimension—a dimension that is only seen over time. Owners must be educated as to the importance of their own role in the operations of their completed project, so that sustainable design goals can continue to be met throughout the life of the building.

▶ Risk Management Strategies (16.1) further discusses how to identify one's risks and manage them.

Sustainable Project (SP) Agreements

The AIA has developed a new series of agreements for sustainable projects. Using these agreement forms will help to manage the expectations of the entire project team: owner, contractor, and architect. (See Table 16.2.)

TABLE 16.2 AIA Sustainable Project Agreements (as of May 2012)

A101™–2007 SP	Standard Form of Agreement Between Owner and Contractor for use on a Sustainable Project where the basis of payment is Stipulated Sum
A201™–2007 SP	General Conditions of the Contract for Construction, for use on a Sustainable Project
A401™–2007 SP	Standard Form of Agreement Between Contractor and Subcontractor, for use on a Sustainable Project
B101™–2007 SP	Standard Form of Agreement Between Owner and Architect for use on a Sustainable Project
B214™–2012	Standard Form of Architect's Services: LEED Certification
C401™–2007 SP	Standard Form of Agreement Between Architect and Consultant, for use on a Sustainable Project

Contract clauses to pay particular attention to on sustainable projects include:

- Standard of care
- Qualifications of design team members
- Performance goals of the project relating to energy usage and potential cost savings
- Consequential damages

Standard of Care

The standard of care is, by nature, always changing. Having the proper clause in the owner-architect agreement is one (good) thing, but responding professionally to current changes in the design practice is quite another. Keeping current is critical because it can prevent a claim. Sustainable design puts a burden on the architect to stay current with:

- Education and training in sustainable design issues, systems, and building materials
- Awareness of changes to codes and standards
- Awareness of what other design professionals are doing—how they are rendering their services and what sorts of services they are providing

Qualifications of Team Members

More and more contracts are dictating the qualifications of the design team members, requiring that some or all be LEED accredited. The problem with this language is that not all team members need to be LEED accredited for the project to attain certification. Check the language with care.

The main consideration is that the architect needs to effectively manage their own capabilities necessary to deliver the services. They must employ the appropriate level of expertise to meet the owner's requirements for sustainable design, regardless of contract language—because the standard of care has moved. Teams should be chosen with this in mind. If the expertise isn't present in any of the team members, then it may be necessary to retain a sustainable design consultant.

Performance Goals of the Project

Promises of a particular outcome, in this case the performance of a sustainable project, create perfect opportunities for later litigation. Though it is reasonable to establish goals for design, there are too many factors beyond the control of the design team that can lead to failure to meet those goals.

Claims against architects and engineers have been brought by owners alleging their energy costs, per-month electricity, gas, and other utility costs, are too high—more than anticipated. Typically, high utility bills are not due to design flaws, but rather are the result of how the owner operates the building—something as simple as setting the thermostat too high or failing to maintain equipment. The way to prevent such a cause for claim is to discuss the specified systems, what the design can and cannot do, and proper maintenance procedures. Any outcome in energy consumption is predicated on assumptions, and those assumptions need to be understood by the owner and facilities manager. Avoid any certification relating to energy usage, unless required by building or codes officials, and then approach with utmost caution.

If an owner requires use of a rating system, such as LEED, the design program should include the anticipated certification level, and which version of the rating system will be used. Do not promise the project will meet a certain level of certification or that such level will ensure meeting specific energy consumption or usage goals. Instead, explain that the design, if built in accordance with the design team's contract documents and specifications, will be *capable* of obtaining the desired certification, energy consumption ranges, or usage goals. After design, others have to build it right, agree to certify it, and then properly operate and maintain the equipment and systems.

▶ See Table 17.1, AIA Contract Documents by Family (17.5) for a more extensive list AIA contract documents, by family.

Textbook definition of standard of care: Rendering services with the ordinary degree of skill and care that would be used by other reasonably competent practitioners of the same discipline under similar circumstances, taking into consideration the contemporary state of the art and geographic idiosyncrasies.

▶ Architects and the Law (5.1) further discusses the standard of care.

IS SUSTAINABLE DESIGN IMPACTING THE STANDARD OF CARE?

Architects are expected to learn from prior mistakes. Acceptable design in one decade might, by ignoring lessons learned, become negligence in the next. Here is a lesson that one architect learned:

> In 2001–2002 we designed a building using lightweight structural concrete (LWSC) slabs for the floors and roof. LWSC is considered a sustainable product because it weighs less, requires less steel to support, and smaller footings to hold up the reduced mass. LWSC began to dominate the design industry in the mid to late 1990s because of these savings. But with more than a few projects complete and in place, unanticipated problems began to emerge—namely that LWSC holds a

(continued)

IS SUSTAINABLE DESIGN IMPACTING THE STANDARD OF CARE? *(continued)*

significant amount of water. In 2006, the flat roof of our project began to fail, bubbling up and delaminating because of the havoc this unanticipated moisture was wreaking on the roofing sandwich.

That same year, two years after our roof was installed, the National Roofing Contractors Association (NRCA) published a finding regarding LWSC, having noted a number of similar failures. NRCA prescribed a solution to the problem—the installation of a vapor barrier to lock the moisture into the concrete, protecting the insulation and adhesives from degradation. Quoting our expert that opined in our defense, without the vapor barrier the roofing insulation was constantly exposed to the presence of the moisture and heat and "curled up like corn chips," ripping the roof apart.

This knowledge, the source and mechanics of the failure—and when it was known in the industry to be a problem—is ultimately what saved us from having to pay for a full roof replacement. The issue was not just what we didn't know, or what we didn't do, it was when we didn't do it.

Consequential Damages

Consequential damages are those that flow from the consequences of negligent performance or a contract breach. Consequential damages can pile up so fast as to overwhelm most professional liability insurance limits. Standard AIA agreement forms recognize the destructive force of consequential damages and seek to avoid this risk through a mutual waiver—waiving for both owner and architect.

In a sustainable design project this waiver takes on additional importance because of the expanded list of possible consequential damages. This list includes the many expectations that can fail to materialize:

- Loss of reduced energy, water, and other operational costs
- Loss of increased market value
- Loss of increased investor participation and return on investment
- Loss of decreased insurance premiums
- Loss of increased worker productivity
- Loss of tax incentives, credits, and rebates
- Loss of development credits and incentives
- Loss of potential increase in sales or increased revenue

During contract negotiations most owner attorneys move to strike the mutual waiver of consequential damages; they want the right to litigate to recover these damages. Don't agree to strike. These damages can put a firm out of business. It is unreasonable for an architect to be financially responsible, by means of consequential damages, to assume the risk that particular performance goals are met. This is clearly a developer risk.

Rating Systems: LEED Registration

Leadership in Environmental and Energy Design (LEED) has a series of rating systems devised by the U.S. Green Building Council (USGBC) and the Green Building Certification Institute (GBCI) to guide and distinguish high-performance building projects. Owners can register their projects with USGBC/GBCI, and then, by means of a rigorous administrative process, obtain some level of formal certification (certified, silver, gold, and platinum)—certification that sustainable design goals have been met.

LEED creates risks for the architect, mostly that a project might fail to achieve the desired level. This becomes a very real possibility when recognizing that there is a lot that can go wrong, involving people and processes that the architect cannot control:

- Design points come under extreme financial scrutiny and can be dropped due to value engineering.
- Contractors must furnish materials that meet the specified performance requirements.
- Contractors must participate in the documentation process.
- The GBCI must accept the documentation and approve each of the LEED credits.

There are additional liability concerns related to LEED projects. Projects must be registered with the GBCI to be eligible for LEED certification. Registration must be completed using LEED Online, which can only be accessed after users agree to USGBC/GBCI's terms and conditions. Prior to 2011, if the architect participated in this registration process, they carried a perceived burden that they were there to *ensure* certification.

In 2011, the USGBC/GBCI made online registration by architects less problematic when it released the agreement, "Confirmation of Agent's Authority Agreement." This agreement shifts responsibility for LEED certification and the risk of failure to the owner, regardless of who accesses the project online.

This transfer-of-risk language becomes effective only if the owner agrees to it in writing by signing this "Confirmation of Agent's Authority Agreement." This executed document should be included as an exhibit to the owner-architect agreement, or kept as an important project record.

Managing the risks of a LEED project (all the credits the project could fail to earn) is best accomplished by educating the owner, thereby managing the owner's expectations. They should be kept aware of the process and the ongoing progress toward certification.

IgCC

The International Green Construction Code (IgCC) was published in March 2012, and joined the other ICC codes for adoption by jurisdictions. It joins Title 24, California's 2010 green construction code, or "CalGreen." The IgCC is expected to become popular very quickly.

► See the backgrounder The International Green Construction Code (13.1) for a more detailed discussion of the IgCC.

Changes in Governmental Regulations

The focus on sustainable design has brought forth significant changes to state and local requirements and codes. Basic due diligence requires keeping current with the newly adopted versions and the plethora of add-ons. Many jurisdictions are adopting new "green" ordinances, including the International Green Construction Code (IgCC), as well as other energy "stretch" codes. What's new about these codes is that they are not voluntary, like GBCI's LEED certification program. These energy and sustainability codes will be enforceable—enforceable like any other building code. As such, they will bring their own challenges.

Regulations can greatly restrict the use of energy, govern the function of mechanical and electrical systems, and dictate fire safety limits that impact a whole host of new energy efficient or sustainable ("green") building products. The new requirements ultimately affect the entire building, from the skin that leaks energy, to the mechanical and electrical systems that consume it.

Taking economic advantage of these changes are the manufacturers that offer, for example, systems that consume energy only when a person is in a room, and building materials that provide for higher insulating values, making the building more airtight. Each of these systems place additional research demands on the architect. Before the architect can specify a system, they should be asking for test results from the manufacturers, confirming that proposed products and systems comply with the new requirements of the code.

Development of New Building Materials, Systems, and Technologies

While the code plays a role in driving changes to building materials and systems, there are other forces at work, namely the marketplace—the simple demand for products that respond to consumer interest in environmental responsibility. Where there is the economic opportunity to convert some waste product, something that someone was throwing away (i.e., cheap) into something to sell, there is an equal demand to buy it… to know there is one less piece of plastic, metal, or paper product going into the landfill, turning consumers into good stewards of the environment.

Sustainable design rating systems, such as LEED, offer credits (i.e., incentive) that focus attention and help to spawn new products and systems. These credits, to name a few, include:

- Construction waste management (recycling)
- Materials with recycled content
- Certified (renewably harvested) wood
- Heat island effect—highly reflective roofing
- Low volatile organic compound (VOC) content in adhesives, sealants, paint, and flooring systems
- Wastewater recycling systems
- Renewable energy
- Daylight systems
- Innovation (i.e., anything you can imagine)

New products and systems that respond to current demand create risk for the architect. Should the architect specify them? New product failure almost always results because of unforeseen exposure conditions—exposure that only time will tell. Products should be tested by time and a reasonable range of exposures to see if they perform as hoped and as advertised. Yet with the green fervor sweeping the market and the government, there is undue pressure to rush sustainable products out prematurely.

The standard of care dictates that the architect has a duty to the owner to investigate and specify appropriate materials and systems, those that are both durable and functional. In the past, when there were fewer building materials to choose from (most with track records), this part of the architect's job was easier. Using untested, new sustainable building products without a track record creates added risk for everyone.

The solution to the problem of designing with new materials falls to a combination of education and communication:

- Research the product as much as possible. Share this information with the owner.
- Arrange for tours of recent product installations and manufacturing plants. Obtain actual user testimonials.
- Share and document findings, concerns—and potential for failure.

Involve the owner in each decision. Document the conversation and decision in writing. Ultimately, what goes into an owner's building needs to be the owner's decision, having listened to the architect's learned advice. Otherwise, if the owner has no opinion, or is uninformed, architects must be ready to answer for each decision on their own.

BUILDING INFORMATION MODELING

Building information modeling (BIM) continues to develop and is gaining widespread adoption. What started as a 3D tool used solely by the architect to generate 2D construction drawings is finding other users and uses. It is those other users now that are creating additional risk—potentially blurring the lines of responsibility for the design and construction. Depending on how the BIM for a project is developed and used, there is potential that the architect could be held responsible for construction means and methods, while the contractor could be held responsible for design. For now at least, in conventional project delivery methods (not IPD), the traditional lines of responsibility should be preserved—that is, until legal precedent suggests other ways of managing the risk brought on by the use of BIM.

► Technology in Practice Overview (11.1) reviews common tools in practice and evaluates their capabilities and value to a project or firm.

Properly Pitching the Benefits of BIM

BIM is made to order for collaboration, allowing architects, owners, contractors, and subcontractors to share detailed design information as it suits their own needs. Architects want to see the design three-dimensionally, to understand how the engineering components are integrated and coordinated, and, as a residual benefit, to automatically generate tedious schedules and alternate views. Contractors want to use the model for quantity takeoffs (estimating), coordination of the trades, and for analysis of staging and sequencing (construction means and methods). Subcontractors want access to the data to generate shop drawings for fabrication of their work, saving drafting time. Owners want to pay only for a single model that is shared, rather than multiple and separately drawn versions—then they want a copy of the completed model to manage their facility. These benefits have indeed been realized, seeing improvements in coordination and quality, shortened project schedules, and better cost management.

In this shared environment—multiple parties accessing the model as it develops—it is possible to lose sight of who is responsible for the design. In order to clarify (and record) who is responsible for the design, who owns the model, and how it is to be used, the AIA has developed several form documents:

C106™–2007, Digital Data Licensing Agreement: to be signed by the transmitting and receiving parties, which, respectively, could be the architect and owner, or architect and contractor. This document provides space to set forth the limitations for use of any transmitted electronic data.

E201™–2007, Digital Data Protocol Exhibit: to be attached as an exhibit to a contract, such as the owner-architect agreement. While this document can relate to BIM, its "Project Protocol Table" also sets forth format requirements and permitted uses for all sorts of other electronic project data, ranging across each of the project phases.

E202™–2008, Building Information Modeling Protocol Exhibit: to be attached as an exhibit to a contract, such as the owner-architect agreement. Ownership of the BIM is defined, and an elaborate table sets forth the permitted uses of the model at each level of design (LOD).

These documents do not directly address this singularly important point: that *only the 2D copies that are generated from the BIM by the architect, in PDF and paper form, constitute the legal construction documents*. It remains an unfortunate aspect of computer and software technology that:

- Not everyone's computer will display the same model in the same way—inadvertently showing data that should have been turned off, or not showing data that had unintentionally become hidden.
- Inconsistent printing adds to the problem, with different machines producing unintended line weights and fonts that affect both legibility and interpretation of content.
- Placing an editable drawing into the hands of another to modify and print without the author's knowledge is an invitation to nefarious use.

Until these problems can be overcome more efficiently with technology, the architect should maintain control over their own document printing and production process as a way of managing the risks. Clarifying restrictions regarding these and other unauthorized uses of the BIM should be added to the final form(s) before execution.

► Project Management with Building Information Modeling Processes (10.4) describes the processes that drive effective use of BIM.

BIM and the Standard of Care

BIM intends the overlay of the engineering trades and the architecture. But this doesn't happen automatically. Overlay requires participation of the engineers who, in general, have not adopted BIM as quickly as have architects. Before architects employed the overlay process to all the design disciplines, several of the large construction firms instituted the practice of building their own models, accurately redrawing in all the components of the architecture and engineering. Analysis of their model enabled them to identify and eliminate a number of coordination problems during the shop drawing process, before components were fabricated and installed, thereby substantially reducing construction change orders—saving both time and money.

As more architects are awakened by these benefits, they have good cause to get serious about using BIM technology. But before architects can benefit from BIM as an integration and coordination tool, they must learn the 3D software used to generate the model *and* also master other software add-ons that generate the clash-detection reports. Until both the drawing and analysis/reporting functions are employed, architects will merely be using a complex 3D drawing tool to make 2D drawings—thereby missing many of the benefits that BIM can provide.

BIM is already helping architects to squeeze out errors before they are built, which translates into a necessarily higher level of design performance afforded to their clients—meaning the standard of care is changing. Firms not using or underutilizing BIM on other than small projects are therefore in danger of falling below the standard of care.

INTEGRATED PROJECT DELIVERY (IPD)

AIA's IPD Guide, a free download on the AIA website, provides succinct information to educate the reader about IPD.

▶ Integrated Project Delivery Overview (9.3) further discusses IPD methods as understood and practiced in 2012.

▶ See the backgrounder on Integrated Project Delivery Agreements (17.2) for related information.

A recent study by the AIA confirmed that many architects that are interested in doing an IPD project have wildly varying views of what IPD is and means. Some do understand it, of course, but to many, IPD means essentially just "collaborating" with others. IPD is not just an enhancement to the standard method of practice—it requires significant mind changes on the part of all participants. Architects must educate themselves and their clients about IPD. Uneducated clients are dangerous, and unmet client expectations will engender claims.

As of 2012, those engaged in "pure" IPD have been few. A review of professional liability companies indicates that less than a handful of project policies have been written for IPD projects. And these projects are not contractually alike. The in-place agreements differ in form, and in legal terms and conditions. Clearly those adopting IPD are sailing into uncharted waters.

On the other hand, there have been more than a few projects employing an "IPD-lite" project delivery method—what the AIA calls a transitional IPD approach. The goal of these arrangements has been to seize on the perceived benefits of IPD—fostering collaboration, teaming—while preserving the traditional lines of responsibility and liability. Accordingly, the types of insurance policies covering the parties involved in IPD-lite have been the same as those encountered in traditional design-bid-build projects.

Several new agreement forms have been developed by the AIA for both the transitional IPD model as well as several types of pure IPD structures. These agreements set forth in detail the roles and responsibilities of the team members, and establish the legal rules to govern these relationships as well as manage disputes.

IPD: A Look at the Money

Pure IPD agreements are distinguished from other agreements in their "share the love and share the pain" clauses. For example, contingencies are established to provide financial incentive to be shared among the project participants. However, when the contingency is exhausted, project participants must make up the difference up to a certain limit, typically a percentage of their profit. The amount of profit at risk is highly negotiable, impacting each of the team members.

The contingency fund is administered by the core team comprised of representatives from the primary project participants, including owner, architect, contractor, and key consultants or subcontractors. The core team uses the fund to pay for change orders that involve design coordination issues (including errors), or unanticipated schedule and procurement issues. The core team contingency can be allocated and used without finger pointing or determination of fault. Unspent core team contingency is split among the project participants. The percentage split is highly negotiable. Certain claims between the IPD core team members may be waived or limited by agreement. Others may be turned over to the internal dispute resolution process, the focus of which is to resolve matters short of litigation.

In addition to this internally managed contingency fund, the owner maintains a separate and distinct contingency to cover scope increases and unforeseen conditions not the fault of the core team.

Insurability Issues Related to IPD

There is an apparent disconnect between the principles governing professional liability insurance and the IPD multiparty agreement terms and conditions. Professional insurance is triggered on fault, that is, a finding of negligence on the part of the architect. Agreeing to pay a part of the design project's profit per an IPD Agreement, including coverage of errors, is not triggered on fault or negligence; it is a contractual requirement.

In addition, when, by agreement, architects consent to pay a portion of their profit, this payment will not count towards the satisfaction of the deductible required by professional liability insurance, unless some other arrangement is made with the underwriter. Difficulties abound here, since fault would have to be found in each instance. From the underwriter's perspective, legislating an easy drawdown of the deductible (compatible with IPD) into the policy will likely cause the premium to skyrocket.

Can professional liability insurance and IPD live together? This is yet to be determined, but some carriers are now offering IPD project-specific policies for very large projects. These policies permit the drawdown of the architect's profits to cover internal claims through a process called rectification, changing the deductible to something called self-insured retention (SIR). Unfortunately, the few project IPD policies written thus far have proven to be costly, and the price should not be expected to come down until a claims history is established. Architects should review any such IPD project policy terms and exclusions carefully to fully understand what is and is not covered, as well as the triggers to accessing coverage.

What to Do with IPD?

So, what should a firm do if the opportunity for an IPD project presents itself? How should it be approached? Cautiously.

As of 2012, there just is not much actual experience out there—a few tales of success, no tales of woe, no litigation, no established legal precedents.

It is reasonable to assume in a claim situation that traditional lines of responsibility and liability will emerge, absent clear changes to those traditions in the executed agreements. One should be wary of accepting any such changes. Associated risks would likely only be overcome with project IPD insurance and a clear limitation of liability equal to policy limits.

▶ The AIA has published case studies on projects that have employed IPD, available for free download at the AIA website.

To parties new to IPD it makes sense to begin with the transitional model, or some similar form of IPD-lite. Extra effort will be required to research and negotiate the many aspects that are different in the agreement form, and to consult with insurance providers in order to maintain the proper risk management strategies. Likewise, seeking involvement of appropriate legal counsel will carry extra costs—but wisdom isn't free.

Those firms that have embraced IPD with success have adopted contractual language to waive claims among the participants. This leaves only an exposure to claims from third parties. Insurance is available to cover such losses.

CONCLUSION

To an ever-changing profession, sustainability, BIM, and IPD are at the forefront of the forces bringing in unknown risk. How new types of claims from these three forces will materialize cannot yet be fully known. Given this situation, appropriate mitigation measures are also difficult to predict. Nevertheless, the tools and cautionary awareness suggested in this article can help practitioners meet the challenges of these emerging practices. There is a long way to go, but the changes thus far suggest there is hope for the future—finding a way to manage new risk.

For More Information

AIA's Guide to the IgCC (International Green Construction Code).

AIA IPD Case Studies, University of Minnesota School of Architecture, February, 2011.

AIA's Integrated Project Delivery, A Guide.

16.4 Dispute Management and Resolution

David A. Ericksen, Esq.

Project disputes are an unfortunate reality. They are also time-consuming, expensive, and stressful. The first goal should be to avoid or contain the potential for disputes. However, when they do arise, they are best resolved by the strategic and effective use of mediation, arbitration, litigation, and even compulsory direct negotiations.

INTRODUCTION: PREVENT DISPUTES BEFORE THEY START

Simply stated, the best way to resolve a dispute is to prevent the dispute from ever beginning, or at least to prevent it from gaining any serious momentum. Although they are discussed elsewhere, it bears repeating that the three most powerful tools in doing so are the successive steps of client selection, client education, and contract documentation. Client selection is obvious. Investigate and then choose those clients most in tune with the architect's vision and with the least likely impulse toward claims and litigation. Most architects pay at least some heed to these issues. Where most fail is in client education and the even more important step of documenting the verbal understandings in the contract and other documents. The too-frequent inevitable results are missed expectations, misunderstandings, and litigated disputes.

► Risk Management Strategies (16.1) further discusses how to know one's risks and how to manage them.

Client education should be centered on the design and construction process and the practical realities and limitations of that process. These realities will be both generic and project-specific. The real key is that this education should and must take place *prior* to entering the agreement, and then become a part of the agreement. Any valid contract provision is supposed to reflect a "meeting of the minds" between the parties. Too often, it is the first, last, and only time architects and their clients actually have a reliable meeting of the minds. When the parties have signed an agreement, courts and arbitrators will generally assume that the provision accurately reflects their mutual understanding and expectation. Beginning with the AIA Document B141™–1997 and continuing in the AIA Document B101™–2007, the exchange of initial information is an excellent *starting point* for this process. Ideally, it will go far beyond those introductory steps and then be reflected in the agreement through project recitals and assumptions, potential additional services, excluded services, and contingencies, as well as the clarification of the roles and responsibility of various project participants.

Beyond the broad value of client education culminating in a contractual meeting of the minds, the two contractual issues, which can lead to more avoidable disputes, claims, and losses than any other issues, are "absolutes" and "ambiguities." Absolutes, because few (if any) design and construction projects proceed perfectly, and they are not expected by the law or covered by professional liability insurance. Nevertheless, expectations of perfection are often asserted and claimed by unhappy or opportunistic clients. Ambiguities, because open-ended obligations create potentially limitless responsibilities. Fortunately, each of these concerns can be managed and contained by some relatively simple contract provisions establishing a touchstone for a meeting of the minds and precluding later revisionist views.

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The first is set forth in the 2007 and later versions of the AIA owner-architect agreements, which now include a standard of care clause that is consistent with the prevailing legal standards for professional skill and care. The clause recognizes that perfection is rare and is not to the legal standard. AIA Document B101TM–2007 provides:

> § 2.2 The Architect shall perform its services consistent with the professional skill and care ordinarily provided by architects practicing in the same or similar locality under the same or similar circumstances. The Architect shall perform its services as expeditiously as is consistent with such professional skill and care and the orderly progress of the Project.

INTEGRATE POINTS OF AGREEMENT OR THEY VANISH

Including any important points of agreement and understanding into the actual contract or by express reference is critical. If not, it may be as if they never existed. The integration clause from all the AIA documents provides, essentially, "This Agreement represents the entire and integrated agreement between the Owner and the Architect and supersedes all prior negotiations, representations or agreements, either written or oral." (AIA Document B101TM–2007, Art. 13.1.) Even absent this provision, the law provides the same result through the "parole evidence rule," which may lead to a similar and potentially devastating result. In one situation, at the outset of the project, the architect and client spent three days negotiating a memorandum of understanding with over 100 points specifically agreed to and initialed. However, when the agreed-upon points were not reflected in the AIA-based written agreement that followed, the memorandum was excluded in its entirety from consideration in the $7.5M claim.

In itself, the standard of care is a great start to overcome the burden of alleged obligations of professional perfection. However, even this clear statement of the law is, by itself, often not enough.

First, just as compliance with the building code is often rightly seen as the floor, and not the ceiling, of the design professional's obligation, clients may wrongly assume that the standard of care is the floor for responsibility and not the fulfillment of responsibility. For that reason, adding language to clarify that the standard of care is also the limit of the architect's responsibility can be very helpful. Whatever words are used, the goal is to make clear that the standard of care represents the limit of the architect's design duties for the project and under the agreement.

▶ Agreements with Owners (17.1) further covers the architect's agreement with the client.

Second, even with a clear statement of the standard of care, it often remains difficult for clients, lay jurors, and even nonspecialist judges to understand that even this "ordinary" standard for licensed professionals could contemplate imperfections. To make this even clearer and to avoid any potential implied obligation of absolute perfection, it is often useful to expressly disclaim perfection and to advise the client to prepare for the corresponding contingencies that would thereby be their financial responsibility. Such a clause might provide: "*Architect's professional standard of care is not a warranty or guarantee of perfection and Architect shall have no such obligation. Accordingly, Owner shall provide appropriate contingencies for cost and schedule impacts resulting from reasonable design clarifications, additions, and corrections.*"

For client satisfaction and project success (and thereby dispute avoidance), the most important section of any architectural agreement remains a qualitatively and quantitatively detailed scope of work. Nevertheless, some provisions will inevitably carry some potentially open-ended or result-oriented clauses that can also be open-ended. In addition, the inherently fluid nature of the design and construction process, as well as the ingrained service mind-set of architects and their design teams, means that new issues can arise and the original scope of work may be stretched or expanded by ambiguities, events, or conduct. This is broadly referred to as "scope creep," and it presents multiple grounds for disputes and the prolonging of those disputes. First and foremost, once a well-defined scope of work is exceeded, absent a written confirmation and agreement, there is no longer any obvious limit to the expanded services. As a result, there is no easy way to either define the duty or say that it has been satisfied. In addition, such services are by definition "extra-contractual" and outside of the procedures and important controls established by the agreement. For these reasons, architects should consider two additions to the scope of work to contain these potential ambiguities.

▶ Defining Project Services (15.1) addresses the centrality of scope definition to developing effective agreements for professional design services.

The first is to simply avoid the ambiguous expansion of duties. The agreement would provide: "*Architect shall have no obligations or responsibilities for the Project except as expressly set forth in this Agreement.*"

PLAYING OUTSIDE THE CONTRACT

Tremendous effort often goes into the drafting and negotiation of agreements. If so, it should be valued and honored by following and remaining within the scope of work. In one situation, a design professional had a very limited role and, accordingly, had a limitation of liability clause limiting exposure to the nominal fee received. The project had a significant failure. When the claim came, the obvious course seemed to be to honor the limitation of liability and quickly exit the dispute. However, the claimant disagreed and argued that the claim was for those services provided outside the agreement as uncompensated extra-contractual services, and therefore the contract and limitation of liability did not control. The claim ultimately cost over 100 times the limitation of liability to resolve.

DOCUMENTATION CHECKLIST

The need to document mid-project issues will vary, but a starting list for issues to be documented and conveyed would be:

1. Agreements
2. Notifications
3. Information relied on
4. Requests for significant action or information
5. Allocated roles and responsibilities

While this may be close to other provisions in many agreements, most such clauses refer to modification of the agreement. This is expressly focused on "the Project" and thereby can be used to avoid or mitigate alleged scope creep.

The second addition turns on the quality of the agreement. Assuming it is a quality agreement, such as an AIA agreement or even an agreement including a limitation of liability clause, it can be important to make clear that all project-related activities, whether expressly referenced in the agreement or not, get the benefit of the contractual protections. For those reasons, a leading introduction or closing provision to any scope of work might include: "*All of Architect's services, actions, communications, and documentation relative to the Project shall be covered by this Agreement.*"

With these provisions in place, any dispute relative to the project will be subject to the certainty of the agreement and the corresponding dispute resolution provisions.

The final two steps in the critical process of dispute and claim avoidance are really performance issues. The first is consistent, timely, and proactive documentation. The reality is that memories can and do differ, and progressively so as time passes. Small misunderstandings or false assumptions and expectations can grow into full-blown failures and disputes. Prompt communication, followed by corresponding documentation, is the key to avoiding this. In a claims context, a written document properly conveyed will almost always triumph over varying recollections and oral testimony.

Finally, the most important key to avoiding disputes is to adopt proactive and responsive behavior that promptly addresses issues rather than allowing them to fester. Simple misunderstandings grow into frustration and anger, intensified disputes, and, ultimately, claims if attention is not paid to them. Similar to the dispute procedures discussed below, this is best done with an escalating or phased sequence of actions and communications. For instance, it is seldom effective to start with written position statements. While sometimes uncomfortable and even intimidating, it is almost always best to start with a conversation or meeting to identify and talk through the issues before reducing positions to writing. As the issues are identified, it is likewise important to attach a schedule and plan of action to each issue with corresponding follow-up actions. Simply identifying the issues and then ignoring them may actually be the worst of all possible paths and the one most likely to lead to a difficult-to-defend claim.

THE AIA AND THE EVOLUTION OF DISPUTE RESOLUTION

For decades, the AIA and its contract documents have been at the forefront of dispute resolution. In particular, the AIA has been a strong proponent of "alternative dispute resolution" procedures, which can effectively seek to resolve matters without recourse to public courts and the associated time, publicity, expense, and imprecision. Instead, the AIA and the professional liability insurance carriers who typically protect architects from claims have long preferred mediation as a first step, with private arbitration as the second step if mediation does not resolve the claim consensually. This was precisely the two-step process prescribed in the AIA Document B141™–1997.

With AIA Document B101™–2007, the AIA took a dramatic departure from its past agreements. While continuing with its support of mediation as a compulsory first step, the AIA opened the door to a more tailored solution by providing that the parties could select either arbitration or litigation as the final venue for ultimate dispute resolution. In doing so, the AIA was likely recognizing the uniqueness of individual projects and project relationships, and that a unitary approach probably is not warranted in all situations. In doing so, it put the onus on the architect (and its client) to understand the competing options and to agree upon the option most likely to lead to a prompt and favorable resolution of any claims when and if they occur.

DISPUTE RESOLUTION METHODS: MEDIATION, ARBITRATION, AND LITIGATION

Where a third party neutral becomes a part of the dispute resolution process, there are three primary paths to resolution: mediation, arbitration, and litigation. There are also countless variations to each path, and even some which blend them in some ways. However, understanding the basic process, advantages, and disadvantages of each is really the first stepping stone in the successful and strategic use of the options. As an introductory point, it is important to distinguish first between mediation on the one hand and arbitration and litigation on the other. Mediation is really a facilitated negotiation of a dispute. Disputes cannot be settled in mediation absent the agreement of the parties. In arbitration and litigation, on the other hand, the decision making passes to a third party who will ultimately make the decision based on the applicable facts and law presented.

Mediation

Mediation is "a process in which a neutral person or persons facilitate communications between the disputants to assist them in reaching a mutually acceptable agreement" (*Jeld-Wen, Inc. v. Superior Court* (2007) 146 Cal.App.4th 536,540). As stated above, mediation is so favored by the AIA that it is the default first step in the dispute resolution process. Mediation has proved to be so useful in efficiently and cost-effectively resolving design professional claims that many professional liability carriers provide significant financial incentives to architects and engineers who can resolve their claims by this means.

Absent an advance agreement, there are typically few rules or procedures applicable to mediations. The one rule that does generally apply to all mediations is that it is a confidential and privileged process such that any statements made in mediation cannot be cited, quoted, or otherwise used against a party in any subsequent proceeding or elsewhere (Federal Rules of Evidence, Rule 501). Nevertheless, most mediations will typically follow a similar format and process. Depending on the extent of material and positions exchanged in advance, most mediations begin with a group session facilitated by the mediator during which there is a presentation of positions by each side through counsel, experts, and the parties. From there, most mediations shift to "shuttle diplomacy," with the mediator moving between separate rooms of parties. This involves an effort to provide feedback, develop arguments and positions, and move the parties toward resolution by the exchanges of various settlement offers and demands. In many mediation contexts, it is not at all unusual for the parties to remain completely separated following the group session until there is either a settlement to be consummated or there is an impasse such that the parties cannot reach agreement.

There are four factors that can be most influential toward the potential for success in mediation. They are:

1. Party Participation and Authority

The goal of mediation is to bring the parties together to agree among themselves to a resolution of a dispute. In the process, a collateral benefit may even be the preservation or resurrection of an important relationship. The chances of achieving either objective decrease dramatically if the necessary parties are not personally present. "Telephone standby" is simply not an adequate substitute.

Party representation must include those with adequate factual knowledge to address and evaluate the factual issues in contention. Mediations can stall over the lack of factual research, or input from the "technical people," or the presence of those with the authority to make the decision to reach a resolution. Authority involves the express legal credentials needed to settle as well as the financial backing to support the process. Those necessary persons should be identified well in advance of the mediation with the verified commitment that they will be personally present as participants.

2. Selection of Mediator

One of the key advantages of the mediation process is the opportunity to independently evaluate and voluntarily select a mediator. In contrast to publicly appointed judges and commissioners who regularly hear a wide variety of unrelated matters, few of which actually relate to construction or architects, mediators can be selected for their particular expertise in the subject matter, experience with design and construction disputes, reputation, and approach. The most important considerations for the selection of a mediator include the following:

Expertise

Expertise in the subject matter and the mediation process is important for two reasons: It creates credibility and it empowers the mediator as the guide in the process. Each is critical to the success of the mediation. Subject matter expertise makes the process far more efficient and creates credibility in the feedback and evaluation. Process expertise facilitates the efficient and productive exchange of information, which then flows into an efficient process of feedback and negotiation, tempered by a mediator with the skill to avoid or work around impasses. Because these combined talents are rare in combination, most mediators tend to be retired judges or attorneys who have practiced in the subject matter. Each has its merits. Under both the AIA and the AGC model agreements, both mediation and arbitration are referred to the American Arbitration Association (AAA), which has rules expressly tailored to the construction industry and which tends to be dominated by attorney mediators with some construction professionals as well. The other major competitor nationally is the Judicial Arbitration and Mediation Service (JAMS), which tends to have a far higher percentage of retired judges in its panel. There are also countless other local and regional providers for both mediation and arbitration services.

Energy

Good mediation is hard work. It takes focus and energy to take in and quickly analyze information, which the parties may have been dealing with for years, listen to their positions, provide relevant feedback, and then facilitate a negotiation to resolution. Passive mediators generally add nothing to the process other than a conference room and the forced experience of having to explain positions to a third party. The other reality is that not all mediations are immediately successful on the initial effort. Good mediators will take the time and have the drive to follow up and continue to pursue resolution for the parties rather than simply providing a one-time forum.

Empathy

Generally speaking, mediators do not make decisions. As a result, mediation resolves a dispute only if the parties themselves agree. To move parties to that position, one of the most important traits and tools of any mediator is the capacity to truly listen and convey an understanding of that party's position. They must connect. With that as a backdrop, the mediator can also then juxtapose that position as to the other positions, information as a means to lead the party into making their own decision for resolution.

Perspective and Persuasion

Finally, good mediators frequently put themselves on the line. As one of the leading construction mediators in the country will frequently say, the mediator's only tool is the "power of persuasion." Their capacity to do so is ultimately the greatest key to selection and the greatest differentiator. Persuasion is driven by the mediator's capacity to convey two perspectives with credibility: that is, the perspective of a third party who might ultimately decide such a matter if not resolved by agreement, and the perspective of a party who has confronted similar disputes many times. Good mediators are willing to share these perspectives. Not surprisingly, the quality of this perspective and its persuasive power builds largely on the first three components of expertise, energy, and empathy.

3. Adequate Advance Exchange of Information and Positions

"Mediation by surprise" does not work. If parties receive information and positions for the first time on the day of mediation, they really are unprepared. In this situation, the parties have little chance of adequately considering the information and adjusting their own positions accordingly, in order to be prepared for resolution. Nevertheless, it is amazing how often parties come to mediation without an advance exchange of information provided with adequate time to evaluate. Although each situation is unique, as a general rule, it is important that the parties share their positions with each other and the mediator at least a week to 10 days in advance. Depending on the circumstances, it may be appropriate to lengthen this time and even provide a time for responses to the position statements.

In addition to the open statements, parties may have information they do not want to share with the other side or publish, but which may be useful to the mediator. Most mediators will operate under two levels of confidentiality. One level is that confidentiality and privilege which attaches to the mediation process under the rules of evidence and civil procedure. The other is an internal level of confidentiality whereby a party can share information only with the mediator with the understanding that it will not be shared with the other side. With respect to position statements, this internal level of confidentiality is sometimes best accomplished by providing a second confidential statement to the mediator alone.

4. Timing

The final issue is timing. Mediation can occur at any time in a dispute and even after a "final" judgment is handed down by a judge, jury, or arbitrator. However, by that time, countless dollars have been spent and hours lost to the process. Moreover, the underlying relationships may have been irreparably damaged. For that reason, the AIA, AGC, and other model agreements call for mediation as an initial step. However, absent a specific provision to the contrary, mediation can often be slow to start and can drag on for an indeterminate period of time. Ideally, the mediation would be contractually mandated to proceed within a short period of time (e.g., 30 or 60 days) and to be declared completed within some short period time thereafter which allows for follow-up, but not an endless process (e.g., 2 weeks or 15 days). The AIA B101, Art. 8.2.2 defers to the AAA Construction Industry Rules for deadlines, but effectively establishes a minimum 60-day deadline by suspending other litigation for that time period. The ACG Consensus Doc 240 is more specific and provides that the mediation shall commence within 30 days of the demand and shall be completed within 45 days.

5. Settlement

Although mediation is not required to achieve it, the goal of mediation is a "settlement" resolving the dispute. Whether as a result of mediation or direct negotiation, just as with the contract, it is critically important that this settlement agreement be reduced to a written agreement as soon as possible, to avoid differing recollections and "buyer's remorse." In addition to any monetary terms, it is important that the settlement agreement be specific as to the parties included and the scope of the release. The goal should be a final resolution of all issues as to all parties and even the project as a whole. Generally, this is referred to as a "project release." If it is less than a complete release, the agreement should be very specific as to what is included and what is not.

Arbitration

Arbitration is the process whereby the parties voluntarily submit their disputes for resolution by one or more impartial third persons instead of by a judicial court process. Absent an agreement to arbitrate in the services agreement or a subsequent agreement at the time of the claim, there can be no arbitration. Although arbitration may take many procedural forms, a dispute resolution mechanism is not really arbitration unless it has all four of the following characteristics:

1. A private/third-party decision maker chosen by the parties or by a service provider chosen by the parties
2. A mechanism for ensuring neutrality in the rendering of the decision
3. An opportunity for both parties to be heard
4. A binding decision or result (*Cheng-Canindin v. Renaisance Hotel Assocs.* (1996) 50 Cal.App.4th 684)

> ### A TALE OF THREE BATTLES
>
> In one recent condominium claim, an architect learned the importance of coordinated dispute resolution provisions the hard way. As a result of differing arbitration provisions with the owner and consultants, which preselected two different arbitration providers, and an owner-contractor agreement, which made no provision for arbitration, the architect was forced to simultaneously participate in two separate arbitrations and a separate lawsuit.

Parties can be included in and bound by arbitration only if they have agreed to do so. Most design and construction disputes are not isolated to a single party, but may also include multiple other parties such as other design professionals, contractors, subcontractors, and supplier/manufacturers. Although there may be very isolated strategic exceptions, it is generally critical for efficiency and fairness that all such parties and disputes be resolved in a single arbitration. Accordingly, the agreements should and must be coordinated for those purposes.

If a consistent contractual template such as the AIA standard form agreements is used for all parties, generally the arbitration or dispute resolution provisions will be coordinated. The AIA provisions then provide for permissive joinder of all related claims and actions into a single proceeding (See AIA B101, § 8.3.4 CONSOLIDATION OR JOINDER), and require that disputes with consultants that involve the owner be resolved according to the dispute resolution method selected in the owner-architect agreement. However, the 2007 AIA agreements and the AGC ConsensusDocs each present a potential failure point for arbitrations that may involve the contractor, because arbitration is no longer the automatic or default option and the parties may elect either arbitration or litigation. If different options are selected for different parties, there may not be a single proceeding and venue for resolution.

The AGC ConsensusDocs seeks to overcome this by affirmatively requiring that all parties be committed to the same dispute resolution process. It provides:

> 9.6 MULTIPARTY PROCEEDINGS The Owner and Architect/Engineer agree that all Parties necessary to resolve a claim shall be Parties to the same dispute resolution procedure. Appropriate provisions shall be included in all other contracts relating to the Project to provide for joinder or consolidation of such dispute resolution procedures.

Arbitration has many fans. It has been a preferred option for both the AIA and AGC. It is included in many public works agreements and private developer agreements. Each proponent likely has its own reasons for arbitration, but the most common perceived advantages to arbitration are as follows:

- Private—the dispute is not confidential, but arbitration awards are not published. Limitations on this privacy may exist on public projects.
- Greater control over selection of decision maker, and better-qualified and experienced decision makers.
- Faster due to avoidance of court congestion and timing and more limited prehearing procedures and discovery.

- Less costly, due to little or no discovery and shorter path to hearing. However, the arbitrator(s) themselves must be compensated.
- Avoidance of lay juries.

However, there are also downsides. Among those most often mentioned as a reason to avoid arbitration are the following:

- Scant discovery. Generally, absent an agreement by the parties there is no right to "discovery" by deposition, interrogatories, or requests for documents. As a result, much of the information is revealed at the arbitration itself and can be a surprise.
- Less opportunity for dispositive motions such as demurrers, motions for summary judgment, and motions to strike, although arbitration rules may accommodate them.
- Can be costlier than civil litigation. The fees for even a short arbitration can run well into five figures.
- Limited judicial review. Decisions from trial courts may generally be appealed to a higher court, but arbitration decisions may only be reviewed for abuse of arbitrator discretion.
- Perception that arbitrators practice "justice by halves" and are more likely to issue compromise awards.
- Limited rights to join third parties.

As a result, the decision whether to elect arbitration is not one to be taken lightly. The decision-making process should consider the following:

- Can/are all necessary parties included in the same arbitration process?
- Are there issues or tools such as lien rights, stop notices, foreclosures, or bonds that are not available in arbitration?
- Is it likely the dispute is better decided by an arbitrator than a judge/jury? If not, is there a part of the dispute or a limited dollar value that would be?
- If there is a dispute, will the parties likely have all of the necessary information or will they need recourse and access to it?
- Is publicity a likely concern for a dispute on this project? Can privacy realistically be maintained by arbitration (i.e., not a public entity claim)?
- Will the expense of arbitration be a problem?

Once arbitration is selected as the dispute resolution forum, there are then multiple considerations for the arbitration itself and the success of that process. Among those issues to be prioritized for consideration are the following:

- *The arbitration provider.* While arbitrators need not be affiliated with an organization or provider, most arbitration will utilize a provider. As stated above, the AIA and AGC contracts both designate the AAA as the provider. One great advantage to that selection is that the AAA has developed arbitration rules specifically applicable to the construction industry. Other providers have some rules of their own. The key advantage to such rules is that they create a predictable structure and process that might otherwise be lacking. The fee structures and policies of various providers can also vary widely. Accordingly, a good provider is a critical first choice and there are many local, national, and international options.
- *The number of arbitrators.* Most arbitration will proceed with a single arbitrator or a panel of three. The advantage of the panel is that it provides a sense of balance with the expectation that each side will have some perspective on the panel. It also triples the cost and can greatly slow the process.
- *The selection of the arbitrator.* The preferred option would always be for the parties to mutually agree as to the selection of the arbitrator. Most providers will give the parties an opportunity to do so from a panel, and the parties would generally have that option in any event. Where they cannot agree, providers such as the AAA will generally give the parties the opportunity to strike and rank potential arbitrators from a panel and then appoint the arbitrator with the highest combined ranking.

The attributes of a good arbitrator are similar to those of a good mediator—in particular, the first two qualities of expertise and energy. From there the key attributes of an arbitrator would likely be intelligent, open-minded, and fair. Each will have these to some extent; and each party inevitably will seek to secure an arbitrator whom they perceive as more sympathetic to their perspective. Most often this comes out of some perceived industry bias, but this can also be a danger because an arbitrator with that historical alliance may go to some considerable lengths to avoid any such perceived bias.

Finally, and sometimes most elusively, a good arbitrator must have the genuine capacity to make decisions. Arbitration is about a dispute. Generally, someone will or should win and someone will or should lose. Too often arbitrators are stereotyped as being inclined toward compromise awards so as to avoid hard feelings. Arbitration providers deny the stereotype, but it is still pervasive. It is important to find arbitrators who can and will make the difficult decisions and, if required, make them early in the dispute to eliminate or truncate claims and save costs.

The arbitration procedures and discovery. As stated above, the default for most arbitration is a very limited exchange of information, which may be as little as an exchange of documents and proposed exhibits. While very efficient, most participants agree that it is too little and does not really allow for adequate preparation or for an arbitration that is efficient and reliable. Accordingly, most arbitration participants will seek to and do negotiate some limited terms of exchange and discovery. A good starting point for such a plan would include the following:

- Statement of claims and response
- Exchange of relevant project records
- Third-party discovery through document subpoenas or depositions
- Limited party depositions
- Expert identification and exchange of reports
- Limited expert depositions
- Pre-arbitration briefing and identifications of exhibits
- Pre-arbitration motions and rulings to limit arbitration hearing

The key to the foregoing is to make it limited and tailored. To do otherwise would convert the arbitration into the equivalent of private litigation, with all of the costs and waste of unfettered discovery. (See Table 16.3.)

TABLE 16.3 Comparing Arbitration and Litigation

Arbitration	Litigation
Parties have input as to decision maker	Court-appointed decision maker
Expertise of decision maker	General judge or lay jury
Private	Public
Faster	Delayed
Limited parties	All parties
Limited discovery	Unlimited (and expensive) discovery
Limited procedures	Extensive procedures
Less attorneys fees/more hard costs	More attorneys fees/less hard costs

Litigation

Litigation is the default resolution venue. Absent an agreement to the contrary, this is where nearly all disputes involving architects end up. It is simply the public court system provided by local, state, and federal governments and it is subject to the rules and procedures adopted by those governments. It is "the American way." It can be slow (years), expensive, distracting, time-consuming, and public. The good news is that generally the out-of-pocket costs to access the courts can sometimes be less than arbitration, and the procedures are time tested and well known.

The "Special Master" Hybrid

In response to the competing issues with mediation, arbitration, and litigation as well as the congestion of the courts, many states and jurisdictions now frequently make use of "Special Masters" who effectively act as a hybrid of arbitrator, discovery referee, and mediator. A construction dispute is filed in the courts and the judge appoints a private Special Master to oversee the exchange of information and facilitate settlement discussions. Rather than allowing the wide-open, inefficient, and wasteful discovery of general litigation, such Special Masters will often tailor processes and orders for the exchange of information, which is similar to the efficient exchanges of most arbitrations. Armed with that insight as well as the Special Master's own expertise, settlement discussions essentially equivalent to mediation are then incorporated into the process.

Early Non-Facilitated Resolutions

All of the foregoing discussion regarding mediation, arbitration, and litigation contemplates the involvement of third parties to assist in or resolve the dispute. This is often critical to getting the parties to come together or to achieving a resolution. However, others may rightly suggest that what may be needed is merely for the participants to just talk to each other and to listen. Human nature being what it is, this does not always happen on its own. To compel such a process, many agreements incorporate such required communications into their dispute resolution process and even as a required precursor to formal processes. The AGC ConsensusDocs is such an example (See AGC ConsensusDoc 240, Section 9.2).

Ideally such a process is a rapid, phased, and escalating process with limited rounds. In the most streamlined of processes, it would start with a mandatory meeting between the project managers within five business days. If they cannot resolve the issues, it would then "escalate" to the principal level for a second discussion within five business days based on written summaries provided by the project managers to both principals. It is amazing how often such processes will resolve issues before they escalate into a genuine dispute. If that is the happy result of such a process, it is important that the resolution be memorialized in writing and signed by both "sides." If not properly motivated, however, parties may abuse required discussions to further delay the path to a formal process.

CONCLUSION

As a final word, there are three admonitions that will serve architects well in resolving disputes. They are:

- *Engage.* Dispute avoidance and resolution is not a passive process. It takes a proactive, pragmatic, and strategic energy from the participants and an open mind. Bring all of this energy to the issue.
- *Engage your support network.* While architects can and often do seek to resolve issues alone, they need not do so, and do themselves a disservice in the process. Professional liability insurance brokers and carriers provide a ready network of support. As appropriate, architects should also engage experienced attorneys and consultants to guide and support them. Choose professionals that have seen these issues before and bring with them both experience and third-party detachment.
- *Secure closure.* Too often, issues are ignored or postponed. Even when architects think the issue has resolved or gone away, it may reappear unless there is a definitive written and communicated resolution of the issue. Documentation and distribution of agreements is critical to dispel uncertainty and recurrence.

For More Information

American Arbitration Association: www.adr.org.

Judicial Arbitration and Mediation Service: www.jamsadr.com.

"Mediation 101 for Architects," *Architectural Record* (September 2008) by B. J. Novitski.

CHAPTER 17

Agreements and AIA Document Program

17.1 Agreements with Owners

Alan B. Stover, Esq., AIA

The architect's agreement with the client should reflect the goals and expectations of both parties and establish the conditions under which services will be rendered.

Other Handbook articles deal with defining the scope of a project and the professional services it will require, the compensation that is needed to support the needed level of services, and techniques for negotiating agreements. The importance of managing risk in an architecture practice is reviewed in Chapter 16, Risk Management. All of these concerns come together in the contract that the architect enters into with the client.

The AIA has traditionally used the term "agreement" in the titles of its professional services contracts and for the "front-end" document in a construction contract (the owner-contractor agreement form) that establishes the scope, time for completion, and method of payment, separate from the general terms and conditions of the contract. However, there is no special legal significance to AIA's choice of terminology

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in the titles of its documents. An executed professional services agreement form is, in fact, a contract.

PREREQUISITES FOR, AND BASIC TERMS OF, A LEGAL CONTRACT

In order for a business relationship to be recognized as a contract enforceable by law, it must meet some basic tests, and the terms of the contract must be sufficiently clear that the performance required of the parties can be determined.

Legal Prerequisites

Mutual Agreement: A "Meeting of the Minds"

There must be a mutual agreement between the parties as to the essential terms of the contract. This agreement is normally reached through the process of offer and acceptance, and results in a "meeting of the minds." The negotiation process may involve many offers and counteroffers before the terms of the contract are settled on. Until both parties have agreed upon the identical terms, there is no agreement. Any terms raised during negotiations that have not been agreed upon do not become a part of the contract.

▶ Negotiating Agreement (15.3) discusses negotiation as a problem-solving skill that can be learned and mastered.

Consideration

A contract does not legally exist unless there is an exchange of values—what lawyers call "consideration." This is what distinguishes a contract from a gift. Each party must give something of legal value to the other: either a benefit conferred on the other, or a detriment incurred. Mutual promises are recognized as having legal value. In the normal situation, the architect promises to provide services, and the client promises to pay the architect's compensation.

Past consideration or a preexisting obligation does not qualify as consideration. An agreement made by a client that the client will pay the architect's past-due invoices in exchange for some additional services would "fail for lack of consideration"—even if the architect expressly agreed to the arrangement.

Capacity

Capacity is the legal ability of the parties to enter into a contract. While classic issues of age, mental incapacity, and incapacity due to the influence of drugs or alcohol rarely arise in contracts for architectural services, conviction of a felony may put someone under a disability, particularly in contracting with the federal, state, or local government. The Consolidated Appropriations Act of 2012 prohibits certain federal agencies from contracting with any corporation that has been convicted of a felony within the past 24 months. Companies can be debarred or suspended by government agencies for fraud, waste, mismanagement, or even for being delinquent in their tax payments.

Legal Purpose

If the underlying purpose of the contract is illegal, or if the contract requires the performance of an illegal act, the contract is void from the outset. This could come into play if the architect has agreed to provide services for a project in a state or jurisdiction in which the architect is not licensed. The courts will not facilitate the performance of an illegal act by enforcing the contract, and the unlicensed architect could be left without legal recourse to collect any unpaid fees.

Contractual Intent

The parties to a contract must have the mutual intent of entering into a binding legal agreement on the terms specified. This mutual intent may not be present because of a mutual mistake of fact, or where there has been the misrepresentation of a material fact or outright fraud, or because of the use of undue influence, or physical or economic duress.

There is a difference between hard bargaining and economic duress. An architect may enter into an economically disadvantageous contract because the economy is bad and there are no other commissions to be had. The client who takes advantage of the architect's financial distress may be a sharp operator, but is not putting the architect under economic duress.

Necessity for a Writing

Only certain types of contracts are required to be in writing under what is called the Statute of Frauds, and this only affects the enforceability, not the underlying validity, of a contract. Examples include contracts for an interest in real estate (including the sale or lease of property), contracts that by their terms cannot be performed within a year, financial guarantees, and contracts between merchants under the Uniform Commercial Code for goods valued at $500 or more. Of particular interest to design professionals, under the copyright laws any transfer of an interest in a copyright (such as the copyright in a set of drawings that the architect has prepared) must be in writing. Ownership of the drawings, even in an electronic form, is separate and distinct from the architect's ownership of the copyright that is embodied in them. Thus, a transfer of the drawings to another party such as the client does not result in a transfer of the copyright: That must be covered by a specific written agreement.

► See the backgrounder Copyright Law for Architects (5.1) for a detailed discussion of intellectual property and copyrights.

Essential Terms, Express and Implied

The terms of an agreement must be sufficiently definite in order for it to rise to the level of a contract. Essential terms include the subject matter of the contract such as the services to be performed, the time for performance, and the price to be paid for those services. In the absence of any of these terms, the contract may "fail for indefiniteness," severely limiting the remedies that an architect might have.

Services to Be Provided

Is it enough for an architect to agree simply to design a client's house and still have an enforceable contract? Probably not, given the complexity of modern design and construction. In order to provide the necessary specificity, it will be important to describe the project, including such things as its location, building and construction type, approximate size or capacity, quality, and estimated cost. Services may be intangible in nature and abstract in their definition, and even when they are described in some detail, it is important to also define the deliverables that will result. In doing so, the architect should be careful to make it clear that the architect is providing and the client is purchasing services, not drawings. Since 1865, the AIA has taken care to define drawings as "instruments of service."

Compensation

Compensation is an essential term of any contract. Without it, the contract can "fail for indefiniteness." There are limited circumstances in which a court may supply a missing term of such importance.

If the agreement is silent on the subject of compensation, a court may be able to supply an implied term of "reasonable compensation." What is reasonable might be measured by the price that a client has previously paid the architect for similar services, or by what the architect normally charges for such services, or by what architects in the community normally charge or are paid for similar services. Obviously, it is better to have a specific agreement than to have to rely on others to determine what one deserves to be paid.

Time of Performance

The time of performance is an essential term of any agreement. If the time term is not specified, courts may sometimes find that there is an implied agreement that performance (such as when payments are due) will take place within a "reasonable time."

The timing of architectural services often depends on external factors over which the architect has no control, particularly the time required for the periodic client approvals needed for the architect to proceed and building code review and approval of the construction documents. While it may not be practicable to include a schedule in the contract, a provision addressing the time for the performance and completion of the architect's services should be a part of every contract. The architect must be careful that any provisions on time of performance take into account delays caused by the client and external factors.

Express Terms

Express terms of a contract are those that have been specifically agreed upon, whether verbally or in writing. Courts generally require that certain undertakings be express, such as an agreement to indemnify another party.

An architect may tell the client during negotiations that schematic design studies will be completed within 60 days. If the agreement is not in writing, the 60-day commitment is nevertheless an express term of the agreement. However, when and if the agreement is reduced to writing, it is important that all terms be included in the written contract, which generally supersedes any prior oral or written understandings or agreements. Most courts will not allow such "extrinsic" evidence to vary or add to the terms of a written agreement that appears to be complete and unambiguous on its face.

The terms of the contract will be interpreted based on the reasonable meaning of the words that were used by the parties, or by common usage in their line of business, or by the conduct or course of dealing of the parties themselves. If the architect agrees to design a commercial retail space in a shopping center as a "vanilla shell" and agrees to produce a "permit-ready set" of drawings, these terms will have meanings that can be defined with fair certainty. Difficulties arise when commonly used words such as "estimate" and "inspection" have special meanings of which the client may not be aware.

Implied Terms and the Architect's Standard of Care

Implied terms in a contract are not specifically mentioned and have to be inferred. They include terms that are a necessary consequence of what the parties have undertaken to do. For example, under the professional standard of care, the architect has a duty under the building code to comply with the design requirements of that code, and it can be implied in a contract for architectural services that the architect will fulfill that duty. Whether the violation of a building code provision related to design is considered to be evidence of negligence in itself (negligence "per se") or merely as evidence of negligence varies among jurisdictions.

While the architect's contract specifies *what* the architect will do, the manner in which the architect's services are performed is generally determined by the professional standard of care. Architectural agreements have historically been silent on the architect's responsibility for code compliance and for the adequacy of its construction documents. It went without saying that the architect was obligated to fulfill these responsibilities under the architect's professional standard of care. A few cases have held that architects impliedly warrant that their services have been performed in accordance with the professional standard of care.

Since the 1970s, more sophisticated owners have insisted on including express terms in the architect's contract. Some of these terms have the effect of imposing a higher standard of care, and must be scrutinized carefully because they may go beyond what is covered under the architect's professional liability insurance. The current AIA agreement forms address clients' desire for more specificity by including a statement of a standard of care that is consistent with the law.

► Risk Management Strategies (16.1) further addresses standard-of-care issues and how to know and manage the risks inherent in architecture practice.

TYPES OF AGREEMENT

Agreements between architects and their clients can take many forms.

Oral Agreements

Oral or "handshake" agreements should be avoided except for the simplest, shortest, and least costly undertakings on behalf of a known and trusted client. While they may fulfill the legal necessities of a contract, oral agreements usually leave too many things unsaid: Movie mogul Samuel Goldwyn is reputed to have said that "verbal agreements aren't worth the paper they are written on."

Some state laws—particularly consumer protection laws—require that certain types of agreement be in writing. This can extend to agreements for architectural design services.

The biggest problem with verbal agreements is proving what terms were actually agreed upon. By the time a misunderstanding develops into a legal dispute, the parties may have vastly different recollections of what was agreed to—such as whether there was an understanding that the building would not exceed a certain cost. When the architect is put in the position of working under a verbal contract, even if it is based upon a detailed proposal or contract form that the client has neglected to sign and return, it will serve the architect to confirm the terms of any verbal agreement in writing as soon as possible, and before beginning performance.

Letter Agreements

Letter agreements are sometimes used to confirm a prior informal verbal agreement, perhaps with the addition of a few terms not previously discussed. They may fulfill the legal necessities of a contract if they cover (1) the services to be provided, (2) the price to be paid, and (3) the time of performance, and provide for the client to return a signed copy confirming the client's acceptance. Like oral agreements, however, letter agreements often leave out too many things, and if the client does not countersign with its acceptance, the letter may not prove the terms that were actually agreed upon.

One variation on the letter agreement is the detailed proposal letter that an architect may submit to a client. This approach is commonplace in all types and sizes of firms. Architects' proposal letters typically describe the project, the scope of services, and the proposed compensation, all in some detail, but all too often omit many of the "boilerplate" terms and conditions such as are found in the standard AIA agreement forms. To remedy that omission, a proposal should incorporate by reference or attach an AIA form or other terms and conditions document.

If a client responds to the architect's proposal with any change in the terms, this is legally considered to be a rejection of the architect's proposal and a counteroffer. This exchange of offers and counteroffers may continue for several rounds before a final agreement is reached. The architect should take care to see that all of the terms of the agreement are restated in the final exchange.

If a letter agreement is subsequently replaced with a formal written contract, the contract's "integration clause" should note that it specifically supersedes the prior letter agreement. This will avoid having two potentially inconsistent contracts operating simultaneously.

What if a client responds to a proposal by asking the architect to proceed with the services as outlined, but without making a firm commitment to the price or other terms or returning a countersigned copy? If the proposal (or an attached AIA agreement form) is never signed by the client, the oral authorization to proceed may be the only contract there is, and it will be subject to all of the same difficulties encountered with oral agreements. The written proposal or AIA form will only be *evidence* of what the agreement is, not definitive *proof*.

One way to address the possibility that a client may not countersign and return the written proposal is to provide in the proposal for the manner in which it may be accepted by the client: in effect, by creating a "self-executing" proposal. The architect could do so (with the assistance of an attorney) by including a statement in the proposal that the terms of the proposal (and/or the attached AIA agreement form) can be accepted by the client's giving authorization for the architect to proceed with the services described in the proposal.

AIA's Owner-Architect Agreement for a Residential or Small Commercial Project, AIA Document B105™–2007, has been designed as a substitute for a simple letter agreement on smaller projects.

Formal Written Contracts

Formal written contracts identify the parties to the contract, describe the scope of the project and services to be provided, the architect's compensation, and the time of performance, and indicate the parties' acceptance by their written signatures. They often include additional terms and conditions.

Contracting parties should take pains to see that their written contract is a complete expression of their agreement. Any conditions or contingencies should be spelled out in the written contract. When a contract is in writing and appears to be complete and unambiguous on its face, the courts are reluctant to look beyond the written words.

Standard AIA Contracts

Standard AIA forms of agreement for architectural services were first introduced in 1917. Today, the AIA publishes many different forms of owner-architect agreement. Although these "B-series" documents share many of the same provisions, each addresses a particular range of circumstances. The various architectural services agreement forms are found in coordinated families of documents.

► The AIA Documents Program (17.5) discusses the range of standard form agreements included in the AIA Contract Documents.

AIA's standard forms of agreement are based on general principles of law prevailing in the United States. However, variations in state and local laws may affect the form and substance of agreements, particularly consumer protection laws that may affect contracts with residential clients. The architect should be aware of the laws in every jurisdiction in which the architect practices. Variation in both statutory and case law among jurisdictions is one reason why architects should consult an attorney about using, completing, or modifying a standard form.

There are many advantages of using AIA standard forms, for both parties:

- The forms describe the services typically provided by the architect in some detail, and in terms that have been widely used in the industry; they also describe the client's responsibilities.
- AIA forms cover the situations, conditions, and contingencies that are most frequently encountered, such as the need for additional services, what happens when the building as designed will cost more than was originally anticipated, and the client's rights to use the work product of the architect.
- They describe not only the extent, but many of the *limitations* of the architect's services, responsibilities, and authority, so as to avoid major misunderstandings.
- AIA agreement forms are carefully coordinated with other contracts and forms that will be used on the project.
- Great care is taken to see that the forms are objectively reasonable and fair, and that they will be legally enforceable by all parties. The documents have a long history of acceptance by the courts.

Some clients may express a reluctance to use a standard printed form for fear that it may be one-sided in favor of the architect. The best way to overcome such a fear will be to engage the prospective client in a review of the specific terms of the agreement to identify any provisions that are of particular concern.

SPECIAL CONSIDERATIONS

Any agreement for architectural services will need to take into account some special considerations, including the following.

Nature of the Owner, Their Capabilities, and Successors

Individual Clients

Individual clients building for themselves or a small business (as opposed to business entities or institutional clients with building programs) rarely have much experience with architects or building construction, and so may have expectations that differ from normal industry practice. For instance, a client may need to understand that an architect expects to be paid for its services whether or not the client decides to proceed with construction. It is extremely important that an agreement be reached regarding any construction cost limitations. "Design creep" can easily take the construction cost of a project beyond what the client expected to spend, and the architect must be prepared to keep rein on the client's expectations. Likewise, the client will need to understand that "schedule creep" must be controlled, as it can delay a project beyond the anticipated construction commencement or completion date.

Individuals sometimes mix their business and personal affairs. If there is a business use involved, the individual may own the business outright or be part of a business entity such as a partnership. It is important to determine whether the client is the individual or the business entity. Care must also be taken when dealing with married couples or partners in civil unions. A client's spouse or domestic partner may not be bound by an agreement entered into solely by the client.

Most projects involve improvements to real property. In order for the architect to secure its lien rights (if available), the architect should check to see that the client is in fact the sole legal owner of the property.

Individual clients building for their own use may fall under the protection of certain state and local consumer protection, new-home, or home-improvement laws and regulations.

AIA Document B105™–2007 is a form of agreement that may be appropriate for small residential projects.

Small Businesses

Small businesses may take many different forms, from individual proprietorships to partnerships, limited liability corporations, and business corporations. A business may be "trading as" or "doing business as" using another name. Some of these forms of business will give the individual limited liability for the debts and obligations of the business. It is important for the architect to know exactly who the client is, and to determine the client's fiscal responsibility. The architect should also check the state corporations or franchise tax office to determine that the business has a legal existence and is in good standing with the state.

AIA Document B104™–2007 is a form of agreement that may be appropriate for small to midsize projects that are of limited scope and complexity.

Corporate Clients

Corporations, limited partnerships, limited liability companies, and other business entities such as real estate investment trusts operate through individuals, but not all corporate or entity employees have the authority to make binding commitments. It is important to know the capacity of the individual(s) with whom one is dealing. Unless that individual is the corporate president or CEO with clear authority to commit the organization, the architect should determine just what the individual's authority is. It is not uncommon for the owner's project manager, to whom the architect reports, to be employed by an entity different from that with which the architect has contracted (making the individual an agent of the client). It is far better for the architect to be able to rely on actual authority, stated in the contract, than on the apparent authority of an agent of the client.

In addition, the architect should also determine what relationship the client corporation has to the real property that is to be improved. The actual owner of the property may be a "shell" corporation with no unencumbered assets; it could be a wholly owned subsidiary; or a separate corporation controlled by or under common control by the client. The client may want the contract to be with one entity, but have the architect report to people in another company. These corporate interrelationships need to be sorted out.

Most corporate projects are constructed for the company's own use and occupancy for an indefinite time into the future. Thus, the company may be more interested in sustainable design, the comfort and convenience of its employees, higher quality of construction, increased energy efficiency, and longer-term savings in operating costs than in a lower initial cost of construction. A corporate client may also offer the architect an opportunity to provide extensive additional services, such as interior design.

AIA Documents B101™–2007 and B103™–2007 are forms of agreement that may be appropriate for larger and more complex projects.

Nonprofit Organizations and Institutional Clients

Nonprofit organizations and institutional clients such as educational and health care institutions usually have a corporate organizational structure; however, they differ from business corporations in their outlook. Because these organizations are less oriented to making a profit than providing a service, the construction of a building may not be viewed as an investment that must have a measurable return. These organizations may be much more receptive to making expenditures for sustainable design and measures that require an extended amortization period.

Many nonprofit organizations work on extremely tight budgets. They may expect their professional service providers to contribute part of their services or work at reduced rates.

AIA Document B101™–2007 may be an appropriate contract to use for typical institutional building projects. AIA Document B106™–2010 has been developed for those situations in which an architect is performing services on a pro bono basis. A version of B101™–2007 for use on sustainable projects, B101™–2007 SP, is also available, complementing other newly published AIA documents for sustainable projects.

Public Sector Clients and Publicly Funded Clients

Contracting with a public sector client differs in many respects from the private sector. Architects seeking to work for the public sector should first be aware of the selection procedures utilized by an agency.

One paramount principle of government contracting is that an agency generally cannot legally contract for services without a specific legislative and/or budgetary authorization. Only certain designated officials have the authority to enter into contracts; contracts are invariably written, but often on an inflexible, non-negotiable government form that may or may not be up to date or appropriate for architectural services. There are many rules and regulations that may be incorporated into a contract or that will apply independent of the contract, such as accounting rules that may affect the architect's entire practice. The architect is obligated to be aware of and comply with these regulations whether or not they have been brought to the architect's attention.

Government contracts can be extremely difficult to modify, such as to authorize the performance of or pay for additional services that may have been required of the architect. Some public sector forms of contract have borrowed liberally from prior editions of AIA Contract Documents. Some AIA components have worked with public sector entities to develop adaptations of the AIA forms that meet their specific contracting requirements but remain consistent with current architectural practices, services, and expectations.

Contracts with clients whose funds are provided by public sources such as grants or loans will also involve restrictions and regulations with which the architect must be familiar.

Users may consider the specialized scope of service forms in the B200 series of documents for defining the scope of services to be provided in a public sector contract. AIA Document B108™–2010 has been designed for use on certain federally funded or federally insured building projects.

Developers

Contracting with a real estate developer is different in many respects from the average business client who is building on its own behalf. Professional developers are usually very familiar with the market for design services and construction. They often have a very definite idea of the services that they want, and how much they are willing to pay for them. While some developers have begun to see the value in having a LEED-certified building, many speculative builders may still be driven by the desire for a project that has the lowest possible initial cost—and this includes their architectural services.

Developers are among the client types who prefer to use their own form of contract, and the terms they seek to impose on the architect can be very one-sided. Many developers and their attorneys now use the AIA Contract Documents software as a starting point for their agreements, so some of the language in a developer's agreement form may be familiar to the architect. However, the presence of familiar language may be deceptive, as the language changes may be subtle and the modifications (particularly deletions) may be extensive, substantially changing a document's legal effects. Engaging a knowledgeable attorney may be necessary in order to negotiate a contract with acceptable risks.

► See Owner-Generated Agreements (17.3) for further information about how to evaluate terms in such agreements.

Typically the owner of the property to be developed is a single-purpose entity that only exists on paper and has no other assets other than the property, which is already fully encumbered by a development or construction loan. It is important for the architect to ascertain just what the relationship is between the developer and the client who signs the contract.

Because the project may be highly leveraged and offer no source of financial recovery for the architect, it is important that during the course of the project, the architect keeps current with its billings and keeps the client current on its payments. Services that have not been billed or fees that are in arrears may be very difficult to collect if the developer or the project encounters financial problems.

One consideration that should be kept in mind is that the project may be one such as a condominium apartment building that the client will be turning over to one or more new owners after it is completed. This may expose the architect to potential claims from many subsequent purchasers for alleged deficiencies in design and construction.

AIA Documents B107™–2010 and B109™–2010 are forms of agreement that may be appropriate for use with developers of single-family residential projects and larger, mixed-use developments, respectively. In addition, AIA Document B509™–2010 provides supplementary conditions that may be used to modify B109 for use in residential condominium construction projects.

Design-Build Companies

► Contractor-Led Design-Build (9.4) further discusses arrangements in which the contractor holds the prime contract with the owner.

Another class of client that the architect finds far different from others is the design-builder. In this situation, the architect no longer has a direct relationship with the ultimate client, and the architect may be working under a detailed set of design criteria developed by the owner or its bridging consultant. The architect's design decisions may be subject to a higher level of scrutiny for their impact on overall building costs. Decisions on finishes, materials, and equipment selection may be made by the design-builder rather than the architect. Finally, the architect may have a much diminished role in construction administration, perhaps limited to reviewing subcontractors' shop drawings, responding to requests for information (RFIs), and providing other services only on an as-needed basis.

Since the emergence of design-build in the 1980s, the AIA has promoted measures that help ensure that the architect will continue to have a meaningful and ethically proper role in the design-build process, even when serving as a consultant to a design-builder. AIA Document B143™–2004 is a contract specifically designed for use between the design-builder and the architect. If the design-builder is not using AIA forms for its agreement with the owner, B143™–2004 can be used as a reference to evaluate the form of agreement that the design-builder proposes that the architect use.

Nature and Extent of the Architect's Undertaking

The Baseline: "Full" Traditional Services

A client that has a definite need, knows its requirements, and has a budget and the means to pay for a project is in a good position to enter into a contract such as AIA Documents B101™–2007, B103™–2007, or B109™–2010, each of which will provide for a "full" scope of services that includes the traditional "Basic Services" plus "Additional Services" that may range from programming and site selection through postoccupancy evaluation. The architect may be able to assemble a project team for the duration of the project and provide the services more efficiently than on a piecemeal basis. The higher degree of certainty in such a project may allow the architect to structure a definitive compensation package.

Feasibility and Design Studies

A contract for preliminary services such as feasibility and conceptual design studies will be most appropriate when the client is not entirely sure of its needs, its desires, or its finances. These types of services may be more open-ended, and it may be most appropriate to charge for them on an hourly or similar basis. It may be appropriate to contract for such services under the terms and conditions of AIA Document B102™–2007, with the scope of services found in B203™–2007, the scope of services document for Site Evaluation and Planning. Another example is AIA Document B142™–2004, the agreement form under which an architect will define the scope of a design-build project for the owner.

Procurement and Construction Phase Services

The architect who has an involvement in the bidding and negotiation phase is more likely to see that a construction contract incorporating AIA Document A201™–2007 is used. The AIA general conditions includes provisions affecting the architect's interests, such as notice of perceived errors or inconsistencies in the contract documents, insurance, indemnity, and waiver of subrogation provisions. Without any involvement during bidding, the architect will have no influence over the documentation that is used for the construction contract. The construction phase services of A201 are incorporated by reference into AIA owner/architect agreements. If A201 is not used, the architect's construction phase services written there establish a reasonable basis for the architect's compensation during the construction phase.

Some owners, particularly those with ongoing building programs, have the knowledge, experience, and personnel to manage the bidding and construction process and to take on much of the contract administration by themselves. Other owners will have hired construction managers to manage construction procurement and administration. In such cases, the architect's role during procurement may be limited to advising on the acceptance of various alternates, and during construction, to reviewing and approving submittals and making recommendations for (as opposed to certifying) payments to the contractor. See AIA Document B132™–2009, the agreement form that has been designed for use on construction management projects.

Unfortunately, there are also owners who lack construction procurement or administration capabilities, but do not appreciate the value of an architect's services during construction. Architects who contract to provide design services only should consider obtaining legal advice to protect their interests, which may be affected by what may happen during the course of construction.

The Architect as Subconsultant

Architects are not always the lead on a project with a direct contract with the owner. When the architect is in a subsidiary position, such as a subconsultant to an engineering firm on a project that has a high engineering component, the architect may not have a choice of which form of agreement to use. Because the architect will be assuming part of the prime consultant's responsibilities, and usually is subject to a "flow-down" of rights and responsibilities, it is important that the architect is provided with a copy of the prime consultant's agreement. Of particular importance will be any unusual allocations of risk in the prime agreement such as indemnity clauses, dispute resolution, and provisions requiring redesign in case of cost overruns.

As a subconsultant, the architect will need to know who is responsible for coordinating the work of the architect with that of the prime consultant, with other subconsultants, and with other prime consultants working for the owner.

As a subconsultant, the payment provisions of the contract need to be examined carefully. Will the architect be paid promptly for its services when billed? Will payment be made within a reasonable time after the owner has paid the prime consultant ("pay when paid")? Or will the architect be expected to bear the risk of nonpayment by the client ("pay if paid")?

▶ See Project Team Agreements (17.2) for a detailed discussion of consultant agreements.

The Architect as a Team Member

"Teaming" is a popular term in marketing but is extremely vague in describing legal responsibilities. In some forms of project delivery, such as design-build and integrated project delivery (IPD), the architect may be assuming legal obligations that extend not only to the ultimate client or project owner, but also to other team members. For instance, as a partner in a joint venture, the architect may have fiduciary responsibilities to its partners that go beyond the duties one would have to a client or consultant.

▶ Project Delivery Methods Overview (9.1) provides a broad discussion of project delivery options and trends.

The Delivery Method

The various construction delivery methods (i.e., conventional design-bid-build, cost-plus work, contracting with separate primes, fast-tracking or phased construction, construction management with a CM-adviser or CM-constructor, design-build, and integrated project delivery) will affect the design documentation that will be provided by the architect, as well as the scope and extent of the architect's construction phase services. If the client has determined what the delivery method will be at the time the owner-architect agreement is negotiated, that should be set forth in the written agreement, and appropriate modifications may need to be made in the architect's services and construction phase responsibilities.

The architect's design and construction phase services, as described in AIA Document B101™–2007, anticipates that the project will be procured and constructed in a conventional manner—a fixed-price contract with a single general contractor. This should be regarded not as a commitment by the client that it will use that process, but as the basis on which the architect prices its construction administration services. Review of alternative methods of delivery is a service that the architect provides under the standard AIA forms. If the owner determines that something other than a conventional delivery approach will be used, the architect will need to initiate a change in the agreement to reflect the approach chosen.

For instance, if the owner intends to contract on a cost-plus basis, the architect may have substantially more construction administration work to do, particularly in reviewing the contractor's documentation of expenditures and calculating allowable overhead and profit. Similarly, if construction will proceed on the basis of a third-party professional construction manager managing multiple separate prime construction contracts, the architect may be required to create multiple bid packages of construction documents for different trades. This may require substantially more effort than a single set of construction documents intended for a general contractor.

In such a case the architect may also have more limited construction phase responsibilities. The terms of the owner-architect and owner-CM agreement will need to be coordinated closely.

If the use of a cost-plus or multiple separate contracts can be anticipated at the time the contract for architectural services is entered into, or if the owner has preselected a contractor or construction manager with whom the architect will be working, these factors should be included in the agreement and appropriate forms selected and modifications made. If it is known that the owner wants to include the services of a construction manager as adviser, the architect may want to start with the AIA's Construction Manager as Advisor forms.

LEGAL AND RISK MANAGEMENT CONSIDERATIONS

Risk Management and Allocation

The professional services agreement is the primary vehicle for allocating risks between the client and architect. Some of the ways that this can be done are as follows.

► Risk Management Strategies (16.1) addresses the range of risks that architects encounter—and the strategies to manage them.

Architect's Disclaimers of Responsibility and Liability

Sometimes it may be easy for a person to read too much into an undertaking described in a contract. Disclaimers are used in contracts to secure a mutual understanding of the limitations of the architect's authority and responsibility. For instance, the preparation of cost estimates by the architect is fundamentally different from a contractor's undertaking in pricing a project for bidding purposes, and yet the contractor may use the same term—"estimate." Perhaps the single most frequent cause of disputes between architects and their clients over the past 150 years (if not over centuries) arises when bids are received that far exceed the architect's estimates. The client may feel that the architect's services have been of no value, and refuses to make payment for the services rendered, especially when the project has to be abandoned or radically reduced in scope. In order to avoid misunderstandings, it is important that architects make it clear that they are not guaranteeing the cost of construction or warranting that costs will not exceed the architect's estimate. Beyond that, the agreement should address what happens if bids exceed the client's budget or the architect's estimate.

Clients and members of the public may have unrealistic expectations as to the extent of the architect's control over the contractor during the construction process, and the extent of the architect's responsibility for the acts or failures to act of the contractor and its subordinates. The architect's review of shop drawings and other submittals has a limited purpose. Likewise, the architect's certifications of a contractor's applications for payment may be misconstrued. These undertakings by the architect are limited by carefully worded disclaimers in the AIA owner-architect agreements and construction contract forms in order to distinguish between the responsibility of the actor (contractor) and the reviewer (architect).

Limitations of Liability

One method of risk allocation that has become increasingly common over the last 40 years is the contractual limitation of liability. Such a provision may be an agreement by the client to limit any claim against the architect to an amount not to exceed the architect's fee or some other sum, or the amount of available insurance coverage. The purpose of such a limitation is to make it clear how much potential risk the architect is prepared to shoulder for the fee it is to receive. Such provisions are often upheld, particularly when it is demonstrated that the limitation is part of an overall risk management agreement that the parties have reached. Because limitations of liability alter the normal legal consequences, courts scrutinize them carefully, and they may be subject to state law requirements. Architects are well advised to seek legal assistance in drafting such a provision.

The AIA has not elected to include limitation of liability clauses in its standard form agreements, but sample language can be found in AIA Document B503™–2007, Guide for Amendments to AIA Owner-Architect Agreements.

Insurance

Insurance is an essential element of any risk management strategy. Some clients insist that their architects carry certain types and limits of coverage. Inclusion of such provisions can reinforce an overall risk management strategy; however, it is important that the coverage and limits specified are reasonable and available. Consultation with one's insurance adviser is critical.

It is also important that the architect understand what coverage and limits are carried by the client. AIA professional services agreements and construction contract forms contain waivers of subrogation that assume that the owner carries property insurance. Some owners do not carry such insurance, and are self-insured. Legal assistance will be needed to redraft these waivers so that their intent is preserved when the client self-insures.

A key element of the insurance plan is a universal waiver of subrogation that extends to all the project participants—owner, architect, consultants, contractor, and subcontractors. The effect of the waiver is to make the owner's property insurance the source of recovery for an insured loss, and to prevent the insurer from bringing suits against project participants in order to recover the amounts it has paid out. Such a waiver can only be implemented in a written contract, and all of the AIA professional services agreements and construction contract and subcontract forms include a universal waiver of subrogation for losses covered by the owner's required property insurance.

▶ Insurance Coverage for Business and Professional Liability (16.2) covers the necessary considerations and alternatives when selecting liability insurance for an architecture firm.

Indemnification (Hold-Harmless) Provisions

Indemnification is an important part of the overall risk management strategy embodied in the AIA contract documents. It is found in the provisions of the construction contract, whereby the contractor is obligated to indemnify the owner and architect against damages or injuries suffered as a result of the contractor's negligence.

It has become common for sophisticated owners to demand indemnification from the architect, as well. Such clauses may extend far beyond the architect's normal legal liability for its errors and omissions and may be uninsurable—for instance, the clause may require the architect not only to indemnify but also to defend the owner against claims, which takes the clause outside of the coverage of the architect's normal professional liability insurance. Because of the legal complexities of such a provision, an architect should consult its attorney upon encountering such a provision.

▶ See Owner-Generated Agreements (17.3) for guidance on how to systematically approach terms in agreements provided by owners.

An example of an indemnification provision that can be used (with appropriate legal guidance) is found in AIA Document B103™-2007, the owner-architect agreement form for large or complex projects; and in AIA Document B503™–2007, Guide for Amendments to AIA Owner-Architect Agreements.

Responsibility for Consequential Damages

Consequential damages are the indirect costs that result from a breach of a contractual undertaking. A primary example would be lost income, productivity, rents, and profits resulting from a construction defect (the direct damages would be the cost of correction of the defective work). Such damages can amount to huge sums, and far exceed the reasonable expectations of the person against whom they are claimed. In a well-considered risk management plan, an owner would purchase loss of use insurance to cover such consequential damages, and there would be a waiver of subrogation so that the owner's insurer could not turn around and sue the contractor or architect in the name of the owner.

The AIA professional services agreements and construction contract and subcontract forms all include a universal mutual waiver of consequential damages. Like the waiver of subrogation, it is important that this be included in every participant's contract in order to be fully effective.

Other Contract Issues

There are more contract issues that should be addressed in a typical professional services agreement. Among the most important are the following.

Intellectual Property

The architect performs professional services, which are represented in tangible form by the drawings, specifications, and other documents that the architect prepares. They are not tangible goods that the architect sells to the client. Nevertheless, some clients take the position that since they are paying for their creation, the documents prepared by the architect (and all rights therein) are owned by the client. The AIA has consistently maintained the position embodied in the U.S. copyright laws that the documents prepared by the architect are the intellectual property of the architect, as their author and creator. AIA contracts go to a great extent to delineate the rights and responsibilities of the owner, architect, and contractors in the documents prepared by the architect.

With the emergence of electronic technology, the architect's work product has taken a more intangible form. The AIA has developed a family of digital practice documents that contain protocols that can be agreed upon by the parties who are transmitting and receiving these documents.

▶ The AIA Documents Program (17.5) covers the range of standard forms included in the AIA Contract Documents.

Additional Services

Additional services have long been a source of friction between clients and their architects. Clients are prone to ask for changes in the architect's design, or for extra services that the architect did not anticipate providing. The architects for the original Library of Congress building won the initial design competition with an Italian Renaissance design in 1873, and over the next 15 years were asked to develop designs in Gothic, French Renaissance, Romanesque, and German Renaissance styles, ultimately returning to an Italian Renaissance scheme. A less-than-satisfactory award on their claim for services rendered was finally confirmed by the Supreme Court in 1893, some 20 years after their work began.

The need for additional services also arises out of events that occur over which neither party has any control, such as a change in the building code. AIA owner-architect agreements distinguish between additional services that the architect will perform only when requested to do so by the client, and the additional services that the architect will provide unless the client determines that they should not be provided—which will typically result in a reassessment of how to deal with the contingency that has arisen.

When preparing an AIA agreement form, the parties should carefully review the document and determine which of the listed services are applicable, and make their own determinations as to the services that should be included in the architect's basic compensation, those services that will not be required, and those that may be required and should be considered as "additional services."

▶ See Defining Project Services (15.1) for further discussion of "basic" and "additional" services.

COMPLETING AND MODIFYING THE STANDARD AIA AGREEMENT FORMS

Every architectural commission is different. The standard AIA owner-architect agreement forms provide a lot of flexibility in how they are completed, and the AIA Contract Documents software provides the ability to modify them at will, while keeping track of changes made from the original. A dozen different forms of agreement, and the many additional possibilities provided by the B200 scope of services series of documents, cover a large range of situations. Nevertheless, users should understand when and how to adapt the documents for their own purposes.

Assumptions on Which the Contract Will Be Based

The services described in AIA Document B101™–2007, the prototypical AIA owner-architect agreement, generally apply where the owner will be constructing a new building for its own use on an undeveloped site. Since 1997, AIA owner-architect agreements have included room for a detailed description of the initial information or assumptions on which the agreement is based, including the project's description and its parameters. Users are encouraged to complete optional Exhibit A to AIA Document B101™–2007, which will include information on the project's physical characteristics, program, budget, delivery schedule, and construction delivery method—all critical information, which could require substantial modifications if it changes from the initial assumptions on which the agreement is based.

During the initial client interviews and a site visit, the architect should determine if there are other major factors to account for. The client may in fact be looking to renovate, modify, or add to an existing structure, which will trigger the need for additional services to document existing conditions. An existing building may remain partially occupied during renovations. There may be significant historic preservation aspects to the project. The site may have existing improvements on it that may need to be demolished, but even if the site has been cleared, there may have been a prior use of the site (in days before environmental regulations) that will require investigation.

Services Provided by Architect's and Owner's Consultants

The standard B101™–2007 form anticipates that the architect's services include the "usual and customary" structural, mechanical, and electrical engineering services required for the project. These services are typically provided by the architect's consultants, who many owners insist on having listed in the agreement. Users should note that civil engineering, a site-related service, is *not* included. Under the agreement, the owner is responsible for site investigations—the rationale is that, after all, it is the owner's property, and there can be serious consequences if there is an error in the survey or subsurface investigation reports. That is a risk that the architect is not normally prepared to undertake. If the site investigations are not a service that the architect typically provides, civil and geotechnical engineering services are likely not covered under the architect's professional liability insurance.

To avoid any confusion over "who does what," an agreement should specify the services that are to be provided by the architect, the owner, and the consultants of either party. The responsibility for coordination of these consultants' services must also be addressed.

Owner's Role

AIA contracts have historically anticipated that the owner will have a limited role in the project, primarily in providing necessary information and approvals, providing insurance, and making payments. Many owners prefer to have a more active role in both design and construction of the facility. In the latter case, the owner may maintain its own construction administration staff, and the architect's authority may be limited to an advisory role. Any such change in the balance of responsibilities should be reflected in the agreement.

One major change in the owner's responsibilities that has been anticipated in some AIA professional services agreements is the provision by the owner of cost estimating services. These provisions, which will also affect the architect's responsibilities for redesign to meet budgetary requirements, can be found in AIA Documents B103™–2007 (for large, complex projects), B105™–2007 (for small projects), and B109™–2010 (for large, multifamily residential and multiuse development projects). B108™–2010, used on federally funded projects, provides an option for either the architect or owner to provide the cost estimates.

Modifying the AIA Forms

AIA Document B503™–2007, Guide for Amendments to AIA Owner-Architect Agreements, includes sample language for many modifications that a user might wish to make. Most agreement forms have a provision such as Article 12 of AIA Document B101™–2007, where additional terms and conditions can be added, or where reference can be made to an Exhibit or Attachment to the agreement form. For descriptions of various types of services, users should consult the special-purpose forms described in this section and the B200-series scope of services documents that are used in conjunction with B102™–2007.

For More Information

AIA Document Synopses: www.aia.org/contractdocs/reference.

The American Institute of Architects Official Guide to the 2007 AIA Contract Documents (Wiley, 2009) by The American Institute of Architects.

The AIA Building Construction Legal Citator (Lexis Publishing/Matthew Bender & Company, 1984–2012), by Steven G. M. Stein, ed.

Legal Guide to AIA Documents, 5th edition (Wolters Kluwer/Aspen Publishers, 2011) by Werner Sabo.

Architects and Engineers, 4th edition (Thomson-Reuters/West Publishing, 2012) by James A. Acret and Anne Perrochet.

17.2 Project Team Agreements

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When architects form teams to pursue projects, and engage consultants or establish joint ventures with other firms, additional agreements result.

FORMING RELATIONSHIPS TO ACCOMPLISH PROJECT GOALS

The project designer may be a single architect who has the necessary expertise and performs all of the professional services required. More often, however, project design includes other design firms and consultants with special expertise in building engineering systems, special design issues, a particular building type or component of the building, or other aspects of the project. In these circumstances, the architect will need to enter into agreements with other design professionals to deliver the required services. There are a variety of agreements for different purposes.

Design Team Agreements

Design team agreements are the documents that describe and order the relationships among the parties within the design team. These agreements establish the duties and responsibilities the team members owe to each other, and set forth the benefits each team member can expect to receive for fulfilling its respective responsibilities. It is important that design team agreements be coordinated with each other to avoid gaps or overlaps in the parties' respective duties and responsibilities.

► Project Teams (10.2) covers best practices in selecting and organizing teams for project delivery.

There are different types of design team agreements for different purposes. The more common include the following:

Agreements that include the architect and its other design professionals and consultants:

- *Teaming agreements* are employed to structure the relationships among the architect and other key design professionals and consultants in connection with pursuing a particular project or client.

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- *Consultant agreements* are typically used by an architect to retain the services of design professionals and other consultants for a project in which the architect cannot provide all of the required services itself.
- *Joint venture agreements* create and structure the relationships between an architect and another design professional or other party who wish to combine forces to provide services to their client.

Design-Build and Multi-Party Agreements

The architect may also enter into agreements with parties that are neither owners nor design professionals, or may enter into multi-party agreements that include not only the owner but also the contractor.

Agreements that include parties other than or in addition to the architect and its design professionals and other consultants:

- *Design-build agreements* set forth the relationship between a designer and a builder for projects in which the client wants a single point of responsibility with a single party for all design and construction services necessary for the client's project. (See the Design-Build Agreements backgrounder in this section.)
- *Integrated project delivery agreements* are a new approach to project delivery which, in a single agreement, creates and structures the contractual relationships among the client, designer, and contractor who jointly share in the success or failure of the project. (See the Integrated Project Delivery Agreements backgrounder in this section.) Such agreements may also include other design professionals and specialty subcontractors. These multi-party agreements create a design and construction team, with the owner as a team member.

► Contractor-Led Design-Build (9.4) and Integrated Project Delivery Overview (9.3) discuss these project delivery methods in greater detail.

Each of these agreements can and should be shaped and contoured to the unique characteristics of the project, its individual participants, and the chosen method of project delivery. Each should reflect their parties' agreements on key aspects of their relationship and reflect their respective expectations with respect to the scope of services to be performed and other obligations each party is to owe to the other, the compensation to be paid for performance of those services, the schedule in which those services are to be performed, the risks to be assumed, and by whom, and other key terms and conditions.

Architect-Consultant Agreements

When other design professionals are required on a project, it is common for architects to select them and add them to the design team. These design professionals act as consultants to the architect, and the architect is responsible to the client for their professional services. The architect-consultant relationship may be established just for the project at hand; it may be a strategic alliance developed between the participants to pursue specific objectives, such as a particular client type or market segment; or the two firms may have a long-standing working relationship on a variety of projects.

The architect may seek consulting arrangements with a wide variety of design professionals and specialists—even with other architects. The most common interprofessional relationship is that between the architect and the professional engineer responsible for the detailed design and engineering of one or more of the building's systems. Most large, complex projects need special expertise in civil, structural, mechanical, and electrical design. Some architecture firms include one or more of these engineering disciplines in-house; many, however, do not.

Consultant services to the architect are outlined in the architect-consultant agreement. These services, and other contract terms and conditions, should be carefully coordinated with those in the architect-owner agreement.

Services

As the architect and owner establish the services to be included in the architect's agreement, both parties may consider the need for the services of other design professionals.

It is advisable to review with the owner the list of services required to accomplish the project and establish who will be responsible for each. Each professional service identified may be provided by any of the following:

- *The architecture firm*, through its own staff.
- *A design professional subcontracted to the architecture firm*. The design professional may be another architect, an alliance partner, or another firm acting as a consultant to the architect.
- *A consultant to the owner*. This arrangement may include a construction manager, a project or program manager, an independent design professional for another portion of the project, or another architecture firm performing a portion of the architecture services—with or without coordination by the architect.
- *The owner*. The owner's staff may provide services themselves or by some other arrangement—with or without coordination by the architect.
- *The contractor*. The architect, or the architect's consultants, may prepare performance specifications for building components such as curtain walls, mechanical systems, or fire sprinklers. To comply with these performance specifications the contractor will retain licensed design professionals through its subcontractors and suppliers.

Clarifying responsibilities between the owner and the architect accomplishes at least two things: It helps the architect identify the services for which other design consultants will be sought, and it begins to allocate project risks among the owner, architect, and others on the project team.

Two major issues are covered in architect-consultant agreements: passing to the consultant the architect's rights and responsibilities to the owner with respect to the services to be provided by the consultant, and sharing risks and rewards. Once these key points have been worked out, it is not difficult to prepare an architect-consultant agreement that incorporates the decisions of and parallels the owner-architect agreement.

Legal Rights and Responsibilities

Usually architects want to give their consultants the same legal rights the architect has from the owner. At the same time, with respect to the consultant's professional discipline, a consultant should owe the same responsibilities to the architect that the architect owes to the owner.

Rather than restate all of these rights and responsibilities from the owner-architect agreement—and run the risk of omitting some—it is common to incorporate the owner-architect agreement (often without specifics of the architect's compensation) into the architect-consultant agreement. This binds the consultant to provide all of the services in its discipline and to be subject to the same terms and conditions the architect owes to the owner.

The architect will need to clarify with its consultants and the owner which design services each consultant will provide and what design services, if any, the contractor will provide under performance specifications. These specifics should be defined in and coordinated with the provisions of the architect's agreement with the owner, such as AIA Document B101™–2007, paragraph 2.2, and with the provisions of the owner's agreement with the contractor, such as AIA Document A201™–2007, paragraph 3.12.10; reviewed and determined to be in accordance with applicable state law; and discussed by the architect with the owner.

Risks and Rewards

In assessing the risks associated with a project, the architect should assess how risks will be shared with consultants. The best advice is for the architect and the consultant to make each other aware of the risks associated with their aspects of the project. Providing to the consultant a copy of the owner-architect agreement facilitates this process. With this information, the negotiation can proceed openly.

Compensation Issues

Consultant compensation is a matter for negotiation between the parties. Consultants who understand the risks and responsibilities they are assuming will be in a position to negotiate compensation with the architect. In considering compensation, architects will want to address two additional issues:

- *What level of coordination is required for the consultant services?* Because consultant services must be fully integrated with those of the architect, coordination should not be casual. The architect will commit time and money to coordination, and these factors should be considered in establishing the architect's compensation. Some firms budget coordination services directly; others budget a multiple or markup of consultant costs to reflect the need for coordination as well as the costs of administration and liability.
- *What will happen if the architect is not paid by the owner or if the project is delayed beyond reason?* Typically, the architect will not want to be obligated to pay the consultant until the architect has first been paid by the owner for the consultant's services. Architects seldom have adequate financial resources to fund such payments, which can average between 20 and 40 percent or more of the architect's total fees on a project. Architect-consultant agreements often include a "pay-when-paid" or a "paid-if-paid" clause, or both, for this purpose, sometimes including an agreement and release on the part of the consultant not to pursue the architect until the architect receives such funds. Consultants typically understand and accept the architect's dilemma, but in return would expect the architect to seek prompt payment from the owner. Care has to be taken in drafting such clauses, however, since state laws vary on the enforceability of such provisions.

Forms of Agreement

Architect-consultant agreement forms with major consultants such as engineers should parallel the owner-architect agreement. (This is normally less critical for consultants for limited purposes such as specifications, kitchens, elevators, security systems, etc.) Statements of service as well as terms and conditions should be carried consistently throughout the owner-architect agreement and the architect-consultant agreements. Using AIA Document C401™–2007, Agreement Between Architect and Consultant, achieves this goal. However, if the standard form is modified, or a custom agreement is used, it is important to verify that the modification is reflected in all the documents. This is particularly important if the scope of services portion of the owner-architect agreement is changed; in this case, the consultant agreement should be modified as well.

Digital Practice Protocols and BIM Management Issues

Architect-consultant agreements should address protocols for e-mail, Internet, web-based, FTP site communications, digital information sharing, and digital document storage and transfer. Protocols should also be established for building information modeling (BIM) requirements with respect to design integration among the project team members, and possibly with respect to vertical integration issues with owners, contractors, subcontractors, fabricators, suppliers, erectors, and others involved in the construction process. Along with the significant potential benefits and opportunities such digital practices can introduce to a project, they also bring new risks, possible liabilities, and some uncertainties. Such concerns can include responsibility for the integrity of the model or its constituent parts, ownership of and use rights with respect to the model and its outputs (drawings, specifications, schedules, energy analyses, cost estimates, etc.), protocols for modifications to the model, and responsibility for errors or omissions in the data included in the model. The architect-consultant agreement offers an excellent opportunity for the parties to determine and agree upon how to handle these issues. AIA Documents E201™–2007 Digital Data

Protocol Exhibit, and E202™–2008 Building Information Modeling Protocol Exhibit, are useful tools for organizing team members' thoughts and reflecting their agreements on these issues.

▶ Project Management with Building Information Modeling Processes (10.4) discusses BIM technology, the processes that drive it, and the control and accountability needed to manage BIM's complexity as a production tool.

Role in Project Planning

When the architect-consultant relationship is formed early in the project, or before the project begins, the consultant can be involved in project planning. The consultant then is in a position to commit to services, scope, schedule, and fee before the architect makes these commitments to the owner.

The Responsibilities of the Architect

As the prime design professional, the architect assumes primary contractual responsibility to the owner for the accuracy and completeness of the work of the architect's consultants. If something goes wrong, the architect can be held contractually liable to the owner for services improperly performed by the architect's consultant. As design professionals, these consultants are required to perform their services in accordance with applicable standards of professional practice, and failure to do so may result in their direct liability to injured parties. However, their failure to meet the standard of care may also make the architect contractually liable to the owner.

This discussion underscores the importance of careful consultant selection and the need for clear agreement between architect and consultant. It is also important for the architect to understand the impact of a consultant's recommendations and to be prepared to accept initial responsibility and liability for these recommendations. This, in turn, explains why insured architects increasingly seek to retain insured consultants and request a certificate of insurance from them.

Owner-Retained Consultants

An owner may directly retain project consultants. The architect may or may not have any contractual responsibility for these consultants. If the architect is to have any contractual responsibility, then the architect must be able to review and negotiate those responsibilities.

An owner may decide to enter into an agreement directly with another consultant for a number of reasons:

- Services may be substantially different from and not overlapping with those of the architect. For example, the owner may retain a land surveyor to develop the information necessary to prepare for design services.
- The owner may have a long-standing relationship with the consultant.
- The owner may seek the benefit of direct and independent advice.
- The owner may feel it can obtain more favorable pricing from consultants it directly retains.
- The owner may prefer to structure the project team and then assume the responsibilities for its coordination, either through the owner's in-house staff or through a program manager.

On occasion, an owner may have motives that benefit the owner but not necessarily the project. For instance, the owner may want to save money by (usually unwisely) eliminating coordination services during design or construction, or the owner may want to keep total control of the project by retaining overall coordination responsibilities.

In some cases, it is to the architect's advantage to have the owner directly retain a consultant. This is especially true when the architect must rely on a consultant's work but is not—and does not want to be—in a position to review that work independently and take responsibility for it (e.g., in connection with land surveying and geotechnical engineering). For this reason, AIA Document B101™–2007 specifies that it is the owner's responsibility to provide any necessary land surveying and geotechnical engineering data to the architect. These consultants are engaged by the owner, and the architect is entitled to rely on the survey and geotechnical information supplied by the owner.

Coordination of Services

Whatever motivations an owner has for directly retaining consultants, someone must coordinate the services of these professionals. The owner must either assume this responsibility and the risks associated with it, or assign it to a program manager or to one of the prime professionals on the project.

Coordination is especially important from the point of view of the architect. Because architects are the generalist design professionals on building projects, others on the project team may expect the architect to coordinate professional services even though the architect may not have contractual responsibility or authority to do so. An architect who acts on that expectation and coordinates activities for other consultants may be held responsible for the results of that coordination, even when the owner has engaged project consultants directly and the architect is not responsible for them.

This situation poses unique dilemmas for the architect. As a generalist, the architect is usually in the best position to coordinate the activities of other design professionals on the project. If the architect is not assigned these responsibilities and the owner is unable or unwilling to provide them, the architect should educate the owner about potential increased costs and schedule impacts that may result from uncoordinated design services. The architect may also want to negotiate to assume these responsibilities and to be compensated for them.

The architect's coordination responsibilities with respect to consultants retained by the owner or the owner's project or program manager should be limited to coordinating its services with those of such consultants. The architect should never assume the responsibility for the internal coordination of any other consultants' documents.

When the architect is assigned coordination responsibilities, owner-retained consultants should be required in their contracts with the owner to coordinate their efforts with the architect, to submit to the architect's authority to coordinate their authority, and to look only to the owner if they have claims with respect to the architect's coordination responsibilities. And, as mentioned in the previous paragraph, whether or not the architect is to coordinate the *activities* of owner-retained consultants (such as attendance at meetings or adherence to schedules), the architect should never assume responsibility to coordinate the *documents* of such consultants (lest the architect assume responsibility for the content of the consultants' documents). Consultants should be obligated to coordinate their own documents with those of the architect; the architect's responsibility should be limited to coordinating the architect's documents with those of such consultants.

JOINT VENTURES

A joint venture is a contractual union between two or more firms for one or more specific projects. The joint venture arrangement enables firms to combine key resources, expertise, and experience to perform professional services on a specific project while allowing each participating firm to pursue other projects independent of the joint venture.

A joint venture functions essentially like a partnership. There is an agreement detailing who brings what to the venture, who will do what, and how the compensation or profit will be shared. The agreement also details how responsibilities and risks are to be allocated internally. Typically a joint venture retains no profits and pays no income taxes; it passes profits (or losses) and tax liabilities along to its participating members. Participating firms are individually and jointly liable to the client and others for the services offered by the joint venture. In other words, each joint venture partner is responsible not only for its own actions, but also for the actions of the other joint venture partners.

Generally speaking, a joint venture is formed only for the purpose of seeking and executing a specific project. After a successful project, some firms feel there is enough value in the collaboration to seek further projects that require the unique talents represented in the venture. Some joint ventures have been so successful that they have resulted in permanent mergers of the participating firms.

It is imperative that the joint venture parties have and exhibit a high degree of trust and confidence in one another. It is also imperative that before the project moves forward, the joint venture parties clearly agree on a division of responsibilities for both the professional services the joint venture will provide to the client and the business responsibilities of managing the joint venture itself. This includes decisions about who will handle the finances and banking arrangements, how key decisions will be made and by whom, and how risk for profit and loss will be allocated. Leaving any of these key decisions to be resolved in real time, when emotions may be running high and the consequences significant, creates an enormous risk that the parties' respective judgments will be unduly influenced by these factors and their ability to come to agreement severely compromised.

It may also be advisable for the design professional to confirm that forming a joint venture with another party is permitted by the relevant state's licensing or practice laws and regulations. Forming joint ventures with parties who may themselves not be licensed design professionals may be prohibited.

Reasons for Forming a Venture

A successful joint venture begins with a clear understanding of why the venture has been formed in the first place. The initiative to form a joint venture is usually taken by the architect, although it may also come from the owner. The reasons for it may be technical or political. For example, a national firm from outside the owner's geographic area may enter a joint venture with a respected local firm.

Each primary participant in a venture must make an independent decision that the venture makes sense, but the participants must make a similar decision collectively. A firm that discovers it is being used in some unexpected and undesired way—by the owner or by another firm, say, for its higher professional liability insurance limits—may have trouble remaining content and performing at its best. Finally, it is important to understand that some owners are cautious about contracting with joint ventures formed for the specific purpose of performing services on the owner's project. They may see the advantages for the firms but may not want *their* project to be the testing ground for the relationship.

Process

A joint venture is a business proposition, and it is important that a good business relationship be developed among the joint venture partners. The process of forming a joint venture begins with asking these questions: What does the project require? What are your firm's strengths and weaknesses relative to these requirements? Stated another way, what does your firm bring to the project, and what does your firm need to obtain through a joint venture? One approach is to examine these key issues:

- *Required skills.* What skills does the project require, and what does your firm have in-house (or through capable consultants)? Are other disciplines required? Is the owner expecting construction management, financing, or other specific services?
- *Background and knowledge.* What special requirements does the project have? How much expertise or experience does your firm have in accomplishing projects like the one under consideration?
- *Staffing.* Does your firm have the people with the right expertise and experience available to work on the project? If these people are committed to the project, can your firm meet its other commitments?

- *Geography*. Does the location of one or both of the venture partners bring an advantage to the project?
- *Financing*. If the joint venture needs resources your firm does not have (e.g., expanded computer-aided design or BIM capability), is your firm in a position to make the investment?
- *Insurance*. Is the scope of each firm's professional liability insurance acceptable to the other's—and to the client?
- *Licensing and registration*. While each joint venture member is likely to be properly licensed and registered as a corporation, partnership, or other appropriate legal entity in its home state, will each member and/or the joint venture itself be required to be licensed or registered under the local laws of the state where the project is located?
- *Management*. Does your firm have the leadership and management capabilities to take on the project, service the client, and manage the people, processes, and risks involved?
- *Contacts*. Does your firm have the necessary contacts to secure award of the contract?

A careful and honest appraisal of what you bring to the project does two things: It helps you decide whether to pursue the opportunity, and it creates a profile of characteristics to seek in your joint venture partner(s). As the parties come to agreement on the various aspects of a joint venture, these should be written down, perhaps first as a statement of principles and then later as an outline for the joint venture agreement. In this process, trust can be developed and expectations clarified and mutually agreed to, making the drafting of a joint venture agreement less difficult. Following these steps to reaching agreement will make it clear when discussions should break off—the point at which one or more of the parties do not see the reward as justifying its risk. It is sometimes easy to coast into agreement, or at least apparent agreement. Writing it down provides the first real test. The time to discover that a joint venture is not going to work is before contractual commitments have been made to the owner. An even better time is before you pitch the owner on the merits of your team.

Joint Venture Agreements

There are many business issues, some related to the project and others related to the ways the two firms will work together, that must be addressed in forming a joint venture. The best advice is to be aware of the full range of issues and to negotiate them before the joint venture offers to provide professional services. A review of the AIA standard form of joint venture agreement, AIA Document C101™–1993, reveals the points to be considered in negotiating a formal agreement. Key issues include the following.

Overall Management

A mechanism and a budget must be created to manage the joint venture. Under AIA Document C101™–1993, a policy board includes a representative and an alternate from each participating firm. The board's responsibilities include, but are not limited to:

- *Joint venture management* to manage joint venture business operations, such as its capital needs and contributions of the parties, banking and financial management, accounting and record keeping responsibilities, insurance requirements, internal dispute resolution procedures, ownership of documents, etc.
- *Project management* to plan, organize, staff, direct, and control the project, and to establish project financial management and risk management/quality control systems. Because each joint venture participant is likely to approach these aspects of their practices in different ways, care must be taken when deciding how the joint venture will function in each of these areas. The participants will want to be open

about their policies and procedures and the rationales behind them so that appropriate practices can be established for the joint venture.

- *Responsibility for professional services* to understand that all of the participants are jointly and severally liable to the client for the quality of the joint venture's efforts. Internally, however, responsibilities for tasks can be allocated to individual participants. Conceptually, the joint venture may take one of three approaches to doing this:
  - Each firm assumes full responsibility for a portion of the work. The policy board allocates specific services to each of the participants. For example, Firm A may design the building shell, and Firm B may be responsible for the building's interiors package.
  - Responsibility for all services is shared by the joint venture participants. The work is apportioned to individual participants based on (1) skills and experience and (2) cost and availability of resources. For example, Firm A may provide design services, Firm B may prepare the construction documents, and Firm C may administer the construction contract.
  - One participant takes the lead in providing services, and the others provide support as needed.

When responsibility for providing professional services is shared by two or more firms, it is essential that the participants allocate responsibilities clearly. This will eliminate gaps or overlaps in professional services and minimize disputes among participants. The greater the effort joint venture participants put into breaking down and delineating general tasks into specific subtasks before project inception, the greater the likelihood that gaps and overlaps will be eliminated and disputes avoided.

One simple method to consider is replacing the "major responsibility" and "minor responsibility" distinctions in the format with the notation "responsible" or "not responsible" and breaking down general tasks into more specific subtasks that can be allocated entirely to one participant. For example, Firm A may be responsible for completing all schematic design phase services "except for those subtasks specifically assigned to the other participant(s)." Those subtasks would then be assigned to Firm B, Firm C, and so forth.

Financial Arrangements

Of particular importance to any joint venture are the financial arrangements and especially the allocation of risks and rewards to the participants. AIA Document C101™–1993, Joint Venture Agreement for Professional Services outlines two possible approaches to dividing rewards: the division of compensation method and the division of profit/loss method.

- *The division of compensation method* assumes that the services provided and compensation received will be divided among the parties as they have agreed at the outset of the project. The specific division is a negotiated amount (or percentage of total compensation to the joint venture) based on (1) what each of the parties brings to the joint venture and (2) what each party does as part of the venture. Compensation to each participant is fixed at the outset; each firm's profit or loss depends on the efficiency with which it carries out its responsibilities.
- *The division of profit/loss method* is based on each party performing work and billing the joint venture at cost plus a stated amount for overhead. The ultimate profit or loss of the joint venture is divided among the parties at the completion of the project. By this approach, the participants share in the good or ill fortunes of the joint venture, but to be successful, it requires allocation of time and costs acceptable to each party at each step along the way.

Whichever approach is selected, it is essential to budget for managing the joint venture. Sometimes joint venture participants overlook the additional time and expense involved in this management.

Insurance

The agreement should address insurance coverage for the participants, especially professional liability insurance. Participants may agree to coordinate insurance so that coverage, limits, deductibles, and other key provisions are negotiated and included in the joint venture agreement. An individual joint venture firm may find it needs an endorsement to its professional liability policy to cover participation in the joint venture—or that the participation is not covered at all. Another approach is to seek a project insurance policy that insures all parties of the joint venture.

Digital Practice Protocols and BIM Management Issues

The parties will certainly want to agree on electronic protocols for e-mail, Internet, web-based, and FTP site communications; information sharing; and document storage and transfer. The parties will need to address building information modeling (BIM) requirements to enable design integration between the joint venture parties and among members of the entire design team. Vertical integration issues with owners, contractors, subcontractors, fabricators, suppliers, and others involved in the construction process may also be a concern. The introduction of BIM practices into the design and construction process brings significant potential benefits and opportunities but at the same time introduces new risks, potential liabilities, and uncertainties regarding issues such as who is responsible for the integrity of the model or its constituent parts, who owns and has use rights to the model and its outputs (drawings, specifications, schedules, energy analyses, cost estimates, etc.), what protocols should be used for modifications to the model, and who is responsible for errors or omissions in data included in the model. The joint venture agreement offers an excellent opportunity for the parties to determine and agree upon how to handle these issues. AIA Documents E201™–2007 and E202™–2008 are useful tools for organizing the joint venture members' thoughts and reflecting their agreements on these issues.

The Resulting Agreement

Agreement on the essential business issues places all participants in a joint venture in a position to finalize the written agreement. At this point, each participant may want to involve its attorney. While it is possible to draft an agreement from scratch, it often makes sense to use, or at least to start with, AIA Document C101™–1993. This document is intended to provide for the mutual rights and obligations of two or more parties who, once they have established a joint venture, will enter into a project agreement with the owner to provide professional services. It also addresses all issues most commonly encountered in structuring a joint venture, such as those described above.

Associated Professional Firms

Sometimes two professional firms choose to represent themselves as "associated" with each other to undertake a project. From a legal standpoint, these firms have two choices: They may either form a joint venture or establish a prime-consultant relationship, with one of the firms acting as a prime consultant to the other.

Whatever arrangement is chosen, the issues discussed above should be addressed. Roles, responsibilities, risks, and rewards should be defined and delineated in a written agreement between the parties. Once an agreement has been signed, the associating firms should act with that agreement in mind. For example, two architects with a prime-consultant arrangement may hold themselves out and act so that a third party sees them as participants in a joint venture, jointly and severally liable for any resulting problems. This could result in unintended liability for one or both of the parties that would not otherwise exist if it were clear from the parties' actions that a prime-consultant arrangement existed.

Architects should approach architect-consultant and joint venture agreements—indeed, all design team agreements—with the same careful attention they pay to arrangements with owners. Both have similar purposes: to put in place an outstanding design team and a framework of arrangements that serve the client and the project well.

▶ Small-Firm Collaboration (5.7) addresses teaming, partnerships, and other arrangements with small-firm practitioners for effective project delivery.

TEAMING AGREEMENTS

Teaming agreements, sometimes called memoranda of understanding or partnering agreements, are agreements between or among the architect and one or more design professionals or other consultants. But unlike architect-consultant or joint venture agreements, which address matters in connection with projects already acquired by the architect, teaming agreements address matters in connection with the pursuit of projects not yet obtained by the architect.

It is often appropriate for the architect to assemble a project team as part of the marketing effort to acquire a project. The architect may find it advantageous to form relationships, to create a team or a strategic alliance, with one or more design professionals and consultants to pool their unique capabilities and experiences to present a more convincing case to the client to select the architect's team. This may even be a client requirement. Owners, especially those whose facilities require sophisticated engineering or other special expertise, are often acutely aware of the need for competent consultants and well-founded architect-consultant relationships. For these owners, consultants become an important part of the interview and selection process.

Teaming agreements are typically much shorter than consultant or joint venture agreements, reflective of their relatively narrow purpose and short-term duration. Besides focusing on the effort required to procure the project, they also seek to protect each team member's position in pursuing the project and from the possibly harmful effects of exposing their key staff and resources to the other team members. Thoughtfully constructed teaming agreements provide an excellent foundation for developing appropriate consultant or joint venture agreements if the team proves successful in securing the project.

Teaming agreements can be and are quite flexible to address the specific circumstances of the particular project pursuit, but typically have a number of key features. Among them are the following:

- *Purpose*. The team members agree to cooperate and to prepare a joint proposal to submit to the client for the project. In the event that the team is selected by the client, the teaming agreement will identify whether the team members will enter into a joint venture agreement with each other to carry out responsibilities in connection with the project, or whether one team member will be the prime who will enter into a contract with the client and who will, in turn, enter into consultant agreements with the other team members. The teaming agreement will also identify which team members will be the architect and engineer(s) of record for the project.
- *Term*. The teaming agreement will identify the period of time it will be in effect, typically until either the team learns it is not successful in being awarded the project or, if successful, until the team members execute the necessary joint venture or prime-consultant agreements among themselves.
- *Obligations of the team members*. The teaming agreement describes the services to be rendered by each team member in connection with submitting the proposal for the project, as well as the services each team member will provide if the team's proposal is accepted by the client. Typically each team member is obligated to use its best efforts to promote and market the interests of the team in the pursuit and implementation of the project. Each team member is usually obligated to bear the costs it incurs in connection with the preparation and submission of a proposal for the project. If there is a stipend payable by the client, say, in connection with a competition which the team members intend to pursue, the teaming agreement would describe the amount and circumstances under which the team members would share that stipend.
- *Exclusivity*. For most projects, team members agree that (a) they will market and solicit the design engagement for the project only as part of the team, (b) team

members will not participate in any marketing for the project with any other design professional or other entity, (c) they will not independently market and solicit services for the project, and (d) they will not solicit or accept an engagement from the project owner for the project without the involvement of the other team members as otherwise described in the teaming agreement.

- *No solicitation of other team members' employees*. Team members agree that for a stated period of time after expiration of the teaming agreement they will not directly or indirectly solicit for employment, nor employ, any person who was an employee of other team members during the time the teaming agreement was in effect.
- *Proprietary information*. Provisions are included to protect each team members' proprietary information, data, and materials that may be provided to the other team members in pursuing the project, and not to use the other team members' proprietary information for any purpose other than for preparation and submission of a proposal for the project.
- *Public relations*. Team members typically agree that publications or announcements they may issue, and any representations they may make to existing or prospective clients, will recognize and give appropriate credit to the other team members, and that no team member will itself take credit for the professional work or participation of the other team members. If one team member wishes to use drawings, images, photographs, or other materials related to the project which were prepared by the other team members, written permission from the other team members will first be obtained.
- *Limitations of the teaming agreement*. Team members typically want it clear that the teaming agreement itself does not constitute or create a joint venture, partnership, or formal business organization of any kind; that the sole object of the teaming agreement is the marketing and securing of business opportunities for the design of the project; that any obligations of the parties relating to the actual performance of agreements for the project will arise only from a separate agreement (such as a prime-consultant or joint venture agreement); and that nothing in the teaming agreement grants to the team members the right to make commitments of any kind for or on behalf of the other team members without prior written consent.
- *Enforceability and dispute resolution*. Provisions to enforce the terms of the teaming agreement and to resolve disputes among the team members, and what law governs the teaming agreement, are typically described.

BACKGROUNDER

DESIGN-BUILD AGREEMENTS

Timothy R. Twomey, Esq., FAIA

Project team agreements may also include design-build agreements in which the client retains in a single contract a design-builder to provide all design and construction services needed to complete the client's project. The client achieves a single point of responsibility for all services, not having to separately retain an architect for design services and a contractor for construction services. Many clients find this approach desirable since it likely avoids, for the client, the finger pointing that sometimes takes place between design professionals and contractors when disagreements arise on issues related to the project, often leaving the client wondering to whom they should look for resolution of the matter. Some clients also feel that overall project schedules and project costs can be reduced by using this approach to project delivery. AIA Document A141™–2004 Standard Form of Agreement Between Owner and Design-Builder, together with its exhibits, can be used for this purpose.

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BRIDGING AGREEMENT

Clients sometimes believe that they must first feel comfortable that the program they provide to the design-builder adequately describes the client's goals and expectations for the project. Some clients may also want to provide the design-builder with the general design requirements of the project so that the client has a greater confidence level that the final design for the project provided by the design-builder will closely match the client's expectations. If the client doesn't have the in-house expertise to develop the program or general design requirements, the client may first want to retain a consultant to prepare this preliminary information before it is given to the design-builder for final design and construction. This approach is often called "bridging," since this preliminary step bridges the gap, so to speak, between the client's giving the design-builder very little specific information concerning the client's goals and expectations and giving the contractor a full set of drawings and specifications. AIA Document B142™–2004, Standard Form of Agreement Between Owner and Consultant, where the owner contemplates using the design-build method of project delivery, together with its exhibits, can be used for this purpose. Exhibit B includes an extensive listing of services the client can select for the consultant to provide to help the client achieve the level of comfort it desires before engaging the design-builder under a design-build agreement.

DESIGN-BUILD SUBCONTRACTS

The design-builder may provide through its in-house forces all required design and construction services; more often the design-builder will, in turn, contract with needed design professionals and trade contractors for required services. The nature of those contracts will depend upon the nature of the design-builder. If the design-builder does not have any in-house design or construction forces, it will have to retain those services through separate subcontracts with qualified design professionals and contractors. More typically, as design-build is practiced in the United States today, the design-builder is a contractor who can provide the required construction services, but must subcontract required design services to the architect.

AIA Document A142™–2004, Standard Form of Agreement Between Design-Builder and Contractor, together with its exhibits, can be used by the design-builder to retain required construction services for the project. AIA Document B143™–2004, Standard Form of Agreement Between Design-Builder and Architect, together with its exhibits, can be used by the design-builder to retain the architect for required design services.

COORDINATION OF AGREEMENTS

Just as in all projects, it is critically important that all agreements between the client and the design-builder, and between the design-builder and its contractor and architect, be coordinated so that there are no gaps or overlaps in the various parties duties and responsibilities, and that the provisions of the agreement between the client and design-builder properly flow down to the contractor and architect, respectively. Even if AIA agreements are used, it is likely that substantial changes will have been made in the agreement between the owner and the design-builder, so great care must be taken to similarly and appropriately reflect those changes in the design-builder's subcontracts with the contractor and the architect, respectively. They also need to be evaluated by the architect to understand their impact on the architect and whether the architect can accept those changes.

All parties must be particularly conscious of the relationships among them, and respect them, since they are different than on traditionally structured projects. Communications among the parties must be clearly delineated. The architect's client is no longer the owner of the project, but the design-builder. The architect's duties now run to the design-builder, and not to the client. Clients often fail to recognize this fundamental distinction as well, and expect the architect to be the client's adviser and to watch out for the client's interests on the project in the same manner as they have come to expect. The design-builder will expect differently, so it behooves all parties to clearly understand their roles and how they differ from traditional relationships.

Design-builders may have a tendency to treat their architect consultants much like their trade contractors. The AIA design-build documents recognize the distinction and address it appropriately. If AIA documents are not used, great caution should be exercised by the architect so that the architect does not provide to the design-builder guaranties, warranties, and other obligations common to contractors but inappropriate for design professionals. There could be significant insurance and liability implications otherwise.

ARCHITECT'S SERVICES

Perhaps the most important point to be negotiated between the architect and the design-builder are the services to be provided by the architect. They may not be as extensive as on traditionally structured projects where the architect is retained by the owner. Architects should not fall into the mistake of performing services as if it were a traditionally structured project, and risk breaching their contractual duties and obligations to the design-builder. The design-builder more often than not does want or need the full scope of design and/or construction phase services the architect traditionally provides, despite what the architect, and maybe even the client, may want the architect to provide. The owner may dictate in its agreement with the design-builder what minimal professional services the owner wants the architect to provide, and those should flow down to the architect in its agreement with the design-builder. The architect must assure itself, however, that it is to provide at least the minimal level and extent of professional services local licensing laws require, but beyond that is a matter of negotiation between the architect and the design-builder. Exhibit B to AIA Document B143™–2004, Standard Form of Agreement Between Design-Builder and Architect, provides an extensive listing of services the architect can provide and from which the parties can select. It is a useful tool to identify and record the extent of the architect's services.

BACKGROUNDER

INTEGRATED PROJECT DELIVERY AGREEMENTS

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These agreements are quite unique and relatively recent, though their motivations are as old as the practice of design and construction itself. They are intended to foster a highly integrative and collaborative approach to these disciplines among all key players, particularly the client, the architect and its design team, and the contractor and its construction team.

Integrated project delivery (IPD) is a project delivery approach that integrates people, systems, business structures, and practices into a process that collaboratively harnesses the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction.

At the core of an integrated project are collaborative, integrated, and productive teams composed of key project participants. Building upon early contributions of individual expertise, these teams are guided by principles of trust, transparent processes, effective collaboration, open information sharing, team success tied to project success, shared risk and reward, value-based decision making, and utilization of full technological capabilities and support. The outcome is the opportunity to design, build, and operate as efficiently as possible.

THE TRANSITIONAL IPD APPROACH

Best exemplified by AIA B195™–2008 Standard Form of Agreement Between Owner and Architect for Integrated Project Delivery and AIA A195™–2008 Standard Form of Agreement Between Owner and Contractor for Integrated Project Delivery, with its Guaranteed Maximum Price Amendment, these documents achieve some, but not all, of the benefits of IPD and include some, but not all, of the features of IPD. It is best suited to those parties who may not be fully committed to IPD, or don't feel they thoroughly understand it, but recognize many of the benefits to be achieved and want them for their project.

This approach to IPD will be most familiar to the parties. In many ways it is structured similarly to a traditional project. The owner has separate agreements with the architect and contractor, and the three parties work together throughout the design phase. At the conclusion of the detailed design phase, the contractor provides a guaranteed maximum price. This approach does not employ a risk-reward approach to compensation nor tie an individual party's success to project success; risk allocation and transfer are dealt with in essentially a traditional manner, and disputes are settled fairly conventionally.

However, the location of subject matter in the two agreements varies somewhat, in that the two agreements contain little more than payment terms and dispute resolution provisions, and the duties of all three parties throughout the design and construction phases are set forth jointly by phase in the general conditions which applies to owner, architect, and contractor, as appropriate; the phases of the project are described a bit differently, and more appropriately, to this project delivery approach; and it includes some but not all of the collaborative processes and open information sharing inherent in a full IPD project. It is primarily through the structuring and integration of greater collaborative processes and the more open and timely sharing of information that a greater measure of benefit is achieved in this transitional IPD approach than on traditionally structured projects.

THE SINGLE-PURPOSE ENTITY (SPE) IPD APPROACH

This approach is intended to maximize the benefits and rewards of IPD. The owner, architect, and contractor structure their contractual and working relationships in a radically different way in order to realize those benefits. In fact, together, they create a single legal entity, likely a limited liability company, for the purpose of planning, designing, constructing, and commissioning the project. The company, in turn, contracts with each of the owner, architect, and contractor to fund, design, and construct the project and to otherwise perform their various duties and responsibilities one to another.

This approach to IPD requires a substantial mind-set change on the part of the owner, architect, and contractor, where all are truly working to maximize the success of the project rather than their own individual success, under the theory and expectation that by doing so they will, in fact, maximize their own individual success. Working together in a common enterprise for a common purpose, and sharing the risks and rewards of doing so, requires close collaboration and cooperation and the open and timely sharing of information and identification of issues for expeditious resolution. All succeed or no one succeeds, so there is little incentive for a given party to dig into its respective silo and ignore the needs of the other parties. Dispute resolution is largely conducted internally among the members, and risk allocation is shared and the parties mutually waive most claims against each other.

For all this to occur, the parties' contractual relationships must be radically different from those in traditionally structured projects. The AIA's family of SPE IPD agreements was designed for this purpose. They consist of AIA C195™–2008 Standard Form Single Purpose Entity Agreement for Integrated Project Delivery, AIA C196™–2008 Standard Form of Agreement Between Single Purpose Entity and Owner for Integrated Project Delivery, AIA C197™–2008 Standard Form of Agreement Between Single Purpose Entity and Non-Owner Member for Integrated Project Delivery, and all of their related exhibits.

THE MULTI-PARTY IPD APPROACH

The most common approach adopted by parties to date who do venture into this method of project delivery is the multi-party approach. Under this approach, the owner, architect, and contractor do not create a separate legal entity (i.e., the SPE), but instead enter into a multi-party agreement. This agreement, at a minimum, consists of the owner, architect, and contractor, but may also include other key players in the project as may seem appropriate to the parties.

Multi-party agreements are typically seen as easier and quicker to structure and enter into than creating a separate legal entity, such as a limited liability company. They also don't include the legal and administrative overhead that such a legal entity would entail. These agreements are structured to obtain all of the key benefits, open information sharing, collaborative processes, shared risk and reward, and other key features included in the SPE approach. Management of the project and of the multi-party agreement is through a process of shared decision making, disputes are handled essentially internally, and the parties waive most claims against each other.

AIA Document C191™–2009 Standard Form Multi-Party Agreement for Integrated Project Delivery, and its extensive exhibits, is well suited for parties wishing to engage in this method of project delivery.

KEY ISSUES IN IPD AGREEMENTS

Creating of a contractual framework that encourages collaboration. Regardless of which approach to IPD the parties may wish to adopt, the agreements used to structure that approach must foster collaboration and shared decision making.

Incentive creation. The agreement must establish incentives for the parties to put project success over individual parties' success and to encourage collaboration and desired behaviors. There must be opportunities for the parties to achieve financial success for achieving project cost targets and project goals that would exceed the financial opportunities typically achievable under traditionally structured projects.

Dispute resolution. It is more fruitful to harmonious working relationships, more expeditious, and far less costly, if the parties can resolve their disputes internally and not have to seek third parties, such as arbitrators or the courts, to resolve disputes. Structuring such internal procedures and the parties' commitments to employ them are critically important.

Licensing laws. Care must be taken that the form of agreement chosen, and the responsibilities assumed and the actions taken by the parties, do not run afoul of local licensing and registration laws. New methods of project delivery sometimes challenge current laws that have been developed in response to then-prevalent methods of project delivery. It took years for state laws and legislatures to respond encouragingly to design-build as a method of project delivery; it will likely take a similar period of time to do likewise for IPD. These traps can be avoided, but one must be vigilant. Consultation with knowledgeable counsel is well advised.

Insurance availability. Similarly, new project delivery methods pose a challenge to insurance companies, particularly those offering professional liability insurance, to offer insurance products appropriate to the needs of the parties engaged in IPD. There is not enough of a track record with these projects for insurers to understand the risks they are being asked to insure. The insurance industry is a conservative industry, and the ones who stay in business and are likely to be around when you need them are loath to insure risks they do not understand and therefore can't price with confidence. Whenever contemplating engaging in an IPD project, be sure to first consult with your insurance advisers.

Use of building information modeling and other collaborative technologies. IPD projects don't require but are greatly aided by the use of BIM and other collaborative technologies. The nature of IPD requires open, transparent, integrative, and shared resources. Parties contemplating an IPD project would be well advised to focus substantial attention on sharing and adapting these technologies throughout their entire team. AIA Document E201™–2007, Digital Data Protocol Exhibit, and AIA Document E202™–2008, Building Information Modeling Protocol Exhibit, are useful tools that can be used for this purpose.

For More Information

"Integrated Project Delivery: A Guide" (AIA and AIA California Council, 2007): http://www.aia.org/aiaucmp/groups/aia/documents/document/aiab085539.pdf.

17.3 Owner-Generated Agreements

Suzanne H. Harness, Esq., AIA

Because architects often have to execute design services agreements that their clients provide, they will benefit from taking a systematic approach to evaluating terms in agreements provided by owners.

INTRODUCTION

In the architect's "dream come true," a new client asks the architect to submit the architect's version of the design services agreement. The architect sends the owner an agreement like AIA Document B101™–2007, Agreement Between Owner and Architect, which the client reads and signs without editing. Because this is a dream that only sometimes comes true, architects need to be able to evaluate an agreement presented by a client and negotiate changes to it when changes are necessary to protect the architect from inappropriate risk.

When the owner provides its own design services agreement, the owner has often engaged legal counsel to draft an agreement from scratch, called a "manuscript" agreement. Alternatively, the owner's counsel has modified a standard form provided by the American Institute of Architects or by another industry group, such as the Associated General Contractors of America's ConsensusDocs. However these owner-generated agreements are produced, the architect must carefully review them. Because the owner's attorney has a duty to prepare an agreement that provides the very best terms to the owner, the owner's first draft may expose the architect to uninsurable and unacceptable risks.

Most owners are willing to negotiate and do not imagine that their first drafts will be executed as final agreements. They expect that the architect will push back and that the final agreement will be one that both parties can ultimately accept. It is not unusual for many drafts of the same agreement to be exchanged before that final acceptable agreement emerges.

When the architect is engaged in a specialty role as a subconsultant to another architect, called the prime architect, the prime architect may have already executed an agreement with the owner, called the "prime agreement," which will be incorporated into the subconsultant agreement. In that event, the subconsultant architect must review not only the subconsultant agreement but also the prime agreement, and may have to negotiate the exclusion of some provisions of the prime agreement.

The steps laid out in numbered paragraphs below provide a process for evaluating agreements generated by building owners and other clients, and categorizing the risks presented in them so that the architect can be prepared to negotiate acceptable agreement terms.

1. EVALUATE THE OWNER'S AGREEMENT

When sitting down to read a client-generated agreement, it is helpful to keep nearby a basis for comparison. Because the standard form owner-architect agreements that the AIA provides are generally recognized within the design community as reasonably balancing the interests of owners and architects, an agreement like B101™–2007, which is suitable for most projects; or B103™–2007, Agreement Between Owner and Architect for a Large, Complex Project, may be used as a benchmark. When in doubt, refer to the AIA agreement for guidance.

► Agreements with Owners (17.1) addresses client-architect and architect-as-subconsultant agreements in detail.

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Whether reading an agreement in a paper copy or on a computer screen, one should be prepared to mark questionable clauses and place comments in the margins for future reference and consultation with lawyers and insurance advisors. The initial purpose in reading and marking the agreement is to identify any risks and classify them into two broad categories: insurable or not insurable. It may not be possible to negotiate an agreement where all risks are insurable. In that case, architects may agree for business reasons to accept and manage certain risks that cannot be insured. Even if insurable, some risks may be too great for the architect to assume. In that case, the architect will need special skills to negotiate the complete removal of unacceptable risks from the agreement.

This article focuses on the clauses that most people call "boilerplate," which includes such topics as professional standards, indemnities, warranties, guarantees, and waivers. In addition to boilerplate, every design services agreement should include a detailed scope of services. A detailed scope of services allows for more accurately developing the compensation to be paid for services, and minimizes disagreements with clients regarding whether a particular service is included in the agreed-upon compensation. This article does not discuss particular services, but assumes that the architect will take whatever steps are necessary to incorporate into the agreement a detailed scope of services, as agreed with the client.

▶ See Dispute Management and Resolution (16.4) for further discussion of dispute resolution processes, including mediation, arbitration, and litigation.

▶ Insurance Coverage for Business and Professional Liability (16.2) covers the necessary considerations and alternatives when selecting liability insurance for one's firm.

Any practitioner or entity performing professional services may also purchase PL coverage, which reimburses damages arising not only from personal injury and property damage but also from economic losses, to the extent the damage or loss is caused by the architect's professional negligence. Professional negligence is found when the architect breaches the professional standard of care, which is implied by law in contracts for professional services. Each state's case law (the common law) provides the standard of care, which is often the same for other professionals such as engineers, doctors, accountants, and lawyers, and varies little from state to state. The common law makes clear that a professional is not required to provide error-free performance, but may be found liable for damages caused only when the professional's performance is not comparable to the performance of other similarly situated professionals. For the avoidance of doubt, the AIA began including a professional standard of care clause in most of its owner-architect agreements starting in 2007.

2. UNDERSTAND THE RISKS THAT CAN BE INSURED

An in-depth discussion of insurance is beyond the scope of this article, but, in general, the architect can purchase two primary types of insurance to cover the risks associated with design and construction projects: commercial general liability (CGL), and professional liability (PL). CGL policies provide coverage to the architect for damages arising from personal injury and property damage that are caused by the architect's general, nonprofessional negligence.

This article cannot definitively state what would or would not be covered under an architect's PL policy. There is no standard form PL policy and each policy is proprietary, so the terms and conditions of the insuring agreement vary somewhat from one carrier to another. For more specific advice, the architect should turn to its insurance broker and insurance carrier; however, some general statements can be made about what a typical PL policy will, and not, cover:

- PL coverage applies only to damages arising from professional negligence, meaning that not all errors and omissions will be covered—only *negligent* errors and omissions will qualify for coverage. Negligence is typically shown through the report and/or testimony of an expert witness.
- Liability that the architect assumes by contract is not covered under a PL policy unless the liability would have attached through a breach of the standard of care. For example, if the architect agrees by contract to perform to a professional standard that exceeds the professional standard of care established in the state's common law, damages arising from failing to meet that higher standard are excluded from coverage.
- The contractual liability exclusion, or a specific exclusion for guarantees and warranties, defeats coverage for any performance warranty or guarantee to the extent that the guarantee or warranty requires performance in excess of the professional standard of care.
- The PL policy covers liability arising only from the negligence of the insured architect named in the policy, as well as liability the architect assumes due to the negligence of any subconsultant under contract to the architect. The PL policy does not cover the negligence of the architect's client, or any third party, and does not directly cover the architect's subconsultants.

Architects purchase PL insurance in order to share the risk of the architect's negligent errors and omissions with the insurance carrier. Sharing takes place because the damages associated with the architect's negligence are transferred to the carrier, to the extent that they exceed a deductible or self-insured retention amount stated in the policy. To maintain the benefit of that risk sharing, architects must carefully review client-generated agreements and negotiate the removal of any uninsurable liability that the client may have introduced. Because the client benefits from receiving insurance proceeds when the architect is negligent, it is in the client's best interest to negotiate an insurable agreement. The architect's insurance broker or a representative of the insurance carrier are the best authorities regarding the insurability of contract provisions under a particular PL policy, and they often provide contract review services to their architect clients.

3. IDENTIFY THE RISKS THAT MAY NOT BE INSURABLE

Below is an examination of certain types of clauses that should be reviewed, flagged, and edited as necessary to avoid jeopardizing PL coverage. The "example" clauses below, copied from a variety of actual agreements presented to architects and other design professionals, illustrate suggested edits that can be made to reduce the risk of uninsurable liability. All example clauses and suggested edits to them serve only as samples to illustrate concepts, and may require further review and modification by legal counsel or insurance advisers. Similarly, any discussion of legal issues throughout this article does not constitute legal advice. For any legal question, architects should seek advice from legal counsel specializing in design and construction law.

Warranties/Guarantees

Any warranty or guarantee regarding the performance of professional services may be excluded from coverage under a specific exclusion or the contractual liability exclusion. These provisions should be revised to exclude words like "warrants," "guarantees," or "ensures," as in the example below:

Example:

> Consultant ~~warrants that~~ <u>shall perform</u> the Services under this Agreement ~~shall be performed~~ in conformance with the ~~highest~~ standard of care and quality practiced by professionals experienced with projects similar to the Project.
>
> Consultant ~~further warrants that the Services will be~~ shall perform~~ed~~ the Services
>
> (i) in a ~~good and workmanlike~~ <u>professional</u> manner consistent with applicable industry standards,
> (ii) free from <u>negligent</u> defects.

Error-Free Design

Clauses requiring that the architect correct all errors and omissions, or correct drawings to the owner's satisfaction, suggest that the architect is guaranteeing a perfect design, which the common law standard of care does not require. For <u>that reason, such clauses are not insurable. Moreover, the client</u> is not qualified to determine whether a design is negligent, which takes expert witness testimony. Any agreements to make corrections should be limited to "negligent" errors and omissions:

Example #1:

> If ~~in the opinion of said County Agent~~ any of the services under this contract have been <u>negligently</u> ~~improperly~~ performed, then, at the option of said County Agent, any such services shall be performed anew by the Provider ~~to the satisfaction and approval of the said County Agent, and~~ at the cost and expense of the Provider.

Example #2

> Any designs, drawings, specifications, or Services prepared or furnished by Consultant that contain <u>negligent</u> errors, conflicts, or omissions (collectively, "Defective Services") will be promptly corrected by Consultant at no cost to Owner.

Adherence to Schedule

"Time is of the essence" provisions do not mean only that the schedule is important or critical; rather, they may be used to hold the architect in default (strictly liable) for failing to meet a schedule and liable for all associated damages, without regard to whether the architect's performance in meeting the schedule was negligent. These words should be deleted.

Example:

> Consultant agrees that time is ~~of the essence~~ critically important in the performance of the Services. Consultant agrees to prosecute the Services with all due diligence and to complete the Services within the time stated in the Contract Documents or the Consultant's schedule, whichever is sooner.

Compliance with Laws/Codes

Design professionals have to exercise professional care to comply with laws regarding design services, because many of these laws and codes are conflicting and subject to more than one interpretation. For that reason, it may not be possible to comply with "all" of them, as clients often require. Also, unless a reference is made to professional standards, an agreement to comply with "all" codes and laws may be seen as a warranty.

Example:

> Consultant shall employ professional care to comply with all requirements of any applicable federal, national, state, or local law, code, statute, rule or regulation and reasonable interpretations of the same.

▶ Architects and the Law (5.1) addresses the basic components of legal requirements governing the architecture profession.

Performance Guarantees

The architect can agree to design in accordance with the professional standard of care to achieve a particular result, but cannot guarantee the achievement of the result without jeopardizing PL insurance coverage. For example, the architect may agree to design the project to achieve a particular sustainability goal or LEED rating, but cannot agree that the resulting design will achieve that result. Performance guarantees often arise in a design-build context where a design-builder has promised a particular result to the owner, and endeavors to pass that guarantee down to the design firm. In the following Example, from the 2010 edition of DBIA Document No. 540, Standard Form of Agreement Between Design-Builder and Design Consultant, the words in brackets obligate the Design Consultant to achieve the specific performance standards, which may be seen as an uninsurable guarantee. In the words after the check box the Design Professional agrees to design to achieve the desired result, but does not guarantee that the result will be achieved. Nevertheless, in the context of Paragraph 15.1, the words could be seen as a warranty unless a reference to professional standards is inserted.

Example:

> 15.1 Other provisions, if any, are as follows:
>
> *(Insert any additional provisions such as incentives or other provisions from the Design-Build Agreement that the parties believe are appropriate to be passed through to the Design Consultant).*
>
> [Section 2.2.1 sets forth a traditional negligence standard as it relates to Design Consultant's performance of its Services. If the Basis of Design Documents identify specific performance standards that can be objectively measured, the parties, by including the following language, agree that the Design Consultant ~~is obligated~~ shall design the Project to achieve such standards.]
>
> Notwithstanding Section 2.2.1 above, if the Design-Build Agreement, including but not limited to the Basis of Design Documents, contain specifically identified performance standards for aspects of the Work, Design Consultant agrees that in accordance with professional skill and care all Services shall be performed to achieve such standards.

Fiduciary Duties

A fiduciary is a person who has accepted the legal duty to subordinate its own interests to those of another party and to demonstrate absolute loyalty to that party. The fiduciary relationship is characterized by the utmost trust and confidence. Agents and trustees accept fiduciary duties. A fiduciary duty is the highest standard of care that can be imposed under the law; as such, it far exceeds the standard imposed under the professional standard of care and is not insurable under a PL policy.

Under a typical owner-architect agreement, the architect serves as an independent contractor, is not the owner's agent (except in a limited way, as set forth in the agreement), and does not owe a fiduciary duty to the owner. In filing a claim, clients may argue that the architect has breached its fiduciary duty, so it is important to edit client-generated agreements to avoid the impression that the agreement created a fiduciary duty.

Words imposing a duty to act in the client's best interest and to accept a relationship of trust can imply that the parties intended to create a fiduciary relationship, even if the words themselves do not expressly create the duty. For that reason, it may be wise to take the extra step of disclaiming a fiduciary duty so that a future adjudicator will understand the parties' intent not to create the duty. On the other hand, a duty of good faith and fair dealing is implied by law in every contract, so words of that nature do not impose a higher standard and do not require deletion.

See below the example from the 2007 edition of ConsensusDocs 240, Agreement Between Owner and Architect/Engineer, edited to disclaim a fiduciary duty.

Example:

> 2.2 Relationship of the Parties. The Design Professional ~~accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate and~~ agrees to exercise the Architect/Engineer's skill and judgment consistent with the Standard of Care ~~in furthering the interests of the Owner~~. The Architect/Engineer represents that it possesses the ~~requisite skill, expertise, and~~ licensing to perform the required services. The Owner and Architect/Engineer agree to work together on the basis of ~~mutual trust,~~ good faith and fair dealing, and shall take actions reasonably necessary to enable each other to perform this Agreement in a timely, efficient, and economical manner. The Owner and Architect/Engineer shall endeavor to promote harmony and cooperation among all Project participants. Nothing in this paragraph shall be interpreted to create a fiduciary relationship between the Owner and Architect/Engineer.

Liability for Another's Fault or Negligence

Because the PL policy provides coverage only for the negligence of the named insured architect and those for whose acts the architect is legally responsible, such as its subconsultants, the architect must review the client-provided agreement for clauses requiring that the architect take responsibility for the mistakes of others.

Owner's Consultants

In the example below, the architect would assume uninsurable liability to the owner for the errors of the owner's consultants. The additions disclaim that result.

Example:

> The Architect shall incorporate into the Construction Documents the design recommendations, drawings, and specifications of the Owner's consultants, including, but not limited to, the environmental consultant, but the Architect shall not be responsible for the accuracy or completeness of any work provided by the Owner's consultants. The Owner shall require that its consultants be professionally licensed and be covered under professional liability insurance, and shall further require that they sign and seal their own design documents prior to submitting to the Architect.

Owner's Cost Estimator

If the owner's cost estimator makes mistakes in cost estimating, the architect should not be required to redesign at its own expense to account for those mistakes. AIA

Document B103™–2007 is written to accommodate a third-party cost estimator. Under that circumstance, the architect does not have control over the quality and completeness of the cost estimate, and should be compensated for any redesign that results from the cost estimator's mistakes. The example below shows how one owner edited AIA Document B103™–2007 to remove that protection and to place a duty on the architect to review the cost estimate for its completeness and report errors and omissions in it to the owner.

Example of edits to Section 6.3 of AIA Document B103™–2007 that should be rejected:

> **§ 6.3** The Owner shall require the Cost Consultant to include appropriate contingencies for design, bidding or negotiating, price escalation, and market conditions in estimates of the Cost of the Work. The Architect ~~shall be entitled to~~ may rely on the accuracy ~~and completeness~~ of estimates of the Cost of the Work the Cost Consultant prepares as the Architect progresses with its Basic Services. The Architect shall ~~prepare, as an Additional Service, revisions to the Drawings, Specifications or other documents required due to the Cost Consultant's inaccuracies or incompleteness in preparing cost estimates. The Architect may~~ review the Cost Consultant's estimates for scope and completeness with reference to the construction documents ~~solely for the Architect's guidance in completion of its services, however,~~ and the Architect shall report to the Owner any material inaccuracies and inconsistencies, and omissions noted during any such review.

Contractor's Submittals

Under AIA agreements, the architect's review of submittals is limited so as to avoid the architect's assuming uninsurable liability for the contractor's means and methods of construction and for additional information provided by the contractor. The owner's attempts to remove protective language should be resisted.

Example of edits to Section 3.6.4.2 of AIA Document B101™–2007 that should be rejected:

> **§ 3.6.4.2** In accordance with the Architect-approved submittal schedule, the Architect shall review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples~~, but only~~ for the ~~limited~~ purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. ~~Review of such submittals is not for the purpose of determining the accuracy and completeness of other information such as dimensions, quantities, and installation or performance of equipment or systems, which are the Contractor's responsibility. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.~~

Contractor's Construction Defects

Under AIA agreements, the architect has the authority, but not the duty, to reject nonconforming construction work. However, the architect has a duty to report defects that the architect observes when performing site visits. The architect may decide how often to visit the site, or the number of visits may be established in the contract. Even with a daily on-site presence the architect could not reasonably be expected to observe each and every construction defect. Nevertheless, the client may wish to transfer liability to the architect for costs arising from the contractor's construction errors by finding the architect at fault for not identifying and reporting each and every such error. Language that could impose that higher standard of review should be deleted.

Example of edits to Section 3.6.2.1 of AIA Document B101™–2007 that should be rejected:

> **§ 3.6.2.1** The Architect shall visit the site at intervals appropriate to the stage of construction, or as otherwise required in Section 4.3.3, to become ~~generally~~ familiar with the progress and quality of the portion of the Work completed, and to determine,

~~in general,~~ if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. ~~However, the Architect shall not be required to make exhaustive or continuous on site inspections to check the quality or quantity of the Work.~~ On the basis of the site visits, the Architect shall keep the Owner ~~reasonably~~ informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) ~~known~~ deviations from the Contract Documents and from the most recent construction schedule, and (2) defects and deficiencies ~~observed~~ in the Work.

Certifications

A certification is a written affirmation that something is true. Among other things, architects are typically requested to certify the accuracy of contractor's payment applications, and to certify to the owner's lenders that the project is constructed in conformance with the contract documents. As shown in Example #1 below, at least one owner has required that the architect certify that it has reviewed its own construction drawings for accuracy and completeness. Because the architect often does not have complete control over the truth of certifications it makes, certifications should be qualified, as edited below, to impose a reasonable standard of review upon them.

Example #1:

> Upon completion of documents, the ARCHITECT shall certify to the OWNER that to <u>the best of the ARCHITECT'S information, knowledge, and belief</u> all Contract Documents have been thoroughly checked for <u>conformance to applicable professional standards for</u> constructability, accuracy and for the coordination of all their parts and details and conformity to applicable laws, ordinances, and codes.

Example #2, from the 2011 edition of ConsensusDocs 240, Agreement Between Owner and Design Professional:

> 3.2.8.5 Design Professional shall assist the Owner in processing the Constructor's applications for payment. Based on its on-site observations and other relevant information, the Design Professional shall certify to the Owner <u>to the best of the Design Professional's information, knowledge, and belief,</u> the amounts due the Constructor and that the Work has progress to the point indicated in the payment application based on the schedule of values submitted by the Constructor.

Payment Disputes

Commonly excluded from a PL policy are the costs associated with payment disputes. PL insurance only covers claims made by the client or third party that allege negligence. Without a claim, and negligence proven to the satisfaction of the carrier, no coverage will apply. If the client covers the costs of its claims by simply withholding funds, coverage will not be triggered. Once the withholding has taken place, the architect must file a claim against the client to recover the funds, and those claim expenses are not covered under the policy. For that reason, it is important not to agree to allow a client to withhold funds based on its own opinion of deficient design.

Example of a clause that should be avoided:

> Grounds for Not Paying Invoices. Owner may decline to pay an invoice, in whole or in part, to the extent Owner decides it is necessary to protect itself from loss due to Consultant's performance or nonperformance of the Services.

Attorney's Fees/Prevailing Party Clause

A prevailing party clause provides that the winning litigant recover its legal fees. If mutual, these clauses will likely be enforceable, even though the so-called American Rule provides that litigating parties are responsible for their respective legal expenses. Unless recoverable under a statute, or awarded by a court for other legal reason, PL carriers may exclude the payment of legal fees to clients in an indemnity provision or prevailing party clause due to the policy's contractual liability exclusion.

Example of prevailing party clause that should be avoided:

> If any Party requires the services of an attorney to secure the performance of this Agreement or otherwise on the breach or default of another party to this Agreement, or if any judicial remedy or arbitration is necessary to enforce or interpret any provision of this Agreement or the rights and duties of any person in relation to it, the prevailing party shall be entitled to reasonable attorney fees, costs, and other expenses, in addition to any other relief to which such party may be entitled.

4. ANALYZE THE INDEMNITIES

Under the common law, an owner, when found legally obligated to pay damages to an injured party, can seek reimbursement (seek indemnity) from the architect whose negligence caused the injury. Under the common law, there is no legal duty for the architect to step forward and defend the owner by providing legal counsel and assuming the ongoing cost of the owner's legal bills. PL policies generally provide coverage based on indemnity under the common law.

Under a contract, the owner may seek to obtain indemnity coverage that exceeds what the common law provides. For example, an owner may require by contract that the architect provide reimbursement not only for damages caused by the architect but also for damages caused by the owner. The owner may also require that the architect provide the owner's defense by retaining and paying for counsel to represent the owner. Because this liability assumed by contract exceeds what is required under the common law, PL policies do not cover damages caused by the owner's negligence, even in part, and do not provide a defense to the owner.

CGL policies operate differently and may provide what is called "contractual liability" coverage, which provides a defense to the indemnified party, reimburses defense costs, and covers the costs of the owner's own negligence, although the latter may be limited by state anti-indemnity statutes. The architect's CGL can provide contractual liability coverage; however, most claims by third parties arise from the architect's provision of professional design services or construction contract administration performed on the job site, which are specifically excluded from coverage under the CGL policy.

Perhaps because owners are accustomed to receiving contractual indemnity from construction contractors under the contractor's CGL policy, they often demand the same of the architect under the PL policy. For that reason, most owner-generated agreements require indemnity and defense obligations that are, at least in part, uninsurable under the PL policy and may require many drafts to negotiate. If the client insists upon including an indemnity with a defense obligation, it may be possible to avoid the defense of any claim arising in professional negligence by using a disclaimer and alternative indemnity.

Example of a disclaimer and alternative indemnity clause:

> The indemnity above shall not apply to Claims arising from the Architect's performance of professional services. For such Claims, the Architect shall indemnify, but shall not defend, the Indemnified Parties from and against any liabilities, damages, and costs incurred due to Claims from third parties to the extent caused by the negligent act, error, or omission of the Architect or anyone for whom the Architect is legally responsible.

Indemnity and defense obligations are two separate duties, but some states, like California, will read into every indemnity a duty to defend. For that reason, it may not be sufficient merely to delete the duty to defend—it may be necessary to expressly disclaim the duty altogether. It is not sufficient to qualify that the defense duty is contingent upon the architect's negligence, because the defense obligation attaches when a claim is filed, which is long before the architect's negligence, if any, is determined.

Bear in mind that no type of insurance policy covers breach of contract, warranties and guarantees, intentional or willful misconduct, strict liability, and copyright infringement; yet owners generally require such indemnities in their agreements, as in the two examples below, and architects may agree to provide them as a business decision. With respect to warranties and guarantees, the recommended approach is to avoid making any such uninsurable promises so that any indemnity provisions based on them, such as those in Example #1 below, will not have any effect.

Indemnities may be long, convoluted and hard to read. Below are a few examples with edits suggested to preserve PL coverage for professional services:

Example #1:

> Architect will indemnify, ~~defend and hold~~ Company and/or its subsidiaries, Affiliates and their respective directors, officers, employees, agents, successors and assigns ("Company Indemnified Parties") ~~harmless~~ from and against any ~~allegation or claim based on, or any~~ damage, loss, and expense and any other liability resulting from claims by third parties ~~(including reasonable attorneys' fees incurred on such claims and in proving the right to indemnification)~~ (collectively "Claims") to the extent caused by ~~arising from~~ any negligent act or omission by Architect and/or its Personnel, including without limitation any breach of Architect's obligations, representations, or warranties under this Agreement, any allegation or claim of negligence, strict liability, misconduct, or the infringement or misappropriation of any foreign or United States patent, copyright, trade secret, or other proprietary right in results. However, the foregoing does not apply to the extent such Claim results from Company's ~~sole~~ negligence or willful misconduct. ~~Architect will use counsel reasonably satisfactory to Company to defend each Claim, and Company will cooperate (at Architect's expense) with Architect in the defense. Architect will not consent to the entry of any judgment or enter into any settlement without Company's prior written consent, which may not be unreasonably withheld.~~

Example #2:

> To the extent permitted by law, Architect agrees to ~~protect, defend, hold harmless and~~ indemnify, but not defend, City, its City Council, commissions, officers, employees, volunteers, and agents from and against any ~~claim~~, injury, liability, loss, cost, and/or expense or damage resulting from claims by third parties, ~~including all costs and reasonable attorney's fees in providing a defense to any claim arising out of, pertaining to, or relating to~~ to the extent caused by the negligence, ~~recklessness,~~ or willful misconduct of the Architect, its employees, subcontractors, or agents in the performance, or nonperformance, of services under this Agreement.

5. ASSESS THE BUSINESS RISKS

It is likely that some provisions in the owner-generated agreement will not be insurable and may have to be accepted and managed. Each architect will have its own level of risk tolerance, and some architects will walk away from a project if the owner will not agree to reduce unacceptable business risks.

Indemnity for Infringement of Intellectual Property Rights

As stated above, the PL policy will not cover damages associated with the architect's breach of contract, unless they arise in professional negligence. For example, unlike laws, regulations, and codes related to design, which require the exercise of professional skill and care for compliance, damages associated with the architect's failure to comply with federal copyright statutes is not an insurable claim under the PL policy. Owners often insist on being indemnified for any such damages, as in the example below. The architect may obtain a better litigating position by negotiating changes in wording to make the indemnity contingent upon a "knowing" infringement. Whether or not that change is made, the indemnity is not insurable and, if it cannot be avoided in contract negotiation, then the architect must implement procedures within the design team for obtaining licenses from copyright holders and controlling the further use of copyrighted material provided by others.

Example of uninsurable indemnity to be avoided:

> Consultant agrees to defend, indemnify, and hold harmless the Owner Indemnitees from and against any claims for patent or copyright infringement or loss relating thereto, which pertain to the Services and/or any Additional Services performed by Consultant or its Affiliates.

Ownership of Architect's Instruments of Service

Frequently, a client will insist on ownership of instruments of service, including the copyright. Owners may be well served by receiving a license for the use of the architect's instruments of service, as AIA agreements provide; however, the owner and its counsel may be firmly convinced otherwise and may include provisions, including "work for hire" provisions, that automatically convey copyright ownership to the owner.

▶ The backgrounder Copyright Law for Architects (5.1) discusses intellectual property rights in greater detail.

When a client has rights of future use in instruments of service, with or without a copyright transfer, a release and indemnity for future use and modification of the design professional's work is reasonable and appropriate. In fact, many owners agree to include the release and indemnity in exchange for the usage rights. If the client or owner reuses instruments of service on another project without retaining the architect, then the owner and its subsequent architect should take responsibility for any errors and omissions in them through the signing and sealing of new construction documents.

Example:

> The ARCHITECT acknowledges that the design of the building, the Drawings, Specifications, and other documents were prepared by the ARCHITECT for the OWNER for use in this Project. Except as hereafter provided, the ARCHITECT hereby assigns to the OWNER all of its right, title, and interest in and to the Drawings, Specifications, and building design, including all common law, statutory, and other reserved rights, including the copyright. The ARCHITECT shall be permitted to retain copies, including reproducible copies, of the Drawings, Specifications, and other documents for information and reference in connection with the OWNER's use and occupancy of the Project. The Design, Drawings, or other documents shall not be used by the ARCHITECT or others on other projects, except with the consent, in writing, from and with appropriate compensation to the OWNER. <u>For any future use by OWNER of the Drawings, Specifications, and other documents without retaining the ARCHITECT, OWNER shall release ARCHITECT from all claims and, to the fullest extent permitted by law, shall indemnify, defend, and hold harmless ARCHITECT, its officers, employees, and subconsultants from and against any damages, liabilities, or costs.</u>

Consequential Damages

Consequential damages do not arise directly and immediately from a party's act, but are consequences of the act that are not ordinarily predictable. On the owner's side, consequential damages include such things as loss of use, lost rents and other revenues, and lost profits. On the architect and contractor's side, consequential damages are not as extensive and generally include unabsorbed home office overhead due to owner-caused delays. Consequential damages, if proved to be caused by the architect's professional negligence, will be covered under the PL policy; but, if the owner can prove consequential damages, it may recover substantial amounts that could exceed insurance limits of liability. For that reason, AIA agreements between owners and architects, owners and contractors, and with all lower-tier consultants and contractors include a waiver of consequential damages. Copied below is the waiver that the AIA includes in owner-architect agreements B101™–2007 and B103™–2007.

> **§ 8.1.4** The Architect and Owner waive consequential damages for claims, disputes or other matters in question arising out of or relating to this Agreement. This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination of this Agreement, except as specifically provided in Section 9.7.

Owners and their counsel may strenuously resist waiving consequential damages. If language such as suggested by the above Section 8.1.4 is not included in the owner-generated agreement, then the architect should consider negotiating its inclusion. Some architects will not execute agreements that do not include either a waiver of consequential damages, or a limitation of liability. For an example of limitation of liability provision, refer to "7. Add What the Owner Left Out," below.

6. CLARIFY INSURANCE REQUIREMENTS

Owner-generated agreements frequently include lengthy insurance requirements; sometimes these are included in a separate exhibit to the agreement. The owner may require insurance limits of liability that exceed the architect's practice policy, may require reporting that is overly burdensome, and may require endorsements that are not available under any conditions. Because the architect may be found in breach of contract for failing to provide the required insurance, the architect should consult its insurance broker to verify that the insurance required is capable of being delivered.

Owner as Additional Insured

Owners that do not understand PL insurance may ask to be named as an "additional named insured" on the PL policy. As an additional insured the owner hopes to obtain the same indemnity and defense of claims that the carrier is required to provide to the named insured architect. Architects need to explain to their clients that because PL insurance covers only the named insured design professional for its professional negligence, PL policies cannot be endorsed to include the owner as an additional insured. The owner is not a design professional, and the owner's negligence, if any, would be general, not professional. For these reasons, the owner does not qualify as a named insured on the PL policy.

Contractual Liability

As discussed above in "4. Analyze the Indemnities," a CGL policy can be endorsed to provide contractual liability coverage, but that coverage is not available under the PL policy. The owner's counsel may not be aware of the distinction, and may include the requirement, which must be deleted so that the architect may not be found in breach of contract regarding the insurance requirements.
Example of contractual liability:

> (j) The coverage under the Architect's Commercial General Liability primary and umbrella/excess Liability ~~and its Professional Liability/Errors and Omissions~~ policies must include blanket written contractual liability coverage for the indemnity agreements set forth in this Agreement.

7. ADD WHAT THE OWNER LEFT OUT

It is not unusual for the owner-generated agreement to be very "heavy" on duties of the architect, and very "light" on duties of the owner. The owner may also not have provided any limitations on the architect's liability for things that are beyond the architect's control, and may not have provided certain protective rights to the architect.

First and foremost, the owner may not have included a standard of care, or may have included one that increases the standard to uninsurable levels. If the contract is otherwise insurable, the exclusion of a contractual standard of care is not harmful, because the standard implied by law will cover the performance of services. However, if the agreement includes any requirements that could be construed as creating a warranty or guarantee, it is advisable to insert an insurable standard of care as a defined term, and to clarify that all professional services performed under the agreement will be performed under it.

Example of an insurable Standard of Care, from AIA Agreement B101™–2007:

> § 2.2 The Architect shall perform its services consistent with the professional skill and care ordinarily provided by architects practicing in the same or similar locality under the same or similar circumstances. The Architect shall perform its services as expeditiously as is consistent with such professional skill and care and the orderly progress of the Project.

Example of language that could be added to clarify that all professional services are performed under the Standard of Care:

> Notwithstanding any clause in this Agreement to the contrary, it is expressly agreed that the quality of all professional services performed under this Agreement shall be judged solely as to whether the Architect performed the professional services in accordance with the Standard of Care.

Owner Duties

AIA owner-architect agreements include a section entitled Owner's Responsibilities. When reviewing the owner-generated agreement, an agreement like AIA Document B101™–2007 can be used as a kind of checklist for identifying owner's responsibilities that should be included in the agreement, such as the following:

- Providing information and approvals in a timely manner
- Providing and updating the project budget
- Furnishing civil surveys, and the services of geotechnical engineers
- Coordinating owner's own consultants
- Requiring that owner's consultants maintain PL insurance
- Furnishing testing, such as for air quality and hazardous materials
- Providing prompt notice of any errors or omissions discovered in the instruments of service

Limitations on the Architect's Liability

Similarly, the owner may not have included certain protections typically found either in the AIA owner-architect agreement, or in General Conditions Documents incorporated by reference into the owner-architect agreement, such as AIA Document A201™–2007, General Conditions of the Contract for Construction. These limitations are not grouped together under a heading called "limitations of liability" but are dispersed through the agreement by subject matter.

Common limitations that the architect should consider securing include:

- Disclaiming the architect's responsibility for the contractor's means and methods of construction and for job site safety
- Limiting the architect's liability for the accuracy of its cost estimates to redesigning at the architect's expense
- Disclaiming liability for results of interpretations and decisions made in good faith
- Disclaiming third-party beneficiary status to any third party
- Waiving subrogation for damages caused by property insurance
- Disclaiming responsibility for an owner's decision made without the architect's approval
- Disclaiming responsibility for hazardous materials, unless a specific duty under the agreement

The example below illustrates how an agreement can seem to provide the necessary disclaimer, but may then add an unexpected requirement that places undue risk on the architect. In a majority of the states, the architect is not required by law to report safety violations. While the architect may choose to notify the superintendent and the owner of any site conditions that the architect deems unsafe, having the contractual duty to do so could impose liability for job site safety on the architect, and that liability could be excluded from PL coverage under the contractual liability exclusion.

Example from the 2011 edition of ConsensusDocs C-240, Agreement Between Owner and Design Professional:

> 3.2.8.4 The Design Professional is not responsible for safety precautions and programs. ~~However, if the Architect/Engineer becomes aware of safety violations, the Architect/Engineer shall give prompt written notice to the Design-Builder.~~

A general limitation of liability clause may be desirable, especially when a client has refused to waive consequential damages. Such a limitation can provide certainty as to the ultimate amount of the architect's liability and can support a decision to move forward on a business decision to execute an otherwise risky agreement. If reasonable, a limitation of liability clause will likely be enforceable under state law. The architect's liability may be capped at an agreed amount, the amount of available insurance, or, as in the example below from AIA Document B503™–2007, Guide for Amendments to AIA Owner-Architect Agreements, to the amount of the architect's compensation.

Example:

> Neither the Architect, Architect's consultants, nor their agents or employees shall be jointly, severally or individually liable to the Owner in excess of the compensation to be paid pursuant to this Agreement or ____________Dollars ($_____), whichever is greater, by any reason of any act or omission, including breach of contract or negligence not amounting to a willful or intentional wrong.

Architect Rights

Finally, the architect should look for the omission of certain desired contractual rights, such as the following:

- To assign the agreement
- To suspend the services and terminate the agreement for the owner's failure to make payments when due
- To obtain indemnification from the contractor for claims of bodily injury and property damage arising from the contractor's negligence
- To be named an additional insured under the contractor's CGL policy
- To rely on the accuracy of owner-provided information

8. DEVELOP A NEGOTIATION STRATEGY

After categorizing and analyzing the risks presented in the client-generated agreement, the architect can prepare a negotiation strategy that takes into account agreement clauses that must be revised, those that must be deleted, and those that can be accepted. As shown in the examples above, an uninsurable risk may often be converted to an insurable risk by changing only a few words. Where a business risk is unacceptable, the architect may need to delete the requirement, or substitute it with an alternative proposal. The architect may also wish to add certain provisions that the owner has omitted. A revised version of the agreement can be prepared and presented in a format that shows the changes made. Documents are often exchanged by e-mail, but should always be discussed with clients to explain why certain changes are necessary.

▶ Negotiating Agreement (15.3) discusses negotiation as a problem-solving skill that can be learned and mastered.

For More Information

Risk Management & Contract Guide for Design Professionals (Ardent Publications, 2005) by J. Kent Holland.

17.4 Construction Contracts

Susan Van Bell, Esq.

The construction agreement, general conditions, and other parts of the construction contract set out what the owner, contractor, and architect are expected to do during the construction phase.

A construction contract is the formal agreement for the purchase of labor, materials, equipment, and services for building work. The construction contract:

Sets forth the rights and obligations of the owner and contractor with respect to each other and to the work:

- Details the contractor's scope of work by incorporating the construction documents prepared by the architect
- Determines the total amount that the owner will pay the contractor and when payments are to be made
- Describes procedures that are to be followed in carrying out the work, including information the owner and contractor are to provide
- May set out how each party can assert a claim against the other and how disputes are to be resolved

Many owners request the architect's assistance in selecting and preparing the construction agreement, general conditions, and other parts of the contract—in addition to preparing the construction drawings and specifications. The architect is well positioned to provide the owner with practical and technical information on these matters and to identify standard form documents that are generally consistent with the owner's goals. It is always appropriate, however, to recommend that the owner also obtain the advice of legal and insurance professionals to meet the requirements of the particular project. It also should be remembered that the owner (not the architect) is entering into the contract. Decisions on contract terms are ultimately the owner's responsibility.

The party that purchases the construction work is commonly referred to as the "owner." In some instances, this party may be the tenant or lessee of the property where the work is to be performed even though the contract documents use the word "owner." When the tenant enters into the construction contract, the landlord's interests should also be taken into account.

At the same time, the construction contract affects the services that the architect will provide during the construction phase of a project. In many projects, the architect provides administration of the construction contract. In the role of construction contract administrator, the architect acts as the owner's representative to the extent agreed upon by the owner and architect. When a construction contract is selected or drafted, the architect should see that its provisions for contract administration are coordinated with the provisions of the owner-architect agreement.

► Construction Phase Services (10.9) further addresses construction contract administration.

For all of these reasons, the architect needs to be familiar with each part of a construction contract and understand alternative approaches that are available in drafting and administering such contracts. This knowledge will enable the architect to contribute to a successful project as well as manage the architect's own services more effectively.

THE EFFECT OF THE PROJECT DELIVERY METHOD ON A CONSTRUCTION CONTRACT

The term "project delivery method" refers to the way that relationships are structured among the primary participants in the design and construction process. A successful

► See Project Delivery Methods (9.1) for a more detailed discussion of project delivery methods and trends.

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construction contract provides an accurate description of those relationships, including their legal, administrative, procedural, and technical aspects.

As a result, the initial selection of a standard form agreement and general conditions for a particular project primarily depends on the project delivery method to be used. This selection also depends on the method for determining the amount the contractor will be paid, a subject discussed in detail later in this topic. The project delivery method is critical because the agreement and general conditions contain more than just abstract legal provisions—these documents also describe the basic administrative procedures by which the project will be built. In other words, these documents provide the framework for what the owner, contractor, and architect will do during the construction process.

This article focuses on construction contracts for projects that follow the traditional design-award-build project delivery method. This method encompasses projects in which the construction contract is negotiated following completion of the design (design-negotiate-build), as well as projects that are competitively bid (design-bid-build). It is common for an owner to enter into a single contract for the general construction work on a project. For some projects, however, the owner may find it advantageous to divide the work into more than one prime contract. When the owner enters into multiple prime construction contracts, each of those contracts will likely follow the design-award-build project delivery method.

This will typically be the case, for example, when the owner enters into multiple prime construction contracts after retaining a construction manager-adviser (i.e., a construction manager who does not perform any of the construction work but serves solely as the owner's consultant). The AIA Construction Manager–Adviser (CMa) family of contract documents, including the CMa construction agreement and general conditions, fits this model and follows the design-award-build project delivery method.

When construction management services are to be provided by a construction company that will also serve as the construction contractor, the owner normally will retain those services during the pre-design or design phase of the project. The AIA Construction Manager–Constructor (CMc) family of contract documents describes this project delivery method. A CMc project is not design-award-build because the owner awards the prime construction contract to the construction manager–constructor *before* the design and construction documents are completed. Once a CMc project enters the construction phase, however, the project relationships mirror the relationships in a design-award-build project. As a result, the information presented in this topic generally applies to the construction phase of an owner-CMc contract. For example, the construction phase provisions in the AIA standard form CMc agreements (A133™–2009 and A134™–2009) are based on the corresponding design-award-build contract documents.

► See The Architect's Role in Construction Manager–Constructor Project Delivery (9.2) for related information.

In design-build projects, the relationship between a design-builder and a construction contractor bears many similarities to the owner-contractor relationship in a traditional design-award-build project. For possible ways to structure construction contracts in the design-build context, refer to AIA Document A142™–2004, Agreement Between Design-Builder and Contractor, in the AIA Design-Build family of documents. When an architect contracts with a design-builder to provide architecture services in a design-build project, the architect should keep in mind that the scope of architecture services during construction will depend on how construction contract administration will be handled and may differ markedly from an architect's conventional role.

► Architect-Led Design-Build (9.5) and Contractor-Led Design-Build (9.4) address those two forms of design-build project delivery.

In a more recently developed delivery method, integrated project delivery (IPD), the contractor is brought into the project earlier than in a traditional design-award-build project, and the contractual relationships can vary depending upon the level of integration used.

► See Integrated Project Delivery Overview (9.3) for further discussion of IPD processes and trends.

The AIA Documents Program (17.5) discusses the AIA Contract Documents in detail.

THE PARTS OF A CONSTRUCTION CONTRACT

In the traditional language of the construction industry, the owner-contractor *agreement* is the document that the owner and contractor sign and that sets out the most fundamental or essential terms of their understanding, such as payment terms. The construction *contract*, by contrast, consists of the owner-contractor agreement and everything that is incorporated into that agreement, whether those additional documents are physically attached as exhibits to the agreement or are simply incorporated into the agreement by reference.

A construction contract normally includes the following essential documents:

- Owner-contractor agreement
- General conditions
- Supplementary or other conditions
- Drawings
- Specifications

A construction contract also includes any authorized changes to the provisions in these documents. Changes made before the agreement is signed are typically made by addendum. Modifications made after the agreement is signed can be made in whatever way the construction contract itself provides or permits; alternatives include change orders, construction change directives, and minor changes in the work typically issued as architects' supplemental instructions.

Not all documents that are prepared and distributed by the architect are part of the construction contract. Documents prepared solely to describe bidding procedures or bidding requirements do not need to be incorporated into the contract, and confusion can be avoided by omitting them from the list of documents incorporated into the contract. When construction work is procured by negotiation instead of bidding, the request for proposals does not need to be part of the contract if the contractor's proposal or other contract documents set out all of the duties of the contracting parties. Similarly, shop drawings and other contractor submittals, even when approved by the architect, typically should not be incorporated into the construction contract. Incorporating approved submittals would alter the contractor's work requirements when a submittal varies from the original contract documents.

A contract is an agreed-upon set of mutual promises that gives each party a legal duty to the other and the right to seek a remedy for the other party's breach of its duties. A "letter of intent" or "memorandum of understanding" may not contain actual mutual promises. In that case, it may not be legally enforceable and therefore not a contract.

The fact that a construction contract may contain at least four initial written documents (agreement, general conditions, supplementary conditions, and specifications) naturally leads to the question: What subject matter goes where? The answer lies partly in practicality and partly in industry practice and tradition. One factor to consider is who is responsible for the content of the document. The agreement and conditions (general, supplementary, and any other) are ultimately the responsibility of the owner, as they contain those matters that should be decided by the owner, such as insurance coverage or the amount of any liquidated damages. The specifications, on the other hand, are the architect's responsibility and generally contain information that is within an architect's expertise. More detailed answers to "what goes where" are available in AIA Document A521™–2012, Uniform Location of Subject Matter. Additional guidance may be found in MasterFormat section numbers and titles published by the Construction Specifications Institute.

Owner-Contractor Agreement

The construction agreement typically identifies the parties and the architect, defines the contractor's scope of work by incorporating the construction drawings and specifications, states when the work will begin and when it is to be completed, states the amount the contractor will be paid or describes how that amount will be determined, and describes payment procedures. The agreement incorporates into the contract the conditions (general, supplementary, etc.) and any addenda or other documents. This may be done either by reference or by attaching the documents to the agreement.

As a general rule, the meaning or enforceability of a contract is not affected when a document is incorporated by reference rather than physically attaching it to the agreement. However, attaching a copy of the incorporated document has the practical benefit of better communication between the parties and decreases the chance of disputes resulting from misunderstanding.

General Conditions

This document, which may also be called terms and conditions or general provisions, describes in detail the relationship between owner and contractor. A set of general conditions is designed to apply generically to a project delivery method or other project type. Although the architect is not a party to the construction contract, the general conditions describe responsibilities the architect has during construction; these provisions may be incorporated by reference into the owner-architect agreement as well. Structuring a construction contract with a separate general conditions document instead of including those provisions within the construction agreement itself normally has no effect on the meaning or enforceability of the provisions. An exception occurs when a precedence clause is included that states which document will override in the event of a conflict among the documents.

Supplementary Conditions

General conditions typically must be adapted to suit the particular requirements of a specific project. Supplementary conditions list such additions, deletions, or other changes to the general conditions. AIA Document A503™–2007, Guide for Supplementary Conditions, is a resource for drafting them. The practice of making changes to general conditions in a separate set of supplementary conditions originated in the pre-computer age and is likely to decline as computers are increasingly used to generate contract documents. When general conditions are adapted by making changes directly in the general conditions document itself, a separate supplementary conditions document is unnecessary.

▶ Construction Drawings (10.6) addresses the importance and essential elements of drawings as part of a completed set of construction documents.

Special Conditions or Other Conditions

Other documents that modify the general conditions may be used. For example, some owners have standard modifications, or special conditions, to be used for their projects. In such instances, project contract documents may include both special conditions (describing the owner's typical requirements) and supplementary conditions (describing project-specific requirements).

AIA contract documents intentionally do not establish an order of precedence among contract documents that would apply in the event of an inconsistency. They require the contractor to consult the architect or owner when a discrepancy is encountered, allowing them to decide on the best course of action rather than leaving the resolution to the contractor.

Drawings

These are the graphic and pictorial portions of the contract documents that show the design, location, configuration, and dimensions of the work. Drawings typically include plans, elevations, sections, details, schedules, and diagrams.

Specifications

These are the written requirements for materials, equipment, systems, standards, and workmanship for the work. Specifications include both technical requirements and administrative or procedural requirements.

▶ Construction Specifications (10.7) discusses the content and organization of specifications.

Addenda

An addendum is issued before the construction agreement is signed to change or interpret provisions of the proposed contract. An addendum may include graphic as well as written material and can change or interpret the conditions of the contract as well as the drawings and specifications.

Change Orders

A change order is a document signed by the owner and contractor (and by the architect when required by the general conditions) after the contract is signed to modify the work requirements. A change order may also change the amount the contractor is to be paid and the time allowed to complete the work.

Construction Change Directives

When provided for by the construction contract, a construction change directive permits the owner to direct a change in the work when the owner and contractor are initially unable to agree on the cost or time required for a change in the work. Typically, the architect prepares and signs a construction change directive, which the owner also signs.

Minor Change in the Work

The construction contract may authorize the architect to order a minor change in the work that does not involve a change either in the amount the contractor is to be paid or in the time to complete the work. Such orders are to be issued in writing and are binding on the owner and contractor.

Other Contract Modifications

The owner and contractor can also agree to modify their contract by signing a written amendment.

BASIS OF PAYMENT

The method used to determine how much the contractor will be paid has a significant effect on the construction contract. Relatively brief contract provisions are required to describe the contract sum when the contractor is to be paid a predetermined fixed amount or "stipulated sum." When the contractor is instead to be paid the actual amounts the contractor expends to do the work ("cost plus fee" or "time and materials"), defining exactly what categories of costs the contractor is allowed to charge to the owner requires considerable detail. Even further provisions are required when the contractor guarantees a maximum price for a project done on a cost-plus basis.

▶ Services and Compensation (15.2) addresses the setting of compensation for architectural services as well as compensation methods and payment strategies.

Stipulated Sum

In this type of contract, the contractor agrees to do the entire scope of work for a stated or fixed amount. Under this arrangement, the owner has the advantage of knowing the cost of the work at the time the contract is signed. A stipulated sum contract is almost always used when the work is competitively bid and may also be used in negotiated contracts. The contractor's profit (or loss) is determined by how the contractor's actual costs incurred compare to the amounts assumed in the bid or proposal.

Cost-Plus Fee

Under this arrangement, the owner reimburses the contractor for the cost of all labor, materials, subcontracts, and other items required to complete the work (referred to as the "cost of the work" in AIA contract documents). The owner also pays the contractor a fee to allow for overhead and profit. The fee may be a fixed sum or may be a percentage of the cost of the work. Establishing the fee as a fixed sum enables the contractor to reduce the cost of the work without reducing its profit. But even in a cost-plus contract with a fixed fee, the owner does not know what the cost of the work will be when the contract is signed. This disadvantage may be outweighed by other considerations, as in the following situations:

- To meet the owner's desired completion schedule, construction must be started before the design is completed, and the design-award-build project delivery method cannot be used.
- Other factors prevent the owner from knowing at the outset of construction what the exact scope of work will be, for example, when the owner will provide the interior finish work for office space to be leased to tenants.
- Construction quality or special construction requirements are more important than cost, such as in defense projects or research facilities.

A construction manager doing construction work under a cost-plus contract with a GMP is sometimes referred to as a CM "at risk." Correspondingly, if no GMP is established in the cost-plus contract, the CM may be described as "not at risk." However, the terms "at risk" and "not at risk" are ambiguous and should be used with caution. Even if there is no GMP, a construction manager–constructor performs the construction work (directly or through subcontracts) and may incur a loss if the fee does not cover expenses.

Particularly in larger cost-plus contracts, a control estimate or target price may be established based on a preliminary cost estimate. This control estimate can be used to monitor costs as they are incurred and billed to the owner.

Guaranteed Maximum Price

This is a variation of the cost-plus-fee arrangement, in which the contractor assumes the risk that the construction cost will not exceed a stated amount. Unlike other cost-plus contracts, a contract with a guaranteed maximum price must include a defined scope of work; without a measurable scope of work, the GMP serves no purpose. Contractors commonly commit to a GMP when construction documents are only 60 to 70 percent complete; larger contingencies can be expected when the construction documents are less complete. In a GMP contract, the contractor is entitled to an increase in the GMP for changes in the scope of work.

When a GMP contract contains a percentage (not fixed) fee, the contractor has a financial incentive to incur the maximum allowable cost and thereby receive the maximum fee. One way to counter this tendency is for the owner and contractor to share the savings, that is, to split the difference between the allowed GMP and the actual cost-plus-fee amount. The proportion of the split can be in whatever percentages the parties agree.

A GMP contract can be adapted in other ways to adjust the cost risks carried by the owner and contractor. For example, the contractor may be able to obtain fixed prices from some subcontractors for their scopes of work; these fixed prices, along with the contractor's associated fee, can be included in the general construction contract, thereby reducing the scope of work that is subject to cost variation.

Unit Price

A unit price is a fixed amount the contractor will be paid for a specified unit of a material or service. Unit prices are used when the quantity of work the contractor will perform cannot be known at the outset, for example, to set the cost for rock excavation or other types of earthwork. Unit prices are used more extensively in construction of civil engineering work than in construction of buildings, although they are often used in building renovation projects and to obtain prices for tenant construction. The unit price method requires a specific description of the work (for example, types of rock excavation may need to be defined) and, during construction, a measurement of the amount of work actually performed (for example, volume of rock excavated). The contractor's cost in performing some kinds of work is dependent on the volume, so care should be taken in estimating how much work will be required on a unit price basis. If the actual amount of work varies significantly from the estimated amount, an adjustment in the unit price may be required to be fair to one party or the other.

Contract parties: Each party to a contract should be identified by its full legal name. This is particularly important when the party is an incorporated entity. Failure to accurately state a party's name in the agreement may complicate the resolution of any disputes.

OTHER SPECIFIC PROVISIONS

Following is a brief discussion of selected provisions commonly found in construction contracts.

Project and Work

As used in standard form AIA contract documents, the term "work" refers to what the contractor provides under a particular contract. The term "project" refers to the owner's entire undertaking and, along with the contractor's work, generally includes such things as professional services; land acquisition; and furniture, furnishings, and equipment (FF&E). The project can be identified in the construction contract by name or other brief description. A description of the work is generally unnecessary because its scope is defined by the entire set of contract documents, including the construction drawings and specifications, which are incorporated by reference into the agreement.

A short description of the work may be useful, however, when the project includes work to be performed by more than one prime contractor.

Date of Commencement and Notice to Proceed

The owner may not be ready for construction to begin on the date the contract is signed. The contract can provide that work is to begin on another specified date or on a date to be established later, in a notice to proceed that the owner will issue. A notice to proceed may be a letter or other document that states the date when the contractor may begin work and is signed by the owner (or by the architect, if authorized by the owner). A significant delay in issuing a notice to proceed may have an adverse effect on the contractor and give rise to a claim for increased costs or for additional time.

Construction contracts typically contain definitions of key terms. When the definition of a term is not provided in the contract itself, the term should be given its ordinary and customary meaning in the construction industry. The glossary in Appendix B contains meanings of some frequently used terms.

Contract Sum

Sometimes referred to as the contract price, this is the total amount that the owner will be required to pay the contractor. If the contract is for a stipulated sum, that fixed amount will be stated in the contract. At completion, the contract sum may be different because of change orders or other contract modifications. In a cost-plus-fee contract, however, the contract sum cannot be stated in the contract as a dollar amount; instead, the contract defines how the cost of the work will be determined and states the contractor's fee amount or percentage.

Progress Payments

Because of the length of time required to perform construction work, the contract typically requires the owner to make partial or progress payments as the work proceeds. Most standard-form construction contracts contain at least basic provisions for how and when such progress payments are to be made. Commonly, applications for payment are submitted monthly. The agreement may list the calendar date deadline for the contractor to make its applications. That date may be based on practical considerations, such as coordination with regularly scheduled project meetings where issues involving progress payments can be discussed and resolved. Other progress payment procedural requirements are typically described in the agreement and in the general conditions. They can be further detailed in the supplementary conditions and in Division 1 of the specifications. Cost-plus-fee contracts generally require more detailed payment provisions than stipulated sum contracts because the contractor is required to justify each of the costs charged to the owner.

Schedule of Values

To certify to the owner the amount to be paid, the architect must evaluate the contractor's application in light of both the scope of work described in the contract and the work completed. A schedule of values breaks down the entire scope of work into categories (such as by subcontract or specification division), which are each assigned a dollar value prior to work beginning. A schedule of values is indispensable for contracts that contain either a stipulated sum or a GMP. (A schedule of values is not required for cost-plus-fee contracts without a GMP, but its use may be considered as a tool for monitoring costs.) The schedule of values enables the architect to certify progress payments with some assurance that the total amount paid corresponds to the completion percentage of the work. To this end, the amount requested in each application for payment must reflect the quantity of work completed by category. In addition, the initial schedule of values must reflect the contractor's anticipated costs with reasonable accuracy. If work to be performed early in the construction process, such as site or foundation work, were assigned excessively high values, the contractor could be overpaid during the early phases of the work.

Retainage

When the federal government is the owner, the government will determine the form of contract to be used. When the federal government is providing funding for construction work but is not the owner, applicable federal regulations need to be incorporated into whatever contract forms are used.

Under traditional industry practice, some percentage of the value of the work completed may be deducted from the amount of each progress payment. This amount or retainage provides some additional assurance that the work can be completed for the unpaid contract amount, thus protecting the owner. The amount of retainage may vary by locale and custom, by project type, and by stage of completion of the work, but the details for any retainage and for any reduction or release of retainage funds must be spelled out in the contract. The amount of retainage on materials stored off-site may be set at a separate percentage. Some states have enacted statutes that affect when retainage must be paid or deposited for subsequent release, so any retainage provisions should be drafted with appropriate legal advice.

Substantial Completion

Requiring the contractor to complete the work by a stated date enables the owner to plan for occupancy and use of the project. The contractor's failure to meet that deadline generally constitutes a breach of contract. The standard for judging the contractor's performance for this purpose is "substantial completion" (that is, the project can be used for its intended purpose) instead of full or final completion (that is, every contract requirement has been met). The concept of substantial completion is consistent with the way the common law resolves breach-of-contract claims. Even when the contract does not fix a required completion date, substantial completion still triggers other contract events. When substantial completion is reached, for example, the architect may be required to perform an inspection, or the method of calculating payments owed to the contractor may change.

▶ Project Completion and Post-Construction (10.10) further discusses project closeout services.

Final Completion and Final Payment

The requirements and procedures for final completion and final payment are distributed among the agreement, general and supplemental conditions, and Division 1 of the specifications. Unlike substantial completion, however, a required date for final completion is frequently not stated in the construction contract.

Warranties and the Period for Correction of Work

Governing law: Construction contracts are typically interpreted under the law of a particular state, except in the case of federal government projects where federal contract law applies. Contracts designate the governing state law in order to avoid disputes over that issue and to increase the predictability of how contract provisions will be applied.

Three separate mechanisms may be found in construction contracts to ensure the contractor's responsibility for the quality of completed work. First, the contractor has a continuing contractual obligation to have performed the work in accordance with the contract documents. This obligation includes a general warranty against defective work (see, e.g., Section 3.5 of AIA Document A201™–2007, General Conditions of the Contract for Construction). This warranty lasts until the expiration of the statute of limitations or statute of repose. Second, the contractor must comply with the specific terms of any product warranty that has been provided, for example, a 15-year warranty on a roofing system. These product-specific warranties are in addition to the general warranty and may be enforced for a longer time. Third, some construction contracts, such as those based on AIA Document A201™–2007, require the contractor to return to the site to correct defective work discovered within a year after substantial completion. This one-year period may sometimes be referred to, informally, as a "one-year warranty period," but that term is misleading because the contractor's warranty and other contractual responsibilities for defective work do not end one year after substantial completion.

Alternative Dispute Resolution

Unless a construction contract provides otherwise, the owner and contractor generally have a right to resolve contract disputes by litigating them in court with a trial by jury. With limited exceptions, this right can be waived by agreeing in the contract that disputes will be decided in another manner, such as mediation and arbitration. Most such arbitration agreements in construction contracts can be enforced under current law including the Federal Arbitration Act. Arbitration agreements may also contain procedural details regarding how arbitration is to be conducted. When the contract does not contain those details, they will be determined by the laws governing the arbitration procedure, which differ substantially among the states.

Consequential Damages

A party that breaches a contract is ordinarily liable to the other party for all damages that are the result of the breach, including both "direct" damages and "indirect" or "consequential" damages. In construction, an example of direct damages is the cost to repair defective work or to complete work left unfinished by the contractor. Consequential damages are losses that are not the immediate result of the breach, but are losses that the breaching party has reason to know the other party will likely incur when the contract is breached. In the construction of a hotel, for example, lost room rentals are consequential damages incurred by the owner when the contractor fails to complete the work by the date stated in the contract, provided that the contractor knew when the agreement was signed that the owner would suffer lost rent if the work was not completed on time. Contracts such as those based on AIA Document A201™–2007 may contain a waiver of consequential damages. When consequential damages are waived, only direct damages can be recovered when the contract is breached.

Liquidated Damages

Because it may be burdensome to determine the precise amount of damages that a party incurs when a contract is breached, the amount of damages may be predetermined or fixed as "liquidated damages" in the contract. The governing law restricts the ways that liquidated damages provisions can be applied, however, so legal advice is always recommended when including a liquidated damages provision. In construction, liquidated damages are most frequently used to set the amount of damages owed to the owner for delay in completion of the work, generally on a per-day basis. Because such delay damages are typically consequential damages, any provision that waives consequential damages should specifically state that liquidated damages are not precluded. Care must be taken to ensure that a liquidated damages provision does not conflict with any waiver of consequential damages.

Statute of Limitations and Statute of Repose

The governing law restricts the length of time that lawsuits (or arbitrations) may be filed after damages are incurred or after a defect occurs or is discovered. This time period is established by a statute of limitations. Most states have also adopted another type of time restriction on claims against construction contractors (and architects), established by a statute of repose. Unlike a statute of limitations, a statute of repose begins to run at the end of construction or whenever services were last provided. Construction contracts may contain provisions that modify or further define these statutory time restrictions.

The information in this topic applies to general construction contracts, including those limited to interior construction work. Contracts for furniture, furnishings, and equipment fall into a separate category, however. Generally speaking, the purchase of FF&E is governed by Article 2 of the Uniform Commercial Code. This law differs markedly from general construction law, and only contract documents specifically intended for the purchase of FF&E, such as the AIA Interiors family of contract documents, should be used for that purpose.

SUBCONTRACTS

An architect may have little or no direct communication with subcontractors when administering a construction contract. As a result, architects have less need to be familiar with construction subcontracts than with prime or general construction contracts. Subcontractors nevertheless perform a substantial percentage of construction work, and project success commonly depends on their performance.

The prime construction contract should provide the owner and architect the opportunity to review the qualifications of the subcontractors proposed for the principal portions of the work and, if necessary, the right to request that other subcontractors be used. In competitive bid situations, the contractor has likely relied on the bids submitted by the contractor's initially proposed subcontractors. As a result, substituting alternative subcontractors will frequently increase the contractor's costs. If an objection is made to a proposed subcontractor and another subcontractor is substituted, the owner should expect to pay the contractor for the increased cost unless the subcontractor initially proposed is demonstrably not capable of performing. When the prime contract is awarded by negotiation or when the prime contractor is a construction manager–constructor, the owner has additional opportunity to control the selection of subcontractors, and the contract should describe that process.

The prime construction contract should also require that subcontracts be governed by the same terms as the owner-contractor relationship. This flow-down serves to ensure that the responsibilities of subcontractors for their particular portions of the work match the responsibilities that the contractor has toward the owner. In addition, the prime contract should provide a means for the owner to require subcontractors to continue work in the event the contractor defaults on the prime contract. For example, the A201™–2007 General Conditions requires that each subcontract be assigned to the owner, contingent on the contractor's default and on the owner's decision to accept the assignment.

In general, the law does not require a contractor to enter into a subcontract with any particular sub-bidder—even if its sub-bid is the lowest submitted and even if the contractor relied on that sub-bid to make its own bid. At the same time, the contractor can generally require a sub-bidder to honor its bid and enter into a subcontract based on that bid. This lack of symmetry is emblematic of the subcontractor's difficult position within the construction process. The subcontractor is affected by actions of the owner and other subcontractors but has no contract with those parties. Moreover, the subcontractor has no formal direct line of communication with the architect or engineering consultants. Depending on the terms of the subcontract, the subcontractor may have limited control over progress payments to be received from the contractor.

State laws provide some help to subcontractors to ensure that they are paid for their work. Some states have enacted prompt payment statutes that may affect when progress payments and retainage must be paid. In addition, mechanics lien statutes provide a way for subcontractors (as well as contractors) to enforce their rights to payment directly against owners that are not government entities. Under such statutes, a subcontractor providing labor or materials for construction work may assert the right to payment by filing a notice within a certain time. This filing begins a process that can result in a lien similar to a mortgage being placed on the construction site property. If the payment dispute is not resolved, the mechanics lien can be foreclosed through litigation and the property sold to satisfy the payment. Using the mechanics lien process, a subcontractor may be able to obtain payment from an owner even though the owner also paid the prime contractor in full. Faced with this risk, many owners seek to ensure that subcontractors get paid by requiring that each application for payment be accompanied by subcontractors' lien waivers covering work paid for under prior applications for payment. Mechanics lien statutes may, however, limit the enforceability of such lien waivers. Statutes governing mechanics liens and prompt payment vary widely among the states, so legal counsel should be relied on for these matters.

17.5 The AIA Documents Program

Susan Van Bell, Esq.

AIA documents capture and convey the expectations, relationships, responsibilities, and rules that bring parties together for the design and construction of buildings.

The AIA was founded in 1857 by 29 architects who shared the goal of creating an organization that would recognize architects as professionals, as distinguished from the trade contractors who constructed buildings at that time, and that would "promote the scientific and practical perfection of its members."

Although the AIA mission statement has changed over the years, and its opinion of design-build has come full circle, the AIA remains committed to serving as (1) the voice of the architecture profession, and (2) the resource of choice for its members as they develop the knowledge needed to provide unsurpassed professional services. One important way the AIA speaks for its members, and provides a valuable resource to them, is through AIA Contract Documents®. The AIA publishes more than 100 standard form documents for use in the design and construction industry. These documents include agreements for design services, construction, construction management, and design-build. They also include general conditions documents to establish the terms and conditions of the contract for construction; instructions to bidders; qualification statements for architects and contractors; bonding forms; payment and change order forms; and a request for information form. These standard forms may be modified to insert project-specific information, or may be edited further to change the standard text.

AIA CONTRACT DOCUMENTS DEVELOPMENT

The AIA has published standard form construction agreements for more than 120 years. Early in its history, the Institute recognized the need for a standard system of construction contracting. Working with the Western Association of Architects (which later merged into the AIA) and the National Association of Builders (which later became the Associated General Contractors of America), the AIA published its first standard form document in 1888. Entitled the Uniform Contract, this three-page agreement between owner and contractor contained many concepts that were carried forward into the first General Conditions of the Contract, published in 1911. The successor to that 1911 document is published today as A201™–2007, General Conditions of the Contract for Construction.

In publishing the Uniform Contract, the AIA accomplished more than merely filling the need for a standardized construction contracting process. The document clarified, for the first time in American society, the AIA view of the appropriate roles of the owner, architect, and contractor during the construction process. It also firmly established, for nearly 100 years, the bright line separating the responsibilities of the architect and those of the construction contractor.

Susan Van Bell is director and associate counsel for the AIA Contract Documents content program. She was in private practice for 13 years prior to joining the AIA in 2007. This topic is updated from "AIA Document Program" by Suzanne H. Harness, Esq., AIA, in the 14th edition of the Handbook.

Benefits of Standard Forms

The industry's acceptance of the Uniform Contract marked the beginning of regulation of the construction process. The Uniform Contract established the steps the owner and contractor would take when entering an agreement to construct a building. The contract also established the most important benefit of standard forms: to ensure nationwide consistency and predictability in contracting and in the construction process. Predictability in the process controls the expectations of the parties and reduces their risks. Reducing the contractor's risk substantially benefits the owner because it results in lower bids that are not padded with contingencies to cover unknowns.

Another significant benefit of standard forms is the savings they achieve in transactional costs, as compared with custom-made contracts. One hour of an attorney's time is easily 10 or 20 times the cost of a paper document and is equivalent to the price of a license to use AIA Contract Documents software for an entire year. Standard forms also provide assurances that nothing important is left out of the contract and that the text is internally consistent. Attorneys appreciate these benefits and see the advantage in using a standard form and modifying it liberally to suit a particular project and their clients' needs, instead of incurring the legal malpractice risks inherent in creating a custom contract.

AIA standard forms are not as inflexible as they once were. For example, the 2004 Design-Build family of documents introduced choices for dispute resolution methods and for the services the architect will provide. Some 2004 and 2005 standard forms of agreement provide menus for designating those services.

▶ Dispute Management and Resolution (16.4) covers dispute resolution methods, including mediation, arbitration, and litigation.

Following the model of the 2004 Design-Build family of agreements, the 2007 owner-contractor agreements and some owner-architect agreements provide check boxes for choosing a binding dispute resolution method. AIA Document A101™–2007, Agreement Between Owner and Contractor, additionally allows the parties to choose whether the architect will be the initial decision maker on claims between the owner and contractor.

The AIA also publishes some model, or alternative, language that can be added to standard forms to modify them to suit particular circumstances. Such model language is available in AIA Document A503™–2007, Guide for Supplementary Conditions; AIA Document B503™–2007, Guide for Amendments to AIA Owner-Architect Agreements; and AIA Document D503™–2011, Guide for Sustainable Projects. These Guides and others are available through AIA Contract Documents software and as free downloads from the AIA website.

The Documents Committee

Since its early days, the AIA has maintained a committee of its members dedicated to the creation and revision of AIA Contract Documents. The AIA Documents Committee must be drawn from practicing architects representing diverse geographic locations, size and type of practice, and specialized expertise. Committee appointments are made annually, although members are frequently reappointed for 10 years or more, based on their ongoing contributions, to provide continuity in document drafting. The Documents Committee meets at least three or four times annually and works with AIA staff attorneys and writers, as well as legal and insurance counsel, to draft and revise AIA documents. The Committee generally revises documents on no more than a 10-year cycle to accommodate changes in practice and to respond to any relevant judicial decisions affecting interpretation of a document.

Guiding Principles

Over a number of years, the AIA has developed what are called the Documents Drafting Principles, which guide the Documents Committee and AIA staff in preparing and revising AIA documents. These principles are as follows:

1. Establish and maintain, for nationwide application, standardized legal forms to enhance the stability of legal transactions in the design and construction industry.

2. Provide assistance to users who otherwise could not obtain knowledgeable legal counsel in a timely or economical fashion, by:
   - Providing standard documents as an alternative to costly custom-drafted documents
   - Promoting flexible use through the publication of supplemental guides that demonstrate, with model language and instructions, the adaptability of the standard documents to particular circumstances
   - Providing continuing education on the proper use of the documents
3. Strive for balanced and fair documents by:
   - Conforming to common law and statutory precepts adopted in the majority of jurisdictions
   - Allocating risks and responsibilities to the party best able to control them; to the party best able to protect against unexpected cost; or to the owner, when no other party can control the risk or prevent the loss
   - Seeking industry consensus among all parties whose interests may be significantly affected by individual documents
4. Publish documents that are subject to uniform legal interpretations so as to be predictably enforceable and, thus, reliable.
5. Use language that is unambiguous and comprehensible to users and interpreters (courts and lawyers) of the documents.
6. Where practices are consistent among regions, reflect industry customs and practices, rather than impose new ones; where practices are inconsistent or no guidelines for practice exist, provide a consensus-based model for practitioners to follow.

Allocation of Risk

The AIA intends that its agreements avoid unreasonable bias by first allocating risks and responsibilities to the party with the most knowledge of the risk and in the best position to control it. The agreements then allocate risk to the party best able to protect against unexpected cost by, for example, purchasing insurance. Risk is assigned to the owner, as the ultimate beneficiary of the project, only when no other party can control the risk or prevent the loss. The design and construction of buildings is a risky undertaking, so—to prevent an undue burden for any party, and to prevent any one interest (including that of architects) from being overrepresented—the Documents Committee strives to equitably balance risks.

Building Consensus

Starting with the Uniform Contract, the AIA has striven to produce documents that represent the consensus of the design and construction community. For that reason, the AIA seeks comment from industry liaison organizations representing contractors, subcontractors, owners, lenders, engineers, insurance and surety interests, and other interested stakeholders when drafting any new document or revising an existing one. So that no industry comment is overlooked, the AIA records all the comments it receives, and the Documents Committee reviews and discusses them thoroughly before agreeing to any changes in the existing text. The committee frequently meets in person with those who submit comments so committee members can gain a full understanding of the issue being presented. Through this process, the AIA works to provide documents that fully and fairly represent the interests of those stakeholders significantly affected by a particular document.

For example, in preparing documents for the 2007 release of the A201 family, which comprised over 40 new and revised documents, the Documents Committee sought comment from more than a dozen industry groups, including the Associated General Contractors of America, American Subcontractors Association, National Association of State Facilities Administrators, Commercial Owners Association of America, Associated Specialty Contractors, Council of American Structural Engineers, American

Council of Construction Lawyers, the American Bar Association's Forum on the Construction Industry, and the American Arbitration Association.

The committee also sought input from outside experts in property, general liability, and errors and omissions insurance. Several AIA knowledge communities, including Technology in Practice, the Committee on the Environment, Small Project Practitioners, and Practice Management, as well as the Integrated Practice Board Discussion Group and the Large Firm Round Table, also provided guidance.

KEEPING PACE WITH THE INDUSTRY

In creating and revising documents, the AIA strives both to reflect and to anticipate the needs of the design and construction industry and to provide agreements that will serve the major delivery methods being used to construct building projects. Design and construction practices are always changing and the documents are also changed to remain relevant to industry needs.

Construction Contracts

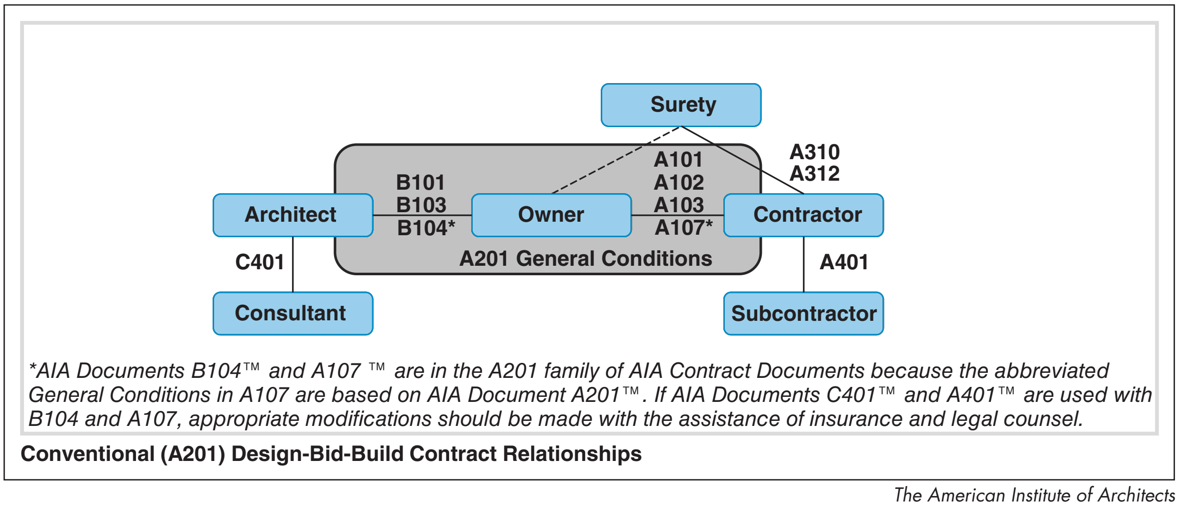
▶ See Demographics of Practice: 2012 AIA Firm Survey (2.2) and Navigating Economic Cycles (7.1) for more discussion of the 2012 AIA Firm Survey.

▶ Chapter 9, Design Project Delivery, includes detailed discussions of project delivery methods, processes, trends, and emerging issues.

Throughout the nineteenth and most of the twentieth centuries, design-bid/negotiate-build was the most common way to design and construct a project. In 2012, it is still the dominant project delivery method in the United States. The *2012 AIA Firm Survey: The Business of Architecture* reported that 55 percent of firm billings are derived from projects using the design-bid/negotiate-build delivery method.

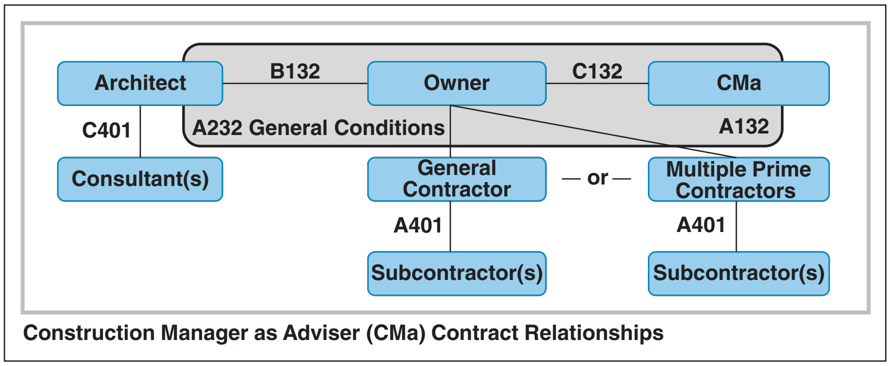
This method involves a sequential process whereby the architect completes the construction drawings and specifications and delivers them to the owner for approval. The owner then uses the architect's construction documents to obtain bids or proposals from construction contractors. AIA Contract Documents in the A201 (conventional) family serve the design-bid/negotiate-build delivery method (see Figure 17.1). Since 1967, the AIA has revised the A201 document and associated agreements and forms that rely on it every 10 years to keep it current with industry trends.

The revised A201–2007 family allows the owner and contractor to designate an optional third-party decision maker to make initial decisions on claims between them, and to name that initial decision maker (IDM) in the owner-contractor agreement. If the owner and contractor fail to appoint an optional IDM, the role will default to the architect, who will make those decisions in the traditional manner. The A201 family also eliminates mandatory arbitration, which AIA documents have required since 1888. Agreements in the A201 family provide check boxes where the parties may choose arbitration, litigation, or another method of binding dispute resolution for resolving



The American Institute of Architects

FIGURE 17.1 Conventional (A201) Design-Bid-Build Contract Relationships



The American Institute of Architects

FIGURE 17.2 **Construction Manager as Adviser (CMa) Contract Relationships**

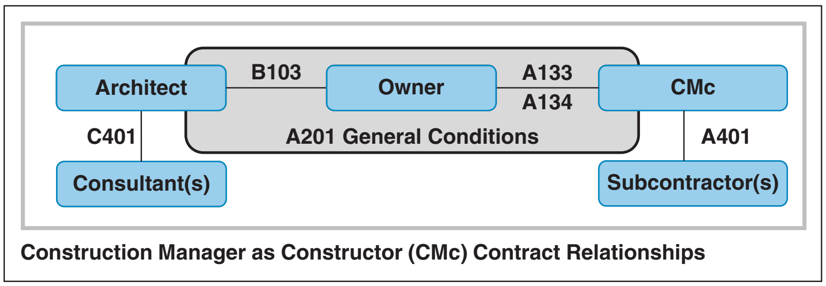
disputes. In addition, the 2007 documents are less restrictive regarding consolidation of arbitration and the joinder of third parties, when arbitration is the selected method of binding dispute resolution. Also, provisions relating to statutory limitation periods in the 2007 documents were substantially revised to follow state law more closely. The waiver of consequential damages clause, added to the A201 family in 1997, remains in the 2007 family as a barrier to "runaway" claims.

Construction Management

Construction management project delivery emerged in the 1970s, and the AIA responded with its Construction Manager as Adviser (CMa) family of documents in 1974. (See Figure 17.2.) The construction manager is an adviser to the owner and does not hold or assume any risk for the construction contracts. The owner holds construction contracts for each trade (multiple prime contracting) or may retain one general contractor. This model works well in some cases, but most owners look for a contractor to assume construction risk. To respond to that concern, Construction Manager as Constructor (CMc) agreements were developed in 1992. (See Figure 17.3.) CMc can be thought of as a hybrid of CMa and design-bid-build because the construction manager serves as an adviser to the owner during the design phase (providing cost estimates and constructability reviews) and as a construction contractor during the construction phase. The construction manager may build the project at risk, by guaranteeing a maximum price, or on a cost-plus-fee basis. The CMc approach in which the construction manager guarantees a maximum price to the owner (using AIA Document A133™–2009, Standard Form of Agreement Between Owner and Construction Manager as Constructor where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price) is a popular delivery method that now rivals design-build delivery.

Both of the construction management families of documents were revised and updated in 2009. A discussion of those updates is included in the next section, AIA Contract Documents in 2012.

▶ See The Architect's Role in Construction Manager–Constructor Project Delivery (9.2) for further discussion of construction management.



The American Institute of Architects

FIGURE 17.3 **Construction Manager as Constructor (CMc) Contract Relationships**

Design-Build

In 1985 the AIA was the first organization to publish standard form design-build documents. The AIA revised these documents in 1996 and 2004 to keep pace with industry changes. Revisions to the 2004 Design-Build family were not a simple update; rather, they presented an entirely new approach to design-build delivery. The new documents replaced the two-part A191, A491, and B901 agreements first published in 1985 and 1996 with one-part agreements, renumbered A141™–2004, A142™–2004, and B143™-2004, respectively. The AIA made these changes in response to industry rejection of the two-part process, in which the design-builder first entered into a contract with the owner for design services and, upon completion of the design, into a subsequent contract for construction. The industry preference was for one integrated contract for both design and construction. (See Figure 17.4.)

▶ Architect-Led Design-Build (9.5), Contractor-Led Design-Build (9.4), and the backgrounder on Architect-Led Design-Build and Architect as CM for Small Firms and Small Projects (9.5) cover design-build project delivery in greater detail.

The 2004 revisions included two new design-build documents. These were AIA Document B142™–2004, an agreement between the owner and a design-build consultant; and AIA Document G704/DB™–2004, a new form for acknowledging substantial completion of the design-build project. In 2008, the AIA completed the Design-Build family with the publication of AIA Document C441™–2008, Standard Form of Agreement Between Architect and Consultant for a Design-Build Project, and AIA Document A441™–2008, Standard Form of Agreement Between Contractor and Subcontractor for a Design-Build Project. It is anticipated that the Design-Build family will be updated again in or around 2014.

Design Contracts

▶ See Agreements with Owners (17.1), Project Team Agreements (17.2), and Owner-Generated Agreements (17.3) for related information.

The design process is also continually changing. When comments were solicited for the 2007 revisions to the 1997 owner-architect agreements, the industry and AIA internal groups shared these concerns: the two-part format of AIA Document B141™–1997, phases vs. services, basic services and additional services, errors and omissions insurance, standard of care, green design, the architect as initial decision maker, ownership of instruments of service, and designing to the owner's budget.

Standard form of architect's services documents are versatile and may be used to provide the scope of services in any owner-architect agreement at the time of contracting, or combined with AIA Document G802™–2007, Amendment to the Professional Services Agreement, to create a modification to any existing owner-architect agreement. Appropriately modified, standard form services documents may be used to provide the consultant's scope of services in an architect-consultant agreement such as AIA Document C401™–2007, Agreement between Architect and Consultant.

The resulting document, B101™–2007, Standard Form of Agreement Between Owner and Architect, is a one-part agreement that consolidates and replaces B141™–1997 and B151™–1997. AIA Document B101™–2007 sets forth the architect's services during five phases: schematic design, design development, construction documents, bidding/negotiation, and construction contract administration. It also contains a number of novel additions, including a specifically defined professional standard of care, an explicit requirement that the architect carry insurance, and a recognition that environmentally responsible design must be a part of every design project. AIA Document B101™–2007 returns to the concept of "basic" and "additional" services and explicitly sets forth basic services in Article 3. Additional services,

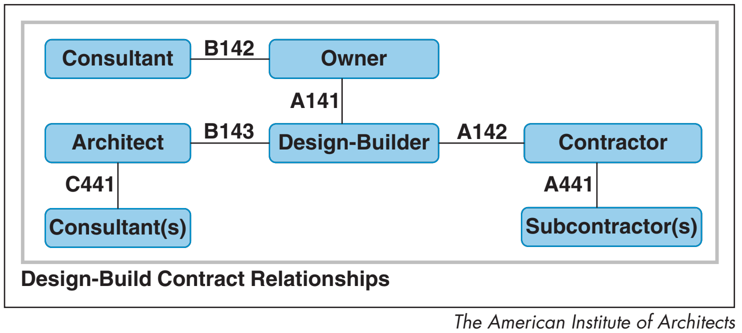


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FIGURE 17.4 Design-Build Contract Relationships

listed in Article 4, may be simply thought of as any service that is not a basic service. Additional services may be included in the agreement when it is executed, or added as the project proceeds. Also, AIA Document B101™–2007 substantially revises the instruments of service provisions. The new provisions clarify the architect's ownership rights, while more liberally granting licenses to the owner for use of the instruments of service upon project completion or the agreement's termination. AIA Document B101™–2007 retains the AIA Document B141™–1997 requirement that the architect design the project to the owner's budget, but strengthens the owner's obligation to identify the budget in the agreement and to modify it appropriately as the project proceeds.

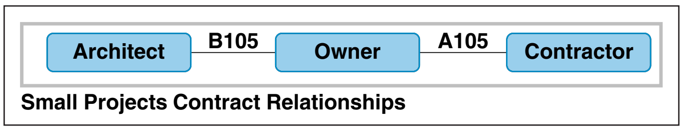
To provide an agreement for the specialist architect, or the architect who may initially provide services for a special scope of work (e.g., a security evaluation) and then provide traditional design and contract administration services, the AIA divided the text of AIA Document B101™–2007 into two parts: the agreement portion (per B141™–1997 Part 1) and the services portion (per B141™–1997 Part 2). These two new documents are, respectively, B102™–2007, Standard Form of Agreement Between Owner and Architect Without a Predefined Scope of Architect's Services, and B201™–2007, Standard Form of Architect's Services: Design and Construction Contract Administration. AIA Document B102™–2007 may also be combined with other scope of service descriptions, such as AIA Document B203™–2007, Site Evaluation and Planning, to create an agreement. The AIA currently publishes 14 scope of services documents, all numbered in the B200 series.

Another significant revision to the 2007 A201 family design agreements was the introduction of three new documents geared to the size and complexity of the project.

AIA Document B103™–2007, Standard Form of Agreement Between Owner and Architect for a Large or Complex Project, is based on B101 but contains revisions and incorporates assumptions that are specifically geared toward large or complex projects, such as that the owner will retain third parties to provide cost estimates and project schedules, and may implement fast-track, phased, or accelerated scheduling. For example, in B103 the architect does not prepare cost estimates, but agrees to design the project to meet the owner's budget for the Cost of the Work at the conclusion of the Design Development Phase Services.

AIA Document B104™–2007 is for use in "midsize" projects or projects of limited scope. B104 is an abbreviated version of B101. However, a significant difference is that B104 is not used with A201 General Conditions but, instead, B104 is used in conjunction with AIA Document A107™–2007, Standard Form of Agreement Between Owner and Contractor for a Project of Limited Scope, which it incorporates by reference. The general conditions are set forth in A107.

Finally, the 2007 revisions included two documents specifically developed for use in small projects. (See Figure 17.5.) AIA Document B105™–2007, Standard Form of Agreement Between Owner and Architect for a Residential or Small Commercial Project, and AIA Document A105™–2007, Standard Form of Agreement Between Owner and Contractor for a Residential or Small Commercial Project, make up the Small Projects family of documents. The goal in developing B105 was to provide a document that would be understandable and accessible, particularly to the homeowner client. The format was simplified to be less formal and more user friendly. Paragraph numbering was removed, and the document is two pages plus the cover. B105 contains seven



The American Institute of Architects

FIGURE 17.5 **Small Projects Contract Relationships**

▶ Construction Phase Services (10.9) addresses the architect's observation and reporting of the progress and quality of the work and its conformance to the design intent expressed in the contract documents.

abbreviated articles. There are only two phases of Basic Services, Design and Construction, that are each described under the Architect's Responsibilities in Article 1. B105 adopts A105 by reference as it sets forth the Architect's responsibilities during the Construction Phase. General conditions are contained within A105.

AIA CONTRACT DOCUMENTS 2012

After updating the A201 family in 2007, the AIA revised the Construction Management family and the two bond forms. It also published three new scope of services documents and new agreements for use in digital practice, integrated project delivery, housing, and sustainable design, and construction. The organization of the documents, by series and family, and the document releases made through 2012 are discussed below.

Document Series

Documents are organized by series using a letter prefix to represent the type of agreement or document. For example, owner-contractor agreements are found in the A series and contract administration forms are found in the G series.

- A-series: Owner-contractor documents
- B-series: Owner-architect documents
- C-series: Architect-consultant documents
- D-series: Miscellaneous documents
- E-series: Exhibits
- G-series: Contract administration and project management forms

Document Families

A family of documents is a type of classification that refers to the type of project or project delivery method addressed by the documents. The documents within each family provide a consistent structure and text base to support the major relationships on a design and construction project. Understanding these family groupings helps architects select the most appropriate agreements and forms for a project. These classifications include:

- Conventional (A201)
- Construction Manager as Adviser (CMa)
- Construction Manager as Constructor (CMc)
- Design-Build
- Integrated Project Delivery (IPD)
- Interiors
- International
- Small Project
- Digital Practice
- Contract Administration and Project Management Forms

Digital Practice

In April 2007, the AIA published two new standard form documents that address a growing concern in the design and construction industry: transmitting data in a digital working environment and maintaining control over its future use. AIA Documents C106™–2007, Digital Data Licensing Agreement, and E201™–2007, Digital Data Protocol Exhibit, allow contracting parties to share digital data in accordance with agreed-upon protocols for transmission, format, and use of the data.

Rather than deal with data transmission issues on an agreement-by-agreement basis, the AIA decided to create one standard form, AIA Document E201™–2007, Digital Data Protocol Exhibit. The parties may incorporate E201™–2007 into their agreements and modify it to suit the specialized transmission needs of each project. AIA Document

E201™–2007 allows parties to determine the transmission method, data format, and permitted uses for a customizable list of the data that will be transmitted throughout the life of the project. The E201™–2007 exhibit may be used to standardize transmission methods and data formats across an entire project because it requires that each party incorporate the exhibit into all other agreements for design or construction for the project.

AIA Document C106™–2007 provides a licensing agreement for two parties who otherwise have no existing licensing agreement relating to the use and transmission of Digital Data. Some or all of the Digital Data may be subject to copyright protection, such as the Architect's or a Consultant's Instruments of Service. AIA Document C106™–2007 allows a Transmitting Party (1) to grant a Receiving Party a limited nonexclusive license for the Receiving Party's use of Digital Data on a specific project, (2) to set forth procedures for transmitting the data, and (3) to place restrictions on the license granted. Parties that have previously executed AIA agreements for design services or construction, or an agreement that incorporates AIA Document A201™–2007, General Conditions of the Contract for Construction, have already entered into licensing agreements pursuant to the provisions in those agreements.

In late 2008, the AIA introduced Document E202™–2008, Building Information Modeling Protocol Exhibit, to provide the contractual structure needed to manage the use of building information modeling (BIM). Like E201™–2007, AIA Document E202™–2008 is not a stand-alone agreement, but is an exhibit to attach to any agreement for design services or construction on a project where the project team will use BIM. Parties executing AIA Document E202™-2008 agree to incorporate it into any other agreement for services or construction on the project, thus ensuring consistency in BIM protocols and procedures across the project. This document establishes the procedures and protocols the parties agree to follow with respect to the development and management of the Model throughout the course of the project.

It is anticipated that updated documents in the Digital Practice family will be published in or around 2013.

Integrated Project Delivery

Beginning in 2007, the AIA turned its attention toward a newly emerging delivery model, integrated project delivery (IPD), beginning with publication of a guide document and then developing three different sets of documents for use in projects utilizing IPD at varying levels of integration (see Figure 17.6).

Integrated project delivery is a model for delivering a construction project that integrates people, systems, and practices from the beginning of the design phase. This model, which is intended to increase efficiency and reduce waste, was initially described in "Integrated Project Delivery: A Guide" (IPD Guide), a manual that is free for download at www.aia.org/ipdg. Written by a collaboration of the AIA's Documents Committee and AIA California Council, the IPD Guide sets forth several IPD principles and provides a roadmap, by project phase, for achieving those principles.

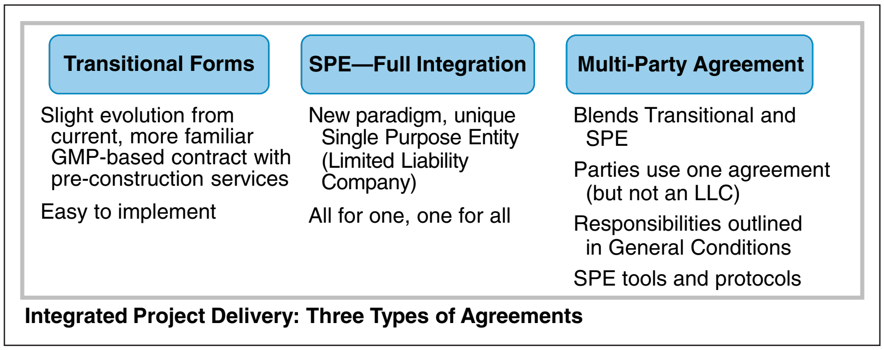


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FIGURE 17.6 Integrated Project Delivery: Three Types of Agreements

The AIA took additional steps to lead the design and construction industry toward this more efficient and collaborative working environment through the 2008 release of two new types of IPD standard form contract documents, the A295 documents (also referred to as the transitional documents), and the Single Purpose Entity (SPE) documents.

The A295 documents consist of AIA Document B195™–2008, an owner-architect agreement, and AIA Document A195™–2008, a guaranteed maximum price (GMP) owner-contractor agreement, both of which incorporate AIA Document A295™–2008, General Conditions of the Agreement for Integrated Project Delivery. The A295 documents provide a smooth transition from traditional delivery methods because they are based on a commonly used delivery model whereby the general contractor provides pre-construction services, such as cost estimating and constructability reviews, working in tandem with the architect during the design phase. The A295™–2008 General Conditions document departs from tradition, however, because instead of setting forth the duties of the owner, architect, and contractor in separate silos, it creates a collaborative working environment by integrating the duties of each participant with the activities of the other two, and describes them sequentially for each of the IPD phases, from conceptualization through construction.

The Single Purpose Entity documents, by contrast, are not based on a traditional delivery model, but represent an entirely new way to deliver a project. To achieve a closer alignment of interests, the AIA developed AIA Document C195™–2008, Standard Form Single Purpose Entity Agreement for Integrated Project Delivery. Using C195™–2008, the owner, architect, construction manager, and perhaps other key project participants each become members of a single purpose entity, the SPE, whose purpose is to provide the skilled services necessary to design and construct the project. The SPE is a limited liability company, a business entity readily recognizable and available in all jurisdictions, that provides the benefit of limited liability to its members. The owner-member provides funding for the project under AIA Document C196™–2008, the agreement between the SPE and the project owner. The architect, construction manager, and other non-owner members provide services to the SPE using AIA Document C197™–2008, an agreement between the SPE and any non-owner SPE member. The SPE itself does not perform professional services, but provides those services through contracts with its own members or with other licensed professionals. Under AIA Document C197™–2008, the non-owner members are reimbursed for the costs they incur in providing services. They may earn profit through the achievement of project goals (goal achievement compensation), and a shared savings provision (incentive compensation). If one member earns profit, all members earn profit. For that reason, members are motivated to help each other achieve goals and monitor costs. This highly collaborative process has the potential to result in a high-quality project for the owner, and substantial monetary and intangible rewards for the other members.

In 2009, the IPD family was completed with publication of AIA Document C191™–2009, Standard Form Multi-Party Agreement for Integrated Project Delivery. C191™–2009 provides a third type of agreement model on the IPD spectrum. C191™–2009 establishes the basic legal framework for a multi-party agreement for integrated project delivery. C191™–2009 integrates the owner, architect, contractor, and perhaps other key project participants, under one agreement from the outset of the project. The parties are required to communicate, share information, and make decisions in a collective manner; establish project goals and compensation criteria based on the success of the project; collectively manage and allocate risk; and use BIM and other technologies to effectively manage the project.

AIA Document C191™–2009 reflects a significant departure from traditional delivery models in that it aligns the success of the individual parties with project success. At the same time, C191™–2009 maintains the familiar roles and responsibilities of each of the parties. Accordingly, C191™–2009 takes the IPD collaborative process further than the Transitional documents but not as far as the SPE documents.

Construction Management

In 2009, the AIA updated and revised the documents in the Construction Manager as Adviser family and the Construction Manager as Constructor family.

The documents were revised to conform to the updates made in the 2007 A201 family of documents, including the dispute resolution check box; selection of an Initial Decision Maker in AIA Documents A132™–2009, A133™–2009, and A134™–2009; and establishment of digital data protocols, with AIA Documents E201™–2007 and E202™–2008 referenced in the agreements

Other substantive changes unique to construction management were also made.

For example, in the Construction Manager as Adviser family, the payment application process and payment application forms were revised to better accommodate the difference between projects where the owner contracts with one general contractor and projects where the owner contracts with multiple prime contractors for construction of the work. In the case where the owner contracts with one general contractor, the construction manager reviews the contractor's periodic payment applications (AIA Document G732™–2009) and supporting materials and, upon certification, forwards each payment application and the supporting materials to the architect for review and certification. In the case of multiple prime contractors, the construction manager reviews the individual periodic payment applications (AIA Document G732™–2009) and supporting materials from each of the trade contractors. The construction manager uses data from the individual periodic payment applications to prepare a project application and certificate for payment (AIA Document G736™–2009) and a summary of the contractors' applications (AIA Document G737™–2009), and forwards those summary documents to the architect for review and certification for payment. The architect is then required to review and certify only the project application and certificate for payment, not each individual contractor application for payment.

A general discussion of the construction management delivery model is included in the previous section, "Keeping Pace with the Industry."

Bond Forms

In 2010, with the support and feedback of industry stakeholders, the AIA revised the long-standing AIA Document A310™–1970, Bid Bond, and AIA Document A312™–1984, Performance Bond and Payment Bond.

AIA Document A310™–2010, Bid Bond, is a simple, one-page form that establishes the maximum penal amount that may be due to the owner if the selected bidder fails to execute the contract or fails to provide any required performance and payment bonds. In addition to generally updated language, A310™–2010 adds language allowing the owner and contractor to extend the period of acceptance of the contractor's bid for up to 60 days without obtaining the surety's consent. A310™–2010 also can be used by subcontractors when a contractor requires a bid bond.

AIA Document A312™–2010, Performance Bond and Payment Bond, is one form that incorporates two bonds: one covering the contractor's performance, and the other covering the contractor's obligations to pay subcontractors and others for materials and labor. In addition, A312™–2010 obligates the surety to act responsively to the owner's requests for discussions aimed at anticipating or preventing a contractor's default.

As with Document A310™–2010, the language of Document A312™–2010 has been updated. Some other changes made to the A312™–2010 Performance Bond include the addition of language clarifying that the owner's failure to comply with the notice requirements of Section 3.1 does not release the surety from its obligations under the bond except to the extent the surety demonstrates actual prejudice. The A312™–2010 Performance Bond also shortens the notice period for surety default under the bond from 15 days to 7 days. Further, the limit of the surety's obligation to the amount of the bond does not apply if the surety elects to undertake and complete the contract itself.

Changes made to the A312™–2010 Payment Bond include an increase in the period of time in which the surety must answer a Claimant's Claim from 45 days to 60 days, and added language stating that a failure of the surety to answer or make payment in the time period specified is not a waiver of the surety's and contractor's defenses to the Claim, but may entitle the Claimant to attorneys' fees.

Housing and Other Owner-Architect Agreements

Since 2007, the AIA has introduced two additional A201 family Owner-Architect agreements that are based on AIA Document B101™–2007. They are AIA Document B108™–2009, Standard Form of Agreement Between Owner and Architect for a Federally Funded or Federally Insured Project, and AIA Document B106™–2010, Standard Form of Agreement Between Owner and Architect for Pro Bono Services.

AIA Document B108™–2009 is a standard form of agreement between owner and architect for building design and construction contract administration that is intended for use on federally funded or federally insured projects. B108™–2009 was developed with the assistance of several federal agencies and contains terms and conditions that are unique to federally funded or federally insured projects. It is an update of AIA Document B181™–1994 but is based on AIA Document B101™–2007 and incorporates the 2007 revisions.

AIA Document B106™–2010 is a new standard form of agreement between owner and architect for building design, construction contract administration, or other professional services provided on a pro bono basis. The architect's pro bono services are professional services for which the architect receives no financial compensation other than compensation for reimbursable expenses. A table format is provided which the parties use to designate the scope of the architect's pro bono services and the maximum number of hours to be provided by the architect for each designated pro bono service.

In 2010, the AIA introduced three documents for use in residential construction projects:

- AIA Document B107™–2010 (formerly B188™–1996), Standard Form of Agreement Between Developer-Builder and Architect for Prototype(s) for Single Family Residential Project
- AIA Document B109™–2010, Standard Form of Agreement Between Owner and Architect for a Multi-Family Residential or Mixed Use Residential Project
- AIA Document B509™–2010, Guide for Supplementary Conditions to AIA Document B109™–2010 for use on Condominium Projects

AIA Document B109™–2010 is based on B103™–2007. B109™–2010 Standard Form of Agreement Between Owner and Architect for a Multi-Family Residential or Mixed Use Residential Project is a standard form of agreement between owner and architect for building design and construction contract administration for a multifamily residential or mixed-use residential project. B109™–2010 contains terms and conditions that are unique to these types of projects and also incorporates the basic assumptions contained in B103™–2007, such as owner-provided cost estimating and scheduling, as well as fast-track, phased, or accelerated scheduling. B109™–2010 contains the same division of Basic and Additional Services as in B101™–2007 and B103™–2007, but adds a new Pre-Design Services article that includes items such as assessment of project feasibility, layout, and regulatory requirements. B109™–2010 is not intended for use on condominium projects.

To assist users who wish to modify AIA Document B109™–2010 for use in condominium projects, the AIA published AIA Document B509™–2010, Guide for Supplementary Conditions to AIA Document B109™–2010 for use on Condominium

Projects. B509™–2010 is not an agreement but a guide that provides model language with explanatory notes to assist users in adapting B109™–2010 for use on condominium projects.

The final owner-architect agreement published in 2010 tailored for residential construction, AIA Document B107™–2010 (formerly B188™–1996), Standard Form of Agreement Between Developer-Builder and Architect for Prototype(s) for Single Family Residential Project, is intended for use in situations where the architect will provide limited architectural services in connection with a single-family residential project. B107™–2010 is not based on B101™–2007 or B103™–2007 and it does not have a related general conditions document, but is instead a stand-alone agreement between the architect and developer-builder. B107™–2010 anticipates that the developer-builder will perform the construction.

Sustainable Design and Construction

Most recently, the documents library has been enhanced with the addition of documents developed to address issues associated with sustainable design and construction.

The AIA first published AIA Document D503™–2011, Guide for Sustainable Projects, including Agreement Amendments and Supplementary Conditions. D503™–2011 is not an agreement, but is a guide that discusses the roles and responsibilities faced by owners, architects, and contractors on sustainable design and construction projects. D503™–2011 also discusses certification systems, codes, and legislation affecting sustainable design and construction projects. D503™–2011 contains model provisions for modifying or supplementing the A201™–2007 general conditions, the A101™–2007 owner-contractor agreement, and the B101™–2007 owner-architect agreement. D503™–2011 also discusses the applicability of key concepts to other delivery models such as design-build, construction management, and integrated project delivery.

In May 2012, as the next step after publication of D503™–2011, the AIA published five documents for use on sustainable projects. These documents are based on underlying documents in the Conventional (A201) family of AIA Contract Documents, with modifications that address the risks, responsibilities, and opportunities unique to projects involving substantial elements of sustainable design and construction. The Sustainable Projects documents are as follows:

- AIA Document A101™–2007 SP, Standard Form of Agreement Between Owner and Contractor, for use on a Sustainable Project where the basis of payment is a Stipulated Sum
- AIA Document A201™–2007 SP, General Conditions of the Contract for Construction, for use on a Sustainable Project
- AIA Document A401™–2007 SP, Standard Form of Agreement Between Contractor and Subcontractor, for use on a Sustainable Project
- AIA Document B101™–2007 SP, Standard Form of Agreement Between Owner and Architect, for use on a Sustainable Project
- AIA Document C401™–2007 SP, Standard Form of Agreement Between Architect and Consultant, for use on a Sustainable Project

The Sustainable Projects documents provide a process to develop and implement a program for sustainable design and construction projects. AIA Document A201™–2007 SP introduces a number of new definitions and terms that are unique to the Sustainable Projects documents. In addition, AIA Document B101™–2007 SP sets forth a newly defined scope of "Architect's Services for Sustainable Projects," that requires the architect to conduct a sustainability workshop and develop a sustainability plan that identifies the owner's sustainable objective for the project, outlines sustainable measures necessary to achieve the sustainable objective, and allocates responsibility for each of the sustainable measures to the project team member in the best position to perform the sustainable measure. The requirements of the sustainability plan, with the owner's approval, will be further developed as the design for the project progresses and will, as appropriate, ultimately be incorporated into the drawings and specifications. The sustainability plan itself is also incorporated as a contract document.

In addition to setting forth this process, the sustainable projects documents contain other provisions related to issues specific to these kinds of projects, such as use of untested materials, the effect of substitutions on achievement of the sustainable objective, and waiver of consequential damages.

The sustainable projects documents were developed for use on a wide variety of sustainable projects, including those in which the owner's sustainable objective includes obtaining a sustainability certification, such as LEED (Leadership in Energy and Environmental Design), or those in which the sustainable objective is based on incorporation of performance-based sustainable design or construction elements. In addition, as new "green" codes are developed, the process outlined in the sustainable projects documents will help project participants navigate the requirements of code compliance.

Using AIA Contract Documents

AIA contract documents are available in paper, in AIA Contract Documents® software, and on AIA Documents on Demand®. AIA Contract Documents software uses Microsoft Word to allow users to easily modify AIA documents using the "track changes" feature, and to e-mail them in Word or PDF formats. AIA software is currently available with an annual subscription that provides access to all AIA contract documents through a number of different license models. AIA Documents on Demand allows users to purchase most of the documents and forms in the AIA Contract Documents library online, fill in the open fill points, and print the completed document.

The AIA registers copyrights in nearly all of its standard form contract documents, claims trademark protection in its document numbers, and has registered the trademark AIA Contract Documents®. The AIA provides notice to document users that documents may not be reproduced or excerpted without express written permission from the AIA. For documents purchased in paper format, the AIA grants written permission in the footers of most documents to reproduce a maximum number of 10 copies of the completed document for use in connection with a particular project. Some documents purchased in paper format, such as General Conditions documents, may not be reproduced.

AIA software users may reproduce an unlimited number of copies of the documents they generate, but only for use on their own projects, and only for use on the project for which the document was created. Software users must comply with the End User License Agreement (EULA) provided for review and acceptance prior to purchasing the software.

The AIA registers copyrights and enforces copyright violations in order to protect the integrity of its valuable intellectual property, but copyright registration protects document users as well. Because AIA documents have a reputation for fairness, some parties attempt to take advantage of that reputation by scanning or copying an AIA document, deleting some or all of the AIA standard text, changing the content to suit their own interests, and then passing on the completed work as an AIA document with the AIA trademarked logo and copyright notice still intact. While these abuses do occur, copyright and trademark protection minimize their frequency and give the AIA the legal right to take action against the infringing parties. To report copyright or trademark violations of AIA Contract Documents, e-mail AIA legal counsel at copyright@aia.org.

LOOKING AHEAD

Over the next few years, the AIA will continue to revise existing documents and publish new agreements and forms. Major efforts will include revisions to the Design-Build family in or around 2014 and preparation for the 2017 revisions to the A201 family, as well as application of sustainable design and construction concepts to additional delivery methods. New documents and revisions to existing ones will reflect input from industry stakeholders, changes in design and construction industry practices, and judicial decisions affecting owners, architects, consultants, and contractors. The Documents Committee will sift through the data and use its best efforts to develop the consensus required to produce documents that will admirably serve their intended purposes. The committee will continually seek new members who are willing to commit significant hours of volunteer time to ensure that AIA documents retain their stature as the industry standard. If you would like more information about serving as a member of the AIA Documents Committee, please send a message to docinfo@aia.org.

For More Information

AIA Contract Documents Reference Materials: www.aia.org/contractdocs/reference.
AIA Contract Documents Knowledge Base: info.aia.org/knowledgebase.

BACKGROUNDER

TABLE 17.1 AIA Contract Documents by Family (as of May 2012)

Family	Document Number	Former Number	Document Title
Conventional (A201) Family of AIA Contract Documents Use of the Conventional (A201) family of AIA Contract Documents may be appropriate when the owner's project is divided into separate contracts for design (with the architect) and construction (with one or more contractors). This is the most commonly used family of AIA documents because the documents are suitable for the conventional delivery approach of design-bid-build. These documents can be used on small to large projects.			
	A101–2007	A101–1997	Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum
	A101–2007 SP		Standard Form of Agreement Between Owner and Contractor, for use on a Sustainable Project where the basis of payment is a Stipulated Sum
	A102–2007	A111–1997	Standard Form of Agreement Between Owner and Contractor where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price
	A103–2007	A114–2001	Standard Form of Agreement Between Owner and Contractor where the basis of payment is the Cost of the Work Plus a Fee without a Guaranteed Maximum Price
	A107–2007	A107–1997	Standard Form of Agreement Between Owner and Contractor for a Project of Limited Scope
	A201–2007	A201–1997	General Conditions of the Contract for Construction
	A201–2007 SP		General Conditions of the Contract for Construction, for use on a Sustainable Project
	A401–2007	A401–1997	Standard Form of Agreement Between Contractor and Subcontractor
	A401–2007 SP		Standard Form of Agreement Between Contractor and Subcontractor, for use on a Sustainable Project
	A503–2007	A511–1999	Guide for Supplementary Conditions
	A521–2012		Uniform Location of Subject Matter
	A701–1997		Instructions to Bidders
	B101–2007	B151–1997	Standard Form of Agreement Between Owner and Architect
	B101–2007 SP		Standard Form of Agreement Between Owner and Architect, for use on a Sustainable Project
	B102–2007	B141–1997 (Pt 1)	Standard Form of Agreement Between Owner and Architect without a Predefined Scope of Architect's Services

(continued)

TABLE 17.1 *(Continued)*

Family	Document Number	Former Number	Document Title
	B103–2007		Standard Form of Agreement Between Owner and Architect for a Large or Complex Project
	B104–2007		Standard Form of Agreement Between Owner and Architect for a Project of Limited Scope
	B106–2010		Standard Form of Agreement Between Owner and Architect for Pro Bono Services
	B107–2010	B188–1996	Standard Form of Agreement Between Developer-Builder and Architect for Prototype(s) for Single Family Residential Project
	B108–2009	B181–1994	Standard Form of Agreement Between Owner and Architect for a Federally Funded or Federally Insured Project
	B109–2010		Standard Form of Agreement Between Owner and Architect for a Multi-Family Residential or Mixed Use Residential Project
	B144ARCH-CM–1993		Standard Form of Amendment for the Agreement Between Owner and Architect where the Architect Provides Construction Management Services as an Adviser to the Owner
	B201–2007	B141–1997 (Pt 2)	Standard Form of Architect's Services: Design and Construction Contract Administration
	B202–2009		Standard Form of Architect's Services: Programming
	B203–2007	B203–2005	Standard Form of Architect's Services: Site Evaluation and Planning
	B204–2007	B204–2004	Standard Form of Architect's Services: Value Analysis, for use where the Owner employs a Value Analysis Consultant
	B205–2007	B205–2004	Standard Form of Architect's Services: Historic Preservation
	B206–2007	B206–2004	Standard Form of Architect's Services: Security Evaluation and Planning
	B207–2008	B352–2000	Standard Form of Architect's Services: On-Site Project Representation
	B209–2007	B209–2005	Standard Form of Architect's Services: Construction Contract Administration, for use where the Owner has retained another Architect for Design Services
	B210–2007	B210–2004	Standard Form of Architect's Services: Facility Support
	B211–2007	B211–2004	Standard Form of Architect's Services: Commissioning
	B212–2010		Standard Form of Architect's Services: Regional or Urban Planning
	B214–2012	B214–2007	Standard Form of Architect's Services: LEED® Certification
	B252–2007	B252–2005	Standard Form of Architect's Services: Architectural Interior Design
	B253–2007	B253–2005	Standard Form of Architect's Services: Furniture, Furnishings and Equipment Design
	B503–2007	B511–2001	Guide for Amendments to AIA Owner-Architect Agreements
	B509–2010		Guide for Supplementary Conditions to AIA Document B109–2010 for use on Condominium Projects
	C101–1993	C801–1993	Joint Venture Agreement for Professional Services
	C401–2007	C141–1997	Standard Form of Agreement Between Architect and Consultant
	C401–2007 SP		Standard Form of Agreement Between Architect and Consultant, for use on a Sustainable Project
	C727–1992		Standard Form of Agreement Between Architect and Consultant for Special Services
	D503–2011		Guide for Sustainable Projects, including Agreement Amendments and Supplementary Conditions

Family	Document Number	Former Number	Document Title
Construction Manager as Adviser (CMa) Family of AIA Contract Documents Use of the Construction Manager as Adviser (CMa) family of AIA Contract Documents may be appropriate when the owner's project incorporates a fourth prime player—the construction manager—on the construction team (owner, architect, and contractor) to act as an independent adviser on construction management matters through the course of both design and construction. The Construction Manager as Adviser (CMa) approach enhances the level of expertise applied to managing a project from start to finish. In its purest form, this approach preserves the CMa's independent judgment, keeping that individual from being influenced by any monetary interest in the actual labor and materials incorporated in the construction work. Documents in the CMa family can be used on small to large public and private sector projects.			
	A132–2009	A101CMa–1992	Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition
	A232–2009	A201CMa–1992	General Conditions of the Contract for Construction, Construction Manager as Adviser Edition
	A533–2009	A511CMa–1993	Guide for Supplementary Conditions, Construction Manager as Adviser Edition
	B132–2009	B141CMa–1992	Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition
	C132–2009	B801CMa–1992	Standard Form of Agreement Between Owner and Construction Manager as Adviser
	G701CMa–1992		Change Order, Construction Manager–Adviser Edition
	G704CMa–1992		Certificate of Substantial Completion Construction Manager–Adviser Edition
	G714CMa–1992		Construction Change Directive, Construction Manager–Adviser Edition
	G732–2009	G702CMa–1992	Application and Certificate for Payment, Construction Manager as Adviser Edition
	G736–2009	G722CMa–1992	Project Application and Project Certificate for Payment, Construction Manager as Adviser Edition
	G737–2009	G723CMa–1992	Summary of Contractors' Applications for Payment, Construction Manager as Adviser Edition
Construction Manager as Constructor (CMc) Family of AIA Contract Documents Use of the Construction Manager as Constructor (CMc) family of AIA Contract Documents may be appropriate when the owner's project employs a construction manager who will complete the construction and also provide construction management services. Under the Construction Manager as Constructor (CMc) approach, the functions of contractor and construction manager are merged and assigned to one entity that may or may not give a guaranteed maximum price, but which typically assumes control over the construction work by direct contracts with the subcontractors. Documents in the CMc family can be used on small to large private sector projects.			
	A133–2009	A121CMc–2003	Standard Form of Agreement Between Owner and Construction Manager as Constructor where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price
	A134–2009	A131CMc–2003	Standard Form of Agreement Between Owner and Construction Manager as Constructor where the basis of payment is the Cost of the Work Plus a Fee without a Guaranteed Maximum Price
Design-Build Family of AIA Contract Documents Use of the Design-Build family of AIA Contract Documents is appropriate when the project delivery method is design-build. In design-build project delivery, the owner enters into a contract with a design-builder who is obligated to design and construct the project. The design-builder then enters into contracts with architects and construction contractors, as needed. Design-build documents can be used on small to large projects.			
	A141–2004	A191–1996	Standard Form of Agreement Between Owner and Design-Builder
	A142–2004	A491–1996	Standard Form of Agreement Between Design-Builder and Contractor
	A441–2008		Standard Form of Agreement Between Contractor and Subcontractor for a Design-Build Project
	B142–2004		Standard Form of Agreement Between Owner and Consultant where the Owner contemplates using the design-build method of project delivery
	B143–2004	B901–1996	Standard Form of Agreement Between Design-Builder and Architect
	C441–2008		Standard Form of Agreement Between Architect and Consultant for a Design-Build Project
	G704DB–2004		Acknowledgement of Substantial Completion of a Design-Build Project

(continued)

PART 4: CONTRACTS AND AGREEMENTS

TABLE 17.1 *(Continued)*			
Family	**Document Number**	**Former Number**	**Document Title**
Integrated Project Delivery (IPD) Family of AIA Contract Documents Integrated project delivery (IPD) is a collaborative project delivery approach that utilizes the talents and insights of all project participants through all phases of design and construction. The AIA provides agreements for three levels of integrated project delivery. *Transitional Forms* are modeled after existing construction manager agreements and offer a comfortable first step into integrated project delivery. The *Multi-Party Agreement* is a single agreement that the parties can use to design and construct a project utilizing integrated project delivery. The *Single Purpose Entity (SPE)* creates a limited liability company for the purpose of planning, designing, and constructing the project. The SPE allows for complete sharing of risk and reward in a fully integrated collaborative process. AIA documents for IPD can be used on large private sector commercial projects.			
	A195–2008		Standard Form of Agreement Between Owner and Contractor for Integrated Project Delivery
	A295–2008		General Conditions of the Contract for Integrated Project Delivery
	B195–2008		Standard Form of Agreement Between Owner and Architect for Integrated Project Delivery
	C191–2009		Standard Form Multi-Party Agreement for Integrated Project Delivery
	C195–2008		Standard Form Single Purpose Entity Agreement for Integrated Project Delivery
	C196–2008		Standard Form of Agreement Between Single Purpose Entity and Owner for Integrated Project Delivery
	C197–2008		Standard Form of Agreement Between Single Purpose Entity and Non-Owner Member for Integrated Project Delivery
	C198–2010		Standard Form of Agreement Between Single Purpose Entity and Consultant for Integrated Project Delivery
	C199–2010		Standard Form of Agreement Between Single Purpose Entity and Contractor for Integrated Project Delivery
Interiors Family of AIA Contract Documents Use of the Interiors family of AIA Contract Documents is appropriate for furniture, furnishings, and equipment (FF&E) procurement services and for FF&E procurement combined with architectural interior design and construction services. The Interiors documents procure FF&E under a contract separate from design services, preserving the architect's independence from any monetary interest in the sale of those goods. AIA Document B152™ may be used as the owner/architect agreement for the design of both FF&E and architectural interiors. AIA Document B153™ is not suitable for construction work, such as major tenant improvements, and is used for design services related solely to FF&E. AIA documents in the Interiors family can be used on small to large tenant projects.			
	A151–2007	A175ID–2003	Standard Form of Agreement Between Owner and Vendor for Furniture, Furnishings and Equipment where the basis of payment is a Stipulated Sum
	A251–2007	A275ID–2003	General Conditions of the Contract for Furniture, Furnishings and Equipment
	A751–2007	A775ID–2003	Invitation and Instructions for Quotation for Furniture, Furnishings and Equipment
	B152–2007	B171ID–2003	Standard Form of Agreement Between Owner and Architect for Architectural Interior Design Services
	B153–2007	B175ID–2003	Standard Form of Agreement Between Owner and Architect for Furniture, Furnishings and Equipment Design Services
International Family of AIA Contract Documents The International family of AIA Contract Documents is for U.S. architects working on projects located in foreign countries. Because U.S. architects usually are not licensed in the foreign country where a project is located, these agreements identify the U.S. architect as a consultant, rather than an architect. AIA documents in the International family can be used on small to large projects.			
	B161–2002	B611INT–2002	Standard Form of Agreement Between Client and Consultant for use where the Project is located outside the United States
	B162–2002	B621INT–2002	Abbreviated Form of Agreement Between Client and Consultant for use where the Project is located outside the United States
Small Projects Family of AIA Contract Documents Use of the Small Projects family of AIA Contract Documents may be appropriate when a project is straightforward in design; of short duration (less than one year from start of design to completion of construction); without delivery complications, such as competitive bidding; and when project team members already have working relationships. AIA documents in the Small Projects family are suitable for residential projects, small commercial projects, or other projects of relatively low cost and brief duration.			
	A105–2007	A105–1993/ A205–1993	Standard Form of Agreement Between Owner and Contractor for a Residential or Small Commercial Project
	B105–2007	B155–1993	Standard Form of Agreement Between Owner and Architect for a Residential or Small Commercial Project

Family	Document Number	Former Number	Document Title
AIA Digital Practice Documents AIA Digital Practice documents may be used for any projects involving digital data or Building Information Modeling. AIA Document C106™ provides a licensing agreement for transmission of digital data when not included in the prime agreement. AIA Documents E201™ and E202™ are exhibits that establish protocols for managing digital data and Building Information Modeling. These documents can be used on small to large projects.			
	C106–2007		Digital Data Licensing Agreement
	E201–2007		Digital Data Protocol Exhibit
	E202–2008		Building Information Modeling Protocol Exhibit
AIA Contract Administration and Project Management Forms AIA Construction Administration and Project Management forms are generally useful for all project delivery methods. The variety of forms in this group includes qualification statements, bonds, requests for information, change orders, construction change directives, and payment applications and certificates. These forms can be used on small to large projects.			
	A305–1986		Contractor's Qualification Statement
	A310–2010	A310–1970	Bid Bond
	A312–2010	A312–1984	Performance Bond and Payment Bond
	B305–1993	B431–1993	Architect's Qualification Statement
	D101–1995		Methods of Calculating Areas and Volumes of Buildings
	D200–1995		Project Checklist
	G601–1994		Request for Proposal—Land Survey
	G602–1993		Request for Proposal—Geotechnical Services
	G612–2001		Owner's Instructions to the Architect
	G701–2001		Change Order
	G702–1992		Application and Certificate for Payment
	G703–1992		Continuation Sheet
	G704–2000		Certificate of Substantial Completion
	G705–2001	G805–2001	List of Subcontractors
	G706–1994		Contractor's Affidavit of Payment of Debts and Claims
	G706A–1994		Contractor's Affidavit of Release of Liens
	G707–1994		Consent of Surety to Final Payment
	G707A–1994		Consent of Surety to Reduction in or Partial Release of Retainage
	G709–2001		Work Changes Proposal Request
	G710–1992		Architect's Supplemental Instructions
	G711–1972		Architect's Field Report
	G712–1972		Shop Drawing and Sample Record
	G714–2007	G714–2001	Construction Change Directive
	G715–1991		Supplemental Attachment for ACORD Certificate of Insurance 25-S
	G716–2004		Request for Information (RFI)
	G801–2007	G605–2000	Notification of Amendment to the Professional Services Agreement
	G802–2007	G606–2000	Amendment to the Professional Services Agreement
	G803–2007	G607–2000	Amendment to the Consultant Services Agreement
	G804–2001		Register of Bid Documents
	G806–2001		Project Parameters Worksheet
	G807–2001		Project Team Directory
	G808–2001		Project Data
	G809–2001		Project Abstract
	G810–2001		Transmittal Letter

Appendix A

ALLIED PROFESSIONAL ORGANIZATIONS

COLLATERAL ORGANIZATIONS

American Institute of Architects (AIA)
www.aia.org
For a listing of AIA local, state, and regional components: www.aia.org/about/structure/components/aias078541

The American Institute of Architecture Students (AIAS)
www.aias.org
For a listing of AIAS chapters: www.aias.org/website/article.asp?id=283

Association of Collegiate Schools of Architecture (ACSA)
www.acsa-arch.org
For an online guide to architecture schools:
www.acsa-arch.org/schools/guide-to-architecture-schools/search-the-guide

National Architectural Accrediting Board (NAAB)
www.naab.org
For a listing of accredited architecture program: www.naab.org/architecture_programs/

National Council of Architectural Registration Boards (NCARB)
www.ncarb.org
For the requirements of each state registration board: www.ncarb.org/en/Getting-an-Initial-License/Registration-Board-Requirements.aspx

OTHER PROFESSIONAL ORGANIZATIONS

Accreditation Board for Engineering and Technology (ABET)
www.abet.org

Acoustical Society of America (ASA)
http://asa.aip.org

Alliance to Save Energy (ASE)
www.ase.org

American Arbitration Association (AAA)
www.adr.org

The American Architectural Foundation (AAF)
www.archfoundation.org/aaf/aaf/index.htm

American Association of Engineering Societies (AAES)
www.aaes.org

American Association of Homes and Services for the Aging (AAHSA)
www.aahsa.org

American College of Health Care Architects (ACHA)
www.healtharchitects.org

American Congress on Surveying & Mapping (ACSM)
www.acsm.net

American Council for Construction Education (ACCE)
www.acce-hq.org

American Council for an Energy-Efficient Economy (ACEEE)
www.aceee.org

American Council of Engineering Companies (ACEC)
www.acec.org

American Design Drafting Association International
www.adda.org

American Hospital Association (AHA)
www.aha.org

American Indian Council of Architects and Engineers (AICAE)
www.aicae.org

American Institute for Conservation of Historic & Artistic Works (AIC)
http://aic.stanford.edu

American Institute of Graphic Artists (AIGA)
www.aiga.org

American National Standards Institute (ANSI)
www.ansi.org

American Planning Association (APA)
www.planning.org

American Society of Architectural Illustrators (ASAI)
www.asai.org

American Society of Civil Engineers (ASCE)
www.asce.org

American Society for Engineering Education (ASEE)
www.asee.org

American Society of Golf Course Architects (ASGCA)
www.asgca.org

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
www.ashrae.org

American Society of Interior Designers (ASID)
www.asid.org

American Society of Landscape Architects (ASLA)
www.asla.org

American Society of Mechanical Engineers (ASME)
www.asme.org

American Society for Quality (ASQ)
www.asq.org

American Solar Energy Society (ASES)
www.ases.org

American Subcontractors Association (ASA)
www.asaonline.com

Architects/Designers/Planners for Social Responsibility (ADPSR) National Forum
www.adpsr.org

Architectural Research Centers Consortium (ARCC)
www.arccweb.org

Associated Builders and Contractors (ABC)
www.abc.org

Associated General Contractors (AGC) of America
www.agc.org

Associated Specialty Contractors, Inc. (ASC)
www.assoc-spec-con.org

ACADIA
(formerly known as the Association for Computer-Aided Design in Architecture)
www.acadia.org

Association of Energy Engineers (AEE)
www.aeecenter.org

ASFE/The Geoprofessional Business Association
(formerly known as the Association of Engineering Firms Practicing in the Geosciences)
www.asfe.org

APPA-Leadership in Educational Facilities
(formerly known as Association of Higher Education Facilities Officers)
www.appa.org

Association for Preservation Technology International (APT)
www.apti.org

Association of University Architects (AUA)
www.auaweb.net

ASTM International
(formerly known as the American Society for Testing and Materials)
www.astm.org

Building Owners and Managers Association International (BOMA)
www.boma.org

Canadian Home Builders' Association (CHBA)
www.chba.ca

Canadian Institute of Planners (CIP)

Institut Canadien des Urbanistes (ICU)
www.cip-icu.ca

Canadian Society of Landscape Architecture (CSLA)

L'Association des architects paysagistes du Canada (AAPC)
www.csla.ca

CSA Group
(formerly known as the Canadian Standards Association)
www.csa.ca

Construction Management Association of America (CMAA)
http://cmaanet.org

Construction Specifications Institute (CSI)
www.csinet.org

Construction Users Roundtable (CURT)
www.curt.org

CoreNet Global
www.corenetglobal.org

Council of Educational Facility Planners International (CEFPI)
www.cefpi.org

Council for Interior Design Accreditation (CIDA)
www.accredit-id.org

Council of Landscape Architectural Registration Boards (CLARB)
www.clarb.org

Design-Build Institute of America (DBIA)
www.dbia.org

DOCOMOMO International (International Committee for Documentation and Conservation of Buildings, Sites and Neighborhoods of the Modern Movement)
http://www.docomomo.com/index.php

Edison Electric Institute (EEI)
www.eei.org

Electric Power Research Institute (EPRI)
www.epri.com

The Energy & Environmental Building Alliance (EEBA)
(formerly known as the Energy & Environmental Building Association)
www.eeba.org

EnterpriseWorks/VITA (EWV)
www.enterpriseworks.org

Environmental Design Research Association (EDRA)
www.edra.org

Gas Technology Institute (GTI)
www.gastechnology.org

Heritage Canada Foundation (HCF)
www.heritagecanada.org

Illuminating Engineering Society of North America (IESNA)
www.iesna.org

Industrial Designers Society of America (IDSA)
www.idsa.org

Institute of Electrical and Electronics Engineers (IEEE)
www.ieee.org

Interior Design Educators Council (IDEC)
www.idec.org

International Association of Lighting Designers (IALD)
www.iald.org

International Code Council (ICC)
www.iccsafe.org

International Confederation of Architectural Museums (ICAM)
http://www.icam-web.org

International Council for Research and Innovation in Building and Construction (CIB)
www.cibworld.nl

International Facility Management Association (IFMA)
www.ifma.org

International Institute for Energy Conservation (IIEC)
www.iiec.org

International Interior Design Association (IIDA)
www.iida.org

International Union of Architects (UIA)
Union Internationale des Architectes
www.uia-architectes.org

Lighting Research Center
www.lrc.rpi.edu

National Association of Home Builders of the United States (NAHB)
www.nahb.org

National Association of Housing and Redevelopment Officials (NAHRO)
www.nahro.org

National Association of State Facilities Administrators (NASFA)
www.nasfa.net

National Association of Surety Bond Producers (NASBP)
www.nasbp.org

National Center for Appropriate Technology
www.ncat.org

National Conference of State Historic Preservation Officers (NCSHPO)
www.ncshpo.org

National Council of Acoustical Consultants (NCAC)
www.ncac.com

National Council for Interior Design Qualification (NCIDQ)
www.ncidq.org

National Fire Protection Association (NFPA)
www.nfpa.org

National Institute of Building Sciences (NIBS)
www.nibs.org

National Organization of Minority Architects (NOMA)
www.noma.net

National Research Council Canada
www.nrc-cnrc.gc.ca

National Society of Professional Engineers (NSPE)
www.nspe.org

National Trust for Historic Preservation
http://www.preservationnation.org/

Professional Photographers of America, Inc. (PPA)
www.ppa.com

Professional Services Management Association (PSMA)
http://psmavancouver.com

Project Management Institute (PMI)
www.pmi.org

Smart Growth Network
www.smartgrowth.org

Society of Architectural Historians (SAH)
www.sah.org

Society for College and University Planning (SCUP)
www.scup.org

Society for Design Administration (SDA)
www.sdadmin.org

Society for Environmental Graphic Design (SEGD)
www.segd.org

Society of Fire Protection Engineers (SFPE)
www.sfpe.org

Society for Marketing Professional Services (SMPS)
www.smps.org

Surety & Fidelity Association of America (SFAA)
www.surety.org

Sustainable Buildings Industry Council (SBIC)
www.sbicouncil.org

Underwriters Laboratories, Inc. (UL)
www.ul.com

U.S. Green Building Council (USGBC)
www.usgbc.org

U.S. Metric Association, Inc. (USMA)
www.metric.org

U.S. National Committee of the International Council on Monuments and Sites (US/ICOMOS)
www.icomos.org/usicomos/

Urban Land Institute (ULI)
www.uli.org

FEDERAL GOVERNMENT

Advisory Council on Historic Preservation
www.achp.gov

Americans with Disabilities Act Information Office
U.S. Department of Justice
www.usdoj.gov/crt/ada

Architectural and Transportation Barriers Compliance Board
United States Access Board
www.access-board.gov

Board on Infrastructure and the Constructed Environment (BICE)
The National Academies
www.nationalacademies.org/bice

Department of Energy (DOE)
www.energy.gov

Department of Veterans Affairs
Office of Facilities Management
http://www.cfm.va.gov/

Department of Health & Human Services (HHS)
Office for Facilities Management and Policy (OFMP)
Division of Planning and Construction
www.hhs.gov/asam/ofmp

Department of Housing and Urban Development (HUD)
www.hud.gov

Energy Efficiency and Renewable Energy (EERE)
Department of Energy
www.eere.energy.gov/

Environmental Protection Agency (EPA)
www.epa.gov

Federal Emergency Management Agency (FEMA)
www.fema.gov

General Services Administration (GSA)
www.gsa.gov

National Endowment for the Arts (NEA)
www.arts.endow.gov

National Institute of Standards and Technology (NIST)
Department of Commerce
www.nist.gov

National Renewable Energy Laboratory (NREL)
Department of Energy
www.nrel.gov

National Technical Information Service (NTIS)
Department of Commerce
www.ntis.gov

Office of Scientific and Technical Information
Department of Energy
www.osti.gov

Occupational Safety and Health Administration (OSHA)
U.S. Department of Labor
www.osha.gov

TRADE PRESS

Architectural Record
www.architecturalrecord.com

Architecture
www.architecturemag.com

Building Design & Construction
www.bdcnetwork.com/

Construction Specifier
www.constructionspecifier.com/index.php

CRIT: Journal of the American Institute of Architecture Students
www.aias.org/website/article.asp?id=58

Engineering News-Record
www.enr.com

Journal of Architectural Education
Association of Collegiate Schools of Architecture
www.acsa-arch.org/acsa-press/JAE

Residential Architecture
www.residentialarchitect.com/

Appendix B

GLOSSARY*

This glossary includes general terms as well as those associated with legal, contractual, financial, and other business aspects of architecture practice.

Account: A tabular record of financial transactions related to a particular item or class of items; used to classify and record financial details of business transactions of the firm.

Accounts payable: Money owed by the firm to vendors, consultants, or others for merchandise or services that have been provided to the firm on open account or short-term credit.

Accounts receivable: Money owed by clients to the firm for services rendered or for reimbursement of expenses. Accounts receivable are aged until they are collected or until it becomes apparent they will not be collectible, at which time they are written off as bad debt.

Accrual-basis accounting (modified): Revenue earned from project fees and expenses invoiced to clients.

Addendum (pl. addenda): A written or graphic instrument issued by the architect before execution of the construction contract that modifies or interprets the bidding documents by additions, deletions, clarifications, or corrections.

Additional services: Professional services that may, if authorized or confirmed in writing by the owner, be rendered by the architect, generally for additional compensation, in addition to the basic services identified in the owner-architect agreement.

Additive (or add) alternate: See *Alternate bid.*

Admonition: A private reprimand issued by a jurisdictional registration board (or other administrative agency) for violation of professional conduct rules in that jurisdiction, or by the AIA for violation of its Code of Ethics and Professional Conduct. See also *Censure.*

Advertisement for bids: Published public notice soliciting bids for a construction project or designated portion thereof, included as part of the bidding documents; most frequently used to conform to legal requirements pertaining to public projects and usually published in newspapers of general circulation in those political subdivisions from which the public funds are derived or in which the project is located.

Aged accounts receivable: Accounts receivable classified according to the length of time each invoice has been outstanding. The age analysis highlights which accounts are falling past due.

Agent: A person or entity that has an agency relationship with and acts for or in place of another. See also *Attorney-in-fact.*

Agency relationship: A fiduciary relationship in which the "agent" is authorized to perform certain binding acts on behalf of the principal. Under AIA Contract Documents the architect is not an agent of the owner. See also *Fiduciary.*

Agreement: (1) A mutual understanding between two or more persons regarding their relative rights and duties for past or future performances; (2) legally enforceable obligations between two or several persons; (3) the document stating the terms of the contract between the parties, as between owner and architect, architect and consultants, or owner and contractor. Although "agreement" is a broader term, it is frequently used interchangeably with "contract" without any intended change in meaning. See also *Contract.*

Alliance: A business relationship between two or more entities in which each entity retains its own identity and internal control; formed to further the common interests of those entities.

Allowance: See *Cash allowance*, *Contingency allowance.*

Alternate: A proposed possible change in the work described in the contract documents; provides the owner with an option to select between alternative materials, products, or systems, or to add or delete portions of work.

Alternate bid: Amount stated in the bid to be added to or deducted from the amount of the base bid if the corresponding change in work, as described in the bidding documents, is accepted. An alternate bid resulting in an addition to the bidder's base bid is an additive (or "add") alternate, and an alternate bid resulting in a deduction from the base bid is a deductive ("deduct") alternate.

Alternative dispute resolution (ADR): A method of resolving disputes by means other than litigation, such as mediation, arbitration, mini-trial, project neutral, or dispute review board.

*Updated by James B. Atkins, FAIA; Ann Casso; Suzanne H. Harness Esq., AIA; Richard L. Hayes, PhD, AIA; Rena M. Klein, FAIA; and Steve L. Wintner, AIA Emeritus

Anti-indemnification statutes: Laws that invalidate contract clauses related to a party being indemnified or held harmless for damages or that limit the ways such contract clauses operate.

Antitrust: Laws to protect trade and commerce from unlawful restraints and monopolies or unfair business practices.

Application for payment: Contractor's certified request for payment for completed portions of the work and, if the contract so provides, for materials or equipment suitably stored pending their incorporation into the work.

Approved equal: Material, equipment, or method proposed by the contractor and approved by the architect for incorporation or use in the work as equivalent in essential attributes to the material, equipment, or method specified in the contract documents.

Arbitration: Method of dispute resolution in which an arbitrator or panel of arbitrators evaluates the merits of the positions of the respective parties and renders a decision.

Architect: A person who is licensed to design buildings, prepare and issue construction documents, and administer construction contracts. In all states, either the term "architect" or the term "architecture" is statutorily defined.

Architect of record: The architect licensed in the jurisdiction in which the building is located who prepares, seals, and signs the construction documents; may also be called the executive architect, when a consulting architect is retained for the design phase, or for other services.

Architect-consultant agreement: Contract between an architect and another firm (e.g., engineer, specialist, another architect, or other consultant) for professional services.

Architecture: The art and science of conceiving or executing building programs, in particular the practice of designing buildings and administering contracts for their construction.

As-constructed record drawings: Drawings that reflect the record of the building project as constructed based on information the contractor provides to the owner under the contract for construction. Because the as-constructed record drawings are based on the contractor's markups, the architect is not responsible for their accuracy or completeness. Commonly referred to as "as-builts."

As-designed record drawings: Drawings that reflect the record of everything the architect designed for the project, and include the original construction documents plus all addenda, architect's supplemental instructions, change orders, construction change directives, and minor changes in the work.

Attorney-in-fact: A person authorized to act for or on behalf of another person or entity to the extent usually prescribed in a written instrument known as a *power of attorney*.

Authority having jurisdiction (AHJ): A federal, state, local, or other regional department or its representative having statutory authority to enforce compliance with particular codes, standards, or other requirements.

Award: See *Contract award.*

Backlog: Dollar value of anticipated revenues from projects contracted but as yet unearned (i.e., the work is contracted but has not been performed or invoiced to clients). Backlog is reduced by the value of revenue earned and increased by the value of new commissions acquired in any accounting period.

Bad debt: A debt owed to the firm that is uncollectible (e.g., invoiced amounts on aged accounts receivable that can be written off due to clients' failure to pay).

Balance sheet: A statement of the firm's financial condition as of a specific date. It is a statement of the balance between the asset accounts and the total of liabilities and net worth (owners' equity) accounts.

Bankruptcy: A state of insolvency in which the property of the debtor (an individual or a business) may be placed under the control of a court-appointed trustee for the benefit of creditors, with the objective of either reorganizing and rehabilitating the business or dissolving it and liquidating its assets.

Base bid: Amount of money stated in the bid as the sum for which the bidder offers to perform the work described in the bidding documents, exclusive of adjustments for alternate bids.

Basic services: Common services of architectural design as recognized in the industry and described in the owner-architect agreement and provided for basic compensation. AIA Document B101™–2007, for example, includes a basic services package for schematic design, design development, construction documents, bidding or negotiation, and construction phase services. Distinguished from *additional services.*

Beneficial occupancy: Use of a project or portion thereof for the purpose intended.

Benefits, employee: Personnel benefits required by law (such as employment taxes and other statutory employee benefits) and by custom (such as health insurance, sick leave, holidays, vacations, pensions, and similar contributions and benefits). Sometimes called "customary and mandatory benefits."

Best-value procurement: The evaluation and selection of construction and/or design services where total costs are considered along with other specialized qualification criteria, including past performance.

Betterment: An improvement to a property that enhances its value more than mere replacement, maintenance, or repairs; a defense to an owner's defective design claim against the architect, under which the architect is responsible only for extra costs the owner incurs due to the defect, and the owner is responsible for the cost it would have paid had the design been properly performed at the outset.

Bid: A complete and properly signed proposal, submitted in accordance with the bidding requirements, to perform the work or a designated portion thereof for the amount or amounts stipulated therein.

Bid bond: A form of bid security executed by the bidder as principal and by a surety to guarantee that the bidder will enter into a contract within a specified time and furnish any required bond. See also *Bid security*.

Bid date: See *Bid time*.

Bid form: A form prescribed by the bidding requirements to be completed, signed, and submitted as the bidder's bid.

Bid opening: The physical opening and tabulation of sealed bids following the time specified in the bidding requirements. This term is preferable to "bid letting."

Bid price: The amount stated in the bid.

Bid security: A deposit of cash, certified check, cashier's check, bank draft, stocks or bonds, money order, or bid bond submitted with a bid; provides that the bidder, if awarded the contract, will execute such contract in accordance with the requirements of the bidding documents.

Bid time: The date and hour established by the owner or the architect for the receipt of bids.

Bidder: A person or entity that submits a bid for a prime contract with the owner; in contrast to a sub-bidder, who submits a bid to a prime bidder.

Bidding documents: The documents required to bid or negotiate the construction contract, including the bidding requirements, contract forms, contract conditions, specifications, drawings, and addenda.

Bidding period: The calendar period beginning when bidding documents are issued and ending at the prescribed bid time.

Bidding requirements: Collectively, the advertisement or invitation to bid, instructions to bidders, sample forms, the bid form, and portions of addenda relating to bidding requirements.

Bill of quantities: See *Quantity survey*.

Billable time: Time that is charged to projects (direct time) and is ultimately invoiced to the client. See also *Chargeable time*.

Billing rate: The price per unit of time (hour, day, week) for staff (principal or employee) billed to a client for work under a contract for a project.

Bona fide bid: Bid submitted in good faith, complete, and in accordance with the bidding documents, and properly signed by a person legally authorized to sign such bid.

Bond: In suretyship, an obligation by which one party (surety or obligor) agrees to guarantee performance by another (principal) of a specified obligation for the benefit of a third person or entity (obligee). See also *Bid bond*, *Completion bond*, *Dual obligee bond*, *Fidelity bond*, *Payment bond*, *Performance bond*, *Statutory bond*, and *Supply bond*.

Bonus clause/penalty clause: A bonus clause is a clause in a contract that rewards the contractor for doing more than the letter of the contract; in particular, for completing construction early. It is the inverse of a penalty clause, where the contractor is penalized for providing less than the letter of the contract, or completing the work later than agreed.

Breach of contract: The failure, without legal justification, to fulfill an obligation required by contract. The breach of a contract can be intentional, inadvertent, or caused by the negligence of the party breaching the contract.

Break-even rate: The overhead rate plus the unit cost of 1.00 for an hour of salary.

Breach of duty: The violation of a legal obligation. See also *Duty* and *Negligence*.

Budget: The sum established as available for a given purpose. See also *Construction budget*, *Project budget*, and (for the architecture firm) *Internal project budget*.

Budgeting: (1) Forecasting future business activities of the firm, usually for fiscal periods or for specific projects in terms of revenues, expenses, and income (profit); (2) developing a plan for achieving future desired activities; (3) planning expenditures of time or money. These definitions can also be applied to budgeting construction or project costs or the firm's costs of providing professional services.

Builder's risk insurance: A specialized form of property insurance that provides coverage for loss or damage to the work during the course of construction.

Building code: See *Codes*.

Building information model: A digital three-dimensional representation of a building consisting of objects that simulate specific properties of actual building components. (Also referred to as "the model" or "the BIM model")

Building information modeling (BIM): The use of digital building information models to develop building design solutions and design documentation, and to analyze construction processes. See also *Building information model*.

Building inspector: See *Code enforcement official*.

Building permit: A permit issued by appropriate governmental authority allowing construction or renovation of a project in accordance with approved construction documents.

Business income (or interruption) coverage: Insurance protecting against financial loss during the time required to repair or replace property damaged or destroyed by an insured peril. (Also called loss-of-use coverage).

Business plan: Plan that describes the strategic and tactical goals of a business entity. Strategic issues include mergers and acquisitions, geographic locations, research and development, market penetration, forecasts, new product introduction, and business integration. Tactical considerations include product and quantity information, head counts, subcontracting, logistics, and processes.

Business plans form the basis for strategic facilities planning. See also *Strategic facilities plan*.

CAD (or CADD): See *Computer-aided design*.

Carbon neutral: (1) Achieving net zero carbon emissions by balancing a measured amount of carbon released with an equivalent amount sequestered or offset, or buying enough carbon credits to make up the difference; (2) Achieving net zero carbon emissions by reducing a building's overall energy consumption and providing site-generated renewable sources for a building's remaining energy needs.

Cash allowance: An amount established in the contract documents for inclusion in the contract sum to cover the cost of prescribed items not specified in detail, with the provision that variations between such amount and the finally determined cost of the prescribed items will be reflected in change orders appropriately adjusting the contract sum.

Cash-basis accounting: The method for tracking income received and all expenditures paid, including salaries.

Cash flow: The change in the firm's cash account during a given accounting period. Positive cash flow (more cash received than disbursed) results in an increase in the cash account; conversely, negative cash flow decreases the cash account.

Cash flow statement: A statement prepared to analyze the sources and applications of a firm's cash during a given accounting period.

Censure: A public reprimand issued by a jurisdictional registration board (or other administrative agency) for violation of professional conduct rules in that jurisdiction or by the AIA for violation of its Code of Ethics and Professional Conduct. See also *Admonition*.

Certificate for payment: A written representation from the architect, based on the architect's evaluation of the work and the data comprising the contractor's payment application, that the work has progressed as represented and the quality is in accordance with the contract documents.

Certificate of insurance: A document issued by an authorized representative of an insurance company stating the types, amounts, and effective dates of insurance for a designated insured for the benefit of the certificate holder.

Certificate of merit: An affidavit required by some states precedent to filing suit against a design professional; prepared by a third-party design professional attesting to the factual basis of the negligent act; intended to protect against baseless claims.

Certificate of occupancy: Document issued by a governmental authority certifying that all or a designated portion of a building is approved for its designated use.

Certificate of substantial completion: A certificate prepared by the architect on the basis of an inspection (a) stating that the work or a designated portion thereof is substantially complete and is usable for the intended purpose; (b) establishing the date of substantial completion; (c) stating the responsibilities of the owner and the contractor for security, maintenance, heat, utilities, damage to the work, and insurance; and (d) fixing the time within which the contractor shall complete the items listed therein. Multiple certificates are commonly issued for designated portions of a project.

Change order: An amendment to the construction contract signed by the owner, architect, and contractor authorizing a change in the work, an adjustment in the contract sum or the contract time, or both.

Change order request: A request by the contractor for implementing a change in the work that may change the contract sum, the contract period of performance, or both. See also *Proposal request*.

Chargeable time: Time that is charged to projects (direct time) which may or may not be invoiced to the client (i.e., the time is necessary to produce the services contracted, but if not invoiced will not result in revenue).

Charrette: The intense effort to complete an architectural project within a specified time or the time in which this work is done.

Civil action: A lawsuit in court seeking enforcement or protection of private rights.

Claim: A demand for money, services, or property based upon a right usually found in contract or by operation of law. In a claims-made insurance policy, coverage is triggered by reporting a claim made during the policy period, such as a demand for money or services made by a client accompanied by an allegation of a wrongful act.

Claim expense (insurance): The cost associated with the handling of a claim, such as defense attorney fees, investigation costs, and expert witnesses, as defined in the insurance policy.

Claims-made policy: A liability insurance policy that provides coverage only (a) if the claim is first made during the term of the policy, and (b) if the services from which the claim arose were performed during the policy period or after the retroactive date otherwise specified in the policy. See also *Retroactive coverage* and *Occurrence policy*.

Clarification drawing: A graphic interpretation of the drawings or other contract documents issued by the architect.

Clerk of the works: Variously used to refer to the owner's inspector or owner's site representative. The term is not in common use today.

Client: A person or entity being provided professional services by the architect. The client includes those who own or lease assets relevant to the services being provided and can include persons or entities that use, operate, and maintain those assets. In the contractual context, the term "owner" is used to signify the person or entity entering into the agreement with the architect or contractor. See also *Owner*.

Closed bidders list: See *Invited bidders.*

Closed specifications: Specifications stipulating the use of specific or proprietary products or processes without provision for substitution.

Code enforcement official: A representative of a governmental authority employed to inspect construction for compliance with applicable codes, regulations, ordinances, and permit requirements. See also *Authority having jurisdiction.*

Codes: Government regulations, ordinances, or statutory requirements relating to building construction and occupancy, generally adopted and administered for the protection of public health, safety, and welfare.

Coinsurance: An insurance policy provision that requires the insured to carry insurance equal to a named percentage of the actual cash value or replacement cost value of the property covered by the policy or suffer a penalty in the event of a loss. This penalty reduces the amount paid by the insurance company in direct proportion to the amount by which the property is underinsured.

Commercial general liability insurance: A broad form of liability insurance covering claims for bodily injury and property damage that combines, under one policy, coverage for business liability exposures (except those specifically excluded) and new and unknown hazards that may develop. Commercial general liability insurance automatically includes contractual liability coverage for certain types of contracts and personal injury coverage. Products liability and completed operations liability are included as well. This policy may be written on either an occurrence form or a claims-made form. See also *Claims-made policy* and *Occurrence.*

Commissioning: A process for achieving, validating, and documenting that the performance of the completed building and its systems meet the design requirements. (Traditionally, "commissioning" has referred to the process by which the heating, ventilation, and air-conditioning systems of a building were tested and balanced according to established standards prior to acceptance by the building owner. However, the scope of commissioning is being broadened to encompass other systems.)

Comparative negligence: The proportional sharing of liability between a plaintiff and defendant for damages based on the percentage of negligence of each. Not all states allow a sharing of liability based on comparative negligence. See also *Contributory negligence.*

Compensation: (1) Payment for services rendered or products or materials furnished or delivered; (2) payment in satisfaction of claims for damages incurred; (3) salary, bonus, profit sharing, and other income received by a firm owner or employee.

Compensatory damages: Damages awarded to compensate a plaintiff for his or her injuries; includes direct out-of-pocket losses as well as compensation for pain and suffering.

Completed operations insurance: Liability insurance coverage for injuries to persons or damage to property occurring after an operation is completed (a) when all operations under the contract have been completed or abandoned, (b) when all operations at one project site are completed, or (c) when the portion of the work out of which the injury or damage arises has been put to its intended use by the person or organization for whom that portion of the work was done. Completed operations insurance does not apply to damage to the completed work itself.

Completion bond: Bond guaranteeing the lender that the project will be completed free of liens.

Completion date: See *Substantial completion.*

Computer-aided design (commonly abbreviated as CAD, or CADD for "computer-aided design and drafting"): A term applied to systems or techniques for design and drafting using integrated computer hardware and software systems to produce graphic images.

Conditions of the contract: Those portions of the contract documents that define the rights and responsibilities of the contracting parties and of others involved in the work. The conditions of the contract include general conditions, supplementary conditions, and other conditions.

Confidentiality agreement: See *Nondisclosure agreement.*

Conformed construction documents: Construction documents revised to reflect all changes issued by addenda during bidding prior to the start of construction. Preparation of conformed construction documents is an additional service to the architect's basic services.

Consent of surety: Written consent of the surety on a performance bond, payment bond, or both to changes in the contract, reductions in the contractor's retainage, transfer of final payment to the contractor, or waiver of notification of contract changes. The term is also used with respect to an extension of time in a bid bond.

Consequential loss: Loss not directly caused by damage to property but that may arise as a result of such damage (e.g., damage to other portions of a building or its contents due to roof leaks).

Construction budget: The sum established by the owner as available for construction of the project, including contingencies for bidding and for changes during construction. See also *Project budget.*

Construction change directive: A written order prepared by the architect and signed by the owner and architect that directs a change in the work and states a proposed basis for adjustment, if any, in the contract sum or contract time, or both.

Construction contract administration services: Services for the architect's general administration of the construction contract(s). This includes reviewing and certifying amounts due the contractor, reviewing the contractor's submittals, preparing change orders, making site visits to observe progress of the work, and conducting site inspections to determine dates of substantial completion and final completion.

Construction cost (cost of the work): (1) For the purpose of preparing cost estimates, or as used for calculating the architect's compensation, the total actual or estimated cost to the owner to construct all elements of the project designed or specified by the architect, including contractor's general conditions costs, overhead, and profit. It does not include compensation of the architect and the architect's consultants or the costs of the land, rights-of-way, contingencies for changes in the work, financing, or other costs that remain the responsibility of the owner. (2) In a cost reimbursement construction contract, all allowable costs necessarily incurred by the contractor in properly performing the work. See *Cost-reimbursement construction contract*.

Construction documents: Drawings and specifications prepared by the architect setting forth the requirements for the construction of the project.

Construction documents services: The phase of the architect's services in which the architect prepares the construction documents from the approved design development documents and assists the owner in the preparation of the bidding documents.

Construction management: Services provided to an owner to manage a project during the design phase, construction phase, or both. Such services may include advice on the time and cost consequences of design and construction decisions, scheduling, cost control, coordination of contract negotiations and awards, timely purchasing of critical materials and long-lead-time items, and coordination of construction activities.

Construction manager: An individual or entity that provides construction management services. This entity may remain as adviser (CMa) during construction or become the construction contractor (CMc).

Construction procurement services: Services in which the architect assists the owner in obtaining either competitive or negotiated proposals and assists the owner in awarding and preparing contracts for construction.

Consultant: A person or entity who provides advice or services.

Contingency allowance: A sum included in the construction budget and project budget to cover unpredictable or unforeseen items of work or changes in the work.

Contingent agreement: An agreement, generally between an owner and an architect, in which some portion of the architect's compensation is contingent upon some specially prescribed condition such as government approvals or the owner's success in obtaining funds for the project.

Contingent liability: Liability that is not absolute and fixed but dependent on the occurrence of some uncertain future event or the existence of an uncertain specified condition.

Contract: A legally enforceable agreement between two or several parties that creates an obligation to do or not to do a particular thing. It also refers to the document that describes the agreement of the parties with the terms and conditions, and which serves as evidence of the obligation. See also *Agreement* and *Contract documents*.

Contract award: A communication from an owner accepting a bid or negotiated proposal. An award creates legal obligations between parties.

Contract date: See *Date of agreement*.

Contract documents: The documents that form the contract for construction between the owner and the contractor. These include the agreement form signed by owner and contractor; conditions of the contract (general, supplementary, and other conditions); drawings, specifications, and addenda issued prior to execution of the contract; other documents listed in the agreement; and modifications issued after execution of the contract.

Contract sum: The sum stated in the owner-contractor agreement that is the total amount payable by the owner to the contractor for the performance of the work under the contract documents.

Contract time: The period of time allotted in the contract documents for substantial completion of the work, including authorized adjustments thereto. If a number of days is specified, calendar or working days should be stipulated.

Contracting officer: In government contracts, the person designated as the official representative of the owner with specific authority to act on the owner's behalf in connection with a project.

Contractor: (1) One who enters into a contract; (2) in construction terminology, the person or entity responsible for performing the work under the contract for construction.

Contractor's affidavit: A certified statement of the contractor, properly notarized or otherwise subject to prosecution for perjury if false, relating to such items as payment of debts and claims, release of liens, or similar matters requiring specific evidence for the protection of the owner.

Contractor's professional liability insurance: An insurance policy that covers the contractor for claims alleging faulty design services, including design services performed by the contractor's in-house staff, by design firms hired as subcontractors, and by design firms in joint venture with the contractor.

Contractor's general liability insurance: Insurance purchased and maintained by the contractor that insures the contractor for claims for property damage, bodily injury, or death arising from the contractor's general negligence.

Contractor's option: The provision of the contract documents under which the contractor may select certain specified materials, methods, or systems at the contractor's option without change in the contract sum. Example: specified acceptable manufacturers.

Contractor's work plan: The contractor's planning and coordination required to manage and execute the means and methods, supervision, and direction of the work necessary for constructing the project in accordance with the contract documents and consistent with acceptable industry practices.

Contractual liability: Liability assumed by a person or entity under a contract. Indemnification or hold-harmless clauses are examples of contractual liability.

Contributory negligence: The finding that the plaintiff or claimant, by not exercising ordinary care, contributed to the injury; in some states, a plaintiff's contributory negligence will bar the plaintiff from recovering damages. See also *Comparative negligence*.

Copyright: Exclusive right to control the making of copies of a work of authorship, such as design plans or other architectural work, granted by federal statute to the author for a limited period of time.

Corporation: A legal entity organized under the laws of a particular jurisdiction. The entity has a legal identity separate from the stockholders, owners, managers, officers, directors, or employees of the enterprise. A corporation is "domestic" to the state of its incorporation and "foreign" to all other states.

Cost-based selection: The procurement of professional design services based solely on the cost for those services.

Cost-benefit analysis: An evaluation technique in which the total expected costs and the total expected benefits of one or more actions are compared in order to choose the most effective option.

Cost of the work: See *Construction cost*.

Cost-plus-fee agreement: An agreement under which the contractor (in an agreement between owner and contractor) or the architect (in an agreement between owner and architect) is reimbursed for stipulated direct and indirect costs of performance of the agreement and, in addition, is paid a fee for services.

Cost-reimbursement construction contract: Any agreement where a contractor is reimbursed its incurred costs. Costs may be limited by a guaranteed maximum price (GMP; AIA Document A102™–2007), or guided only by an estimate and the contractor's obligation to perform in good faith (A103™–2007). The owner typically has the right to audit the contractor's accounts. The contractor's fee may be a fixed amount or a percentage of the construction costs. In a GMP contract, the contractor may be incentivized to control costs by the opportunity to share with the owner, as additional profit, savings realized below the GMP amount. See also *Time and material contract*.

Counterclaim: A defendant's claim against the plaintiff. A counterclaim that arises from the same transaction or occurrence as the plaintiff's claim, is considered compulsory. Under federal rules of procedure, such counterclaims must be made in the defendant's response to the plaintiff's complaint and may not be raised in a separate lawsuit.

Covenant: A written, signed agreement between two or more parties pledging that something is done, shall be done, or shall not be done (e.g., a covenant not to sue).

Critical path method (CPM): A scheduling method in which all events expected to occur and operations to be performed in completing a given process are rendered in a form permitting determination of the optimum sequence and duration of each operation.

Current earnings: The net dollar amount after all distributions have been made and all applicable taxes have been deducted.

Customary and mandatory benefits: See *Benefits, employee*.

Daily billing rate: A rate established for billing for services of identified personnel on a per-day basis.

Damages: The amount claimed or allowed as compensation for injuries sustained or property damaged through the wrongful acts, negligence, or breach of contract of another.

Date of agreement: The date an agreement is made or when it is effective. If not stated in the agreement, it is the date on which the agreement is signed by the last person or entity.

Date of commencement of the work: The date established in a notice to the contractor to proceed or, in the absence of such notice, the date of the contract for construction or such other date as may be established therein. See *Notice to proceed*.

Date of substantial completion: See *Substantial completion*.

Declaratory judgment: The order of a court that establishes the rights of parties on a question of law or on a contract.

Deductible (insurance terminology): A provision requiring the insured to pay a specified portion of the loss on each claim. Deductibles may be as low as $1,000. Increasing the deductible lowers the premium cost.

Deductive (or deduct) alternate: See *Alternate bid*.

Default: The omission of or failure to perform a legal or contractual duty.

Defective work: See *Nonconforming work*.

Demurrage: A charge for time exceeding that allowed for loading, unloading, or removing goods shipped or delivered from a railroad car or similar vehicle or location.

Deposit for bidding documents: Monetary deposit required to obtain a set of bidding documents.

Deposition: Pretrial testimony of a fact or expert witness in the form of oral questions and answers by a party or witness. Depositions are taken under oath and may be used during a trial or arbitration proceeding.

Depreciation: The reduction in value of a long-term (fixed) asset that occurs over a stated period of time known as the "useful life" of the asset, after which the asset retains only a salvage value. This reduction in value may result from lapse of time, obsolescence, deterioration, wear, or consumption and is recorded periodically as an expense to the firm. The amount of depreciation that may be taken as a deduction for tax purposes may have no relation to any actual decrease in value or usefulness; consequently, depreciation rates vary depending on whether they are being used for income tax purposes, other types of taxes, or management in planning capital expenditures or establishing credit.

Design development documents: Drawings and other documentation that fix and describe the size and character of the entire project with respect to architectural, structural, mechanical, and electrical systems; materials; and other elements as may be appropriate.

Design development services: Services in which the architect prepares the design development documents from the approved schematic design studies, for submission to the owner for the owner's approval.

Design-build: A method of project delivery in which the owner contracts directly with a single entity that is responsible for both design and construction services for a construction project.

Detail: A drawing, explanatory of another drawing, indicating in detail and at a larger scale the design, location, composition, and correlation of elements and materials.

Detailed estimate of construction cost: A forecast of construction cost prepared on the basis of a detailed analysis of materials and labor for all items of work, as distinguished from a preliminary estimate of construction cost based on current area, volume, or similar conceptual estimating techniques. See also *Quantity survey*.

Direct expense: All items of expense directly incurred for or specifically attributable to a particular project, assignment, or task.

Direct labor (salary): Represents the time charged to projects, whether invoiced or not.

Direct personnel expense (DPE): Direct salaries of all the architect's personnel engaged on the project and the portion of the cost of their employee benefits related thereto.

Direct salary expense (DSE): Direct salaries of all the architect's personnel engaged on the project, excluding the cost of fringe benefits (payroll burden).

Discovery: The process by which parties or witnesses in a lawsuit are required before trial to disclose evidence that they possess in relation to issues in the lawsuit.

Dividend: In an ongoing corporation, a payment to shareholders out of net income (profits). Payment is in proportion to the number of shares held and is usually made either in cash or in stock.

Double-entry bookkeeping: A system of keeping books of an account in which there are always two entries, a debit and a credit, for every transaction.

Drawings: Graphic and pictorial documents depicting the design, location, and dimensions of the elements of a project. Drawings generally include plans, elevations, sections, details, schedules, and diagrams. When the term is capitalized, it refers to the graphic and pictorial portions of the contract documents.

Dual obligee bond: A bond in which two obligees are identified, either of whom may enforce the bonded obligation. An example is a performance bond furnished by a contractor in which the entity providing the financing is named as an obligee along with the owner.

Duty: An obligation imposed by law or by contract.

Earned revenue: Revenue for which services have been rendered by the architect and for which payment from the client may be rightfully claimed. Earned revenue may be unbilled, billed but uncollected, or billed and collected.

Easement: A legally created restriction on the unlimited use of all or part of one's land.

Employer's liability insurance: Insurance protection purchased by an employer to cover the employer against claims arising out of bodily injury to an employee who is not covered by a workers' compensation statute. This is usually provided on the same policy form as the employer's workers' compensation insurance.

Endorsement: A written amendment (sometimes called a "rider") that changes the declarations, insuring agreements, exclusions, or conditions of an insurance policy.

Entity: A person, partnership, corporation, estate, trustee, government unit, or other organization.

Environmental design professions: The professions collectively responsible for the design of the human physical environment, including architecture, urban planning, and similar environment-related professions.

Errata sheet: An attachment to a deposition transcript containing the deponent's corrections upon reading the transcript and the reasons for those corrections.

Errors and omissions insurance: See *Professional liability insurance*.

Estimate of construction cost: A forecast of construction cost. See also *Detailed estimate of construction cost*.

Estoppel: A legal bar that prevents a person from asserting a legal position because of his or her own conduct or for some other reason created by operation of law.

Ethics: See *Professional ethics.*

Excess liability insurance: A separate insurance policy that provides higher limits of liability than the coverage provided by a scheduled list of underlying insurance policies. The terms of the excess liability insurance are never broader than the underlying policy.

Exclusions: A list in an insurance policy or bond of losses, hazards, or circumstances not included within the scope of coverage of the policy or bond.

Execution of the contract (or agreement): (1) Performance of a contract or agreement according to its terms; (2) the acts of signing and delivering (to the parties) the document or documents constituting the contract or agreement.

Expenditure: A commitment by the firm to incur a cost on behalf of the firm. Capital expenditures result in the cost being capitalized—that is, established as an asset. Expenditures that are not to be capitalized become expenses in the period in which they generate revenue.

Expense: (1) As a noun: in cash accounting, actual cash disbursements made for goods or services that do not result in the acquisition of an asset, distribution of profit, or reduction of a liability. In accrual accounting, expenses may be recognized when they are incurred without regard to the date of payment; (2) as a verb: to transfer an amount previously regarded as an asset (e.g., an account receivable) to an expense account or to the profit-and-loss account. The amount is said to be "expensed."

Expense-only claim: A claim that results only in claim expenses being incurred by the insurance company; no indemnity payment is made.

Expert witness: A witness who, by virtue of experience, training, skill, or knowledge of a particular field or subject, is recognized as qualified to render an informed opinion on matters relating to that field or subject.

Exposure: Estimate of the probability of loss from some hazard, contingency, or circumstance; also used to signify the estimate of an insurer's liability under a policy from any one loss or accident or group or class thereof.

Express warranty: An explicit affirmation of fact or promise. Any description of materials or equipment, or a sample or model, furnished by or agreed to by the warrantor can create an express warranty.

Extended coverage insurance: Property insurance endorsement that extends the perils covered beyond basic causes such as fire and lightning to include windstorm, hail, riot, civil commotion, explosion (except steam boiler), aircraft, vehicles, and smoke.

Extended reporting period: The time period beyond the expiration of the original policy term in a claims-made policy during which an insured may report claims from acts that occur within the original policy term and thereby obtain coverage for such claims. See *Tail coverage (insurance)*.

Extra: A term sometimes used to denote an item of work involving additional cost.

Facility life cycle: The series of stages or increments through which a building facility passes during its lifetime. Stages can be structured in various ways. One example includes planning, entitlement, design, construction, move-in, use and operation, and disposal.

Facility planning: Planning for the long-term use of a building or buildings, which may include furnishings, equipment, operations, maintenance, renovation, expansion, and life cycle planning.

Fact witness: A person with personal knowledge about what happened on a project who gives testimony only as to those facts, as distinguished from an expert witness, who may provide an opinion.

Faithful performance: Performance of contractual duties with reasonable skill and diligence.

Fast track: A process in which certain portions of the architect's design services overlap with construction activities in order to expedite the owner's occupancy of all or a portion of the project.

Feasibility study: A detailed investigation and analysis conducted to determine the financial, economic, technical, or other advisability of a proposed project.

Fee: A term used to denote the amount of compensation to be paid to a person who provides a specific service; sometimes used to denote compensation of any kind for services rendered. The fee may be the entire compensation or a portion thereof.

Fidelity bond: A surety bond that reimburses an obligee named in the bond for loss sustained by reason of the dishonest acts of an individual or entity covered by the conditions of the bond.

Final acceptance: The owner's acceptance of the work from the contractor upon final completion. The owner may sometimes accept a portion of the completed work.

Final application for payment: The contractor's formal request for the remaining balance of project funds allocated in the contract, submitted on the directive of the architect after final completion has been determined. The final application for payment is submitted after or contemporaneously with the processing of the final change order.

Final change order: A change order to the contract for construction, executed prior to or contemporaneously with the contractor's final application for payment, that reconciles outstanding contract cost liabilities and variables such as allowances, contingencies, shared savings, penalties, bonuses, or outstanding additional services costs due the architect.

Final completion: Term denoting that the work has been completed in accordance with the terms and conditions of the contract documents, all contract requirements for project closeout have been satisfied, and the architect's certificate for payment of the contractor's final application for payment has been sent to the owner.

Final inspection: Final review of the construction by the architect to determine whether final completion has been achieved; performed prior to submittal of the contractor's final application for payment and issuance of the architect's final certificate for payment.

Final payment: Payment made by the owner to the contractor, upon issuance by the architect of the final certificate for payment, of the entire unpaid balance of the contract sum as adjusted by the final change order.

Fiscal year: Any period of 12 consecutive months that is used as the basis for budgeting or for reporting financial activity. The period may coincide with the calendar year or it may begin on any day of the year and close on the last day of the succeeding 12-month period.

Fixed assets: Assets of a tangible, physical, and relatively permanent nature (such as furniture, equipment, buildings, and automobiles) that are used in the operation of a business and that will not be consumed within one year. See also *Current assets.*

Fixed limit of construction cost: A term used in some pre-2007 AIA owner-architect agreements to identify the maximum construction cost that could be obtained by bid or proposal without requiring that the architect redesign the project at its own expense to lower the construction cost.

Force account: A time and materials–based method for computing the cost of the work, wherein predetermined rates are typically applied to time expended for labor, material, and equipment, plus factors for insurance, taxes, and an agreed percentage for overhead and profit; sometimes used to describe work performed by the owner's own forces when completing the work. See also *Time and material (T&M) contract.*

Force majeure: A control-based principle used to allocate the risk of time-impacting events in order to ensure that neither party is responsible for losses caused by uncontrollable risks.

Fringe benefits: Benefits paid for by an employer on behalf of an employee in addition to direct compensation; frequently includes health care, retirement, and disability insurance.

Frivolous suit: A lawsuit having no legal basis, often filed to harass or extort money from the defendant. See also *Certificate of merit*.

General conditions (of the contract for construction): (1) The general terms and conditions contained in a construction contract that will govern the requirements of performance of the contractor and defines the general rights and responsibilities of the parties; (2) the supervisory or management expenses that make up a contractor's contract price, particularly when compensation is based on a "cost plus" or "guaranteed maximum price" structure.

General contract: (1) The contract between the owner and the contractor for construction of the work, which can be accomplished by the contractor with its own forces and through subcontractors; (2) under multiple prime contracting, a contract between the owner and a contractor for general construction, typically excluding mechanical, plumbing, and electrical work.

General ledger: A book of accounts used in complete accounting systems. It is a book of "final entry," containing a summary of all transactions in separate accounts.

General requirements: Title of Division 01 of the specifications when MasterFormat is used. This section includes detailed contractor requirements for administering the construction contract.

Geotechnical investigation (or subsurface investigation): The boring and sampling process, together with associated laboratory tests, necessary to establish subsurface profiles and the relative strengths, compressibility, and other characteristics of the various strata encountered within depths likely to have an influence on the design of the building.

Goodwill: An asset, representing the excess of the value paid or to be paid for a firm over and above its net worth. It usually arises when a firm or an interest in a firm is purchased by a second firm for more than its book value. Goodwill is carried on the books of the purchasing firm as an asset, and its impairment value written off each year. Goodwill cannot be amortized for tax purposes.

Gross profit from projects: Revenue remaining after direct (project) expenses are subtracted from project revenues.

Gross negligence: Failure to use even the slightest amount of care in a way that shows recklessness or willful disregard for the safety of others.

Guarantee: See *Warranty.*

Guaranteed maximum price (GMP): A sum established in an agreement between owner and contractor as the maximum compensation to be paid by the owner to the contractor for performing specified work on the basis of the cost of labor and materials plus overhead expenses and profit.

Hold harmless: See *Indemnification.*

Hourly billing rate: A rate established for billing for services of identified personnel on a per-hour basis.

Impact costs (related to betterment): The costs for repair and restoration that do not increase or enrich the scope of the project.

Implied warranty: An affirmation of fact or promise imposed on a party by law, even without an express warranty, as a result of that party's relationship with another. See also *Express warranty.*

Incentive clause: A term used to describe savings that are shared proportionally in an agreed-upon manner between an owner and a contractor, and that are derived from the difference between the guaranteed maximum price and the actual cost of a project when the work is performed on the basis of cost plus a fee with a guaranteed maximum price. The terms of an incentive clause are normally included in the agreement between the owner and the contractor.

Income: Money received for services rendered.

Income statement: The cash-basis financial statement showing the activity of the firm for the accounting period specified; shows income received, expenses paid, and the resulting profit. Also called "profit-loss (P-L) statement" or "income-expense statement."

Indemnify: To protect another against loss or damage or to promise compensation for loss or damage. The duty to indemnify may be created by rule of common law, by statute, or by contract. The party who is to be indemnified from loss or damage is the indemnitee; the party providing the indemnification is the indemnitor.

Indemnity (contractual): A contractual obligation by which one person or entity agrees to reimburse another for loss or damage arising from specified liabilities.

Indemnity (implied by law): An indemnification that is implied by common law or statute rather than arising out of an express contract to provide indemnification.

Indemnity payment (insurance): A payment to a third party by an insurance company and/or the insured in satisfaction of a claim made against the insured.

Indirect expense: An expense indirectly incurred and not directly related to a specific project. Also called "overhead expense" or general and administrative (G&A) expense."

Indirect expense allocation: The process of allocating or prorating to projects on some consistent basis the indirect expenses of the firm, most commonly by use of an overhead rate. See also *Overhead rate*.

Initial decision maker (IDM): A third-party designated to make an initial decision regarding a dispute. (A201™–2007, General Conditions of the Contract for Construction, designates the architect as the IDM unless otherwise indicated.)

Insolvency: Inability of the firm to meet (pay) financial obligations as they come due. The firm may have assets that exceed the value of its liabilities but be temporarily unable to meet maturing obligations because its assets cannot be easily converted into cash; or the firm may have liabilities greater than its assets, which may lead to bankruptcy.

Inspection: (1) The architect's examination of the work at substantial and final completion to determine its conformance with the requirements of the contract documents (distinguished from the more general observations made by the architect from time to time on visits to the site during the progress of the work); (2) the contractor's inspection of portions of work already performed to determine that such portions are in proper condition to receive subsequent work; (3) examination of the work by a public official, owner's representative, or others.

Inspection list: A list of items of work to be completed or corrected by the contractor after substantial completion; sometimes referred to as a "punch list."

Instructions to bidders: Instructions contained in the bidding documents for preparing and submitting bids for a construction project or designated portion thereof.

Instruments of service: Drawings, specifications, and other documents prepared by the architect as part of providing services under the owner-architect agreement. Instruments of service may be in any medium, including electronic, and may encompass sketches, preliminary drawings, outline specifications, calculations, studies, analyses, models, and renderings.

Insured: The party under a property or liability policy to whom or on whose behalf benefits are payable.

Integrated project delivery (IPD): A project delivery approach that integrates people, systems, business structures, and practices into a process that collaboratively harnesses the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction. See also *Building information model* and *Building information modeling*.

Interest: An amount of money paid for the use of capital, usually expressed as a rate (a percentage). Simple interest is calculated on the principal amount borrowed; compound interest is calculated on the principal amount plus interest added from prior periods.

Intern architect: (1) Any person who by means of their education or experience has qualified to enter the Intern Development Program (IDP); (2) a person in the process of meeting a state licensing board's requirements for obtaining a license to practice architecture.

Intern Development Program (IDP): A comprehensive training program created to ensure that intern architects gain the knowledge and skills required for the independent practice of architecture. The program is developed, maintained, and administered by the National Council of Architectural Registration Boards (NCARB) and is required by most U.S. architectural registration boards to satisfy experience requirements for licensure.

IDP mentor: A registered architect in a U.S. or Canadian jurisdiction that is a loyal adviser, teacher, or coach to an intern. An intern can have many mentors.

IDP supervisor: A person, usually a registered architect, who supervises interns on a daily basis and has responsibility and professional knowledge for their work. The IDP supervisor is required to certify that the information submitted on their interns' experience reports is true and correct and that they have performed the work competently.

Interoperability: The ability for software applications to exchange information directly through open industry standards. This capability supports effective collaboration between project participants.

Interrogatories: A set or series of formal written questions used to obtain information from a party before trial; a series of written questions exchanged between parties to a lawsuit, which must be answered under oath. See *Discovery*.

Investment credit: Federal tax legislation allowing businesses a specified percentage of new capital expenditures as credits against tax liabilities. The IRS defines rules for the percentages, applicability to various expenditures, and recapture in the event of early disposal of the asset before the end of its assumed useful life.

Invitation to bid: A portion of the bidding documents soliciting bids for a construction project.

Invited bidders: The bidders selected by the owner after review of their qualifications as the only persons or entities from whom bids will be received.

Invoice: A bill, usually itemized, received or sent for goods or services.

Job captain: A term used for an individual within the architect's office responsible for preparation of the construction documents.

Job site: See *Site*.

Joinder: Uniting two or more elements into one, such as the joinder of multiple claims into one legal action, or the joinder of parties as co-plaintiffs or codefendants in a suit or as parties to arbitration.

Joint and several liability: A legal concept under which defendants can be held both collectively and individually liable for all damages, regardless of their degree of fault.

Joint venture: A business relationship consisting of two or more persons or entities that has legal characteristics similar to those of a partnership.

Journal: (1) A book of original entry in accounting which records financial transactions in the order in which they occur day to day. (See also *Cash journals* and *Payroll journal*.) (2) A personal record of events, transactions, or observations kept by the architect daily or at frequent intervals.

Judgment: The final decision of a court with respect to the rights of the parties in a suit. A summary judgment is a decision of a court before the actual trial, made in suits in which there are no disputes about material issues of fact.

Jury: (1) A committee for evaluating design work and, in connection with a design competition, for designating awards; (2) a panel convened by a court and sworn to give a verdict in a civil or criminal matter.

Labor and material payment bond: See *Payment bond*.

Latent defect: A "hidden" defect in materials, equipment, or completed work not readily apparent or capable of discovery by reasonable observation. See also *Patent defect*.

Legal liability: An obligation that arises out of contract or by operation of law.

Lender/construction lender: A construction lender can be a mortgagee, beneficiary under a deed of trust, or any other party that advances funds for the purpose of financing the construction, alteration, repair, or improvement of real property.

Letter form of agreement (or letter agreement): A letter stating all material terms of an agreement between addressor and addressee. When countersigned without change by the addressee the letter becomes a contract.

Letter of intent: A letter signifying an intention to enter into a formal agreement, usually setting forth the material terms of the proposed agreement.

Liabilities: Debts or obligations of the firm owed to others. They may be subdivided as current liabilities (due within one year) and long-term liabilities (due beyond one year). See also *Contingent liability*.

Liability insurance: A contract under which an insurance company agrees to protect a person or entity against claims arising from a real or alleged failure to fulfill an obligation or duty to a third party who is an incidental beneficiary. See also *Commercial general liability insurance*, *Completed operations insurance*, *Contractor's general liability insurance*, *Contractor's professional liability insurance*, *Employer's liability insurance*, *Owner's liability insurance*, *Professional liability insurance*, *Property damage insurance*, *Public liability insurance*, and *Special hazards insurance*.

Licensed architect: See *Architect*.

Licensed contractor: A person or entity authorized by the authority having jurisdiction (AHJ) to engage in construction contracting. The U.S. government and some states require the licensing of construction contractors.

Licensed engineer: See *Professional engineer*.

Licensure (architect): A person may not practice architecture or be called an architect within a state without a license issued by the authority having jurisdiction in that state. Licensure signifies to the public that the licensee has completed the education, experience, and examination necessary to practice architecture independently.

Lien: See *Mechanic's lien*.

Lien waiver: A sworn statement from the contractor, subcontractor, or supplier that acknowledges receipt of payment and waives or releases claims for work performed through a specified date or up to a stated amount.

Life cycle cost: The capital and operational cost of a construction item or system during the estimated useful life of the building.

Limit of liability: The maximum amount an insurance company is obligated to pay in case of loss.

Limitation of liability: Monetary limit of the legal liability of a person or entity to another based on an agreement or established by statute.

Line of credit: An agreement between a bank and a firm whereby the bank agrees to lend the firm funds up to a maximum amount. The firm may borrow, as needed, as much as it requires up to the maximum and pays interest only on the amount borrowed and outstanding. Some or all of the amount borrowed may also be repaid.

Liquid assets: Items that have a readily ascertainable market value and can be relatively easily converted to cash without significant loss of value. Items such as cash, notes receivable, marketable securities, and certificates of deposit are typical liquid assets.

Liquidated damages: A sum established in a construction contract, usually as a fixed sum per day, as the predetermined measure of damages to be paid to the owner because of the contractor's failure to complete the work within a stipulated time; not enforceable as a penalty.

Liquidity: The ability to convert an asset into cash with relative speed and ease and without significant loss in value.

Loss: Excess of expense over revenues during an accounting period.

Loss of use insurance: See *Business income coverage.*

Low bid: Bid stating the lowest price proposed by two or more bidders for performance of the work, including selected alternates, if any.

Lowest responsible bidder: Bidder who submits the lowest bona fide bid and is considered by the owner and the architect to be fully responsible and qualified to perform the work for which the bid is submitted.

Lowest responsive bid: The lowest bid that is responsive to and complies with the requirements of the bidding documents.

Malpractice: Breach of a professional duty by one rendering professional services, where the breach is the proximate cause of injury, loss, or damage to another.

Margin: The degree of difference; in financial reporting, the profit margin is the difference between revenues and expenses. ("Margin" has a different meaning in the commodities and securities markets.)

MasterFormat™: A system owned and created by the Construction Specifications Institute for classifying building products and systems by materials and trades (e.g., concrete, masonry, thermal and moisture protection, etc.). See also *UniFormat.*

MasterSpec©: A master guide specification system owned by the American Institute of Architects and published by ARCOM for use on building and construction projects and as design firms' office masters. Not to be confused with MasterFormat.

Means and methods: The approach to or manner of construction, including amount of labor, material, and equipment necessary to implement the selected technique adopted by the contractor to perform work. See also *Contractor's work plan*.

Measured drawings: Drawings prepared in the process of measuring a building for future renovation or as historic documentation. They are created from on-site measurements.

Mechanic's lien: An encumbrance on real property granted by statute to secure a priority or preference of payment for the performance of labor, or the furnishing of materials to buildings or other improvements. The validity of a mechanic's lien depends upon an affirmative demonstration that each statutory prerequisite for the creation of such an encumbrance has been satisfied.

Mediation: A voluntary, confidential process often mandated by contract whereby a neutral third party assists the parties to a dispute in achieving resolution.

Meeting minutes: A written record of project meetings that can include topics discussed and decisions made. Meeting minutes are considered "official business records" and may be introduced as evidence in a court proceeding.

Memorandum of insurance: See *Certificate of insurance.*

Merger: The combination of two businesses in which one company survives and the other loses all or part of its identity. ("Consolidation" is the complete fusion of two companies to form one entirely new company. "Acquisition" is a general term used to indicate the combining of one business enterprise with another.)

Metes and bounds: A method of describing real property using physical features of the local geography along with directions and distances.

Minor changes in the work: Changes in the construction work that do not involve an adjustment in the contract sum or an extension of the contract time and that are not inconsistent with the intent of the contract documents. Minor changes are effected by written order issued by the architect.

Modification (to the contract documents): (1) A written amendment to the contract signed by both parties; (2) a change order; (3) a construction change directive; (4) a written order for a minor change in the work issued by the architect.

Multiple prime contracts: Two or more separate owner-contractor contracts for work on a construction project (e.g., separate prime contracts might be for site work, general construction, mechanical, plumbing, electrical, etc.). See also *Prime contract.*

Multiplier: The relevant factor by which an architect's direct personnel expense, direct salary expense, or reimbursable expense is multiplied to determine compensation for professional services.

Named insured: Any person or organization specifically designated for coverage on the declarations page of an insurance policy, as distinguished from others who, although unnamed, may be afforded coverage under some circumstances.

NCARB certification: A register of licensed architects that have met the highest professional standards established by the 54 registration boards that regulate the practice of architecture in the U.S. and its territories. Certification facilitates reciprocal registration among all 54 National Council of Architectural Registration Boards (NCARB) Member Boards and II Canadian provincial associations.

Negligence: Failure to exercise due care under the circumstances. Legal liability is imposed on a person or entity that is negligent when such negligence causes damage to some other person to whom the negligent actor owes a duty recognized by law.

Negligence per se: An act or omission regarded as negligence without the need for argument or proof because it violates a standard of care defined by statute or is so beyond reasonable behavior that it is negligence on its face.

Negligent act or omission: In law, an act or omission involving a failure to exercise due care.

Net multiplier: The ratio of net operating revenue (NOR) to total direct labor, indicating the return on every dollar of direct labor.

Net operating revenue (NOR): Represents the net dollars remaining after deducting invoiced outside consultant fees and expenses and all reimbursable and direct (non-reimbursable) project-related expenses.

Net profit: The dollar amount remaining after deducting from net operating revenue all direct and indirect labor and indirect expenses, before any distributions are made or applicable taxes are paid. In accrual-basis accounting, it is the excess of revenues over expenses during an accounting period. In cash-basis accounting, it is referred to as "taxable income" based on the excess of cash received over cash disbursements.

Net working capital: Current assets less current liabilities (this definition is used by some financial managers as "working capital").

Net worth: The value of the owners' equity (investment) in the firm—basically, book value (assets minus liabilities); in a proprietorship, the proprietor's capital account; in a partnership, the total of the partners' capital accounts; in a corporation, the total of capital stock (par value paid) plus paid-in capital (capital contributed in excess of par value) plus retained earnings.

Non-collusion affidavit: Statement by a bidder under oath that the bid was prepared without collusion of any kind.

Nonconforming work: Work that does not fulfill the requirements of the contract documents. Sometimes called "defective work."

Nondisclosure agreement: A contract between at least two parties that outlines confidential material, knowledge, or information that the parties wish to share with one another for certain purposes, but wish to restrict access to or by third parties. Also known as a confidentiality agreement, confidential disclosure agreement, proprietary information agreement, or secrecy agreement.

Non-expense items: Expenditures affecting only the assets, liabilities, or net worth of the firm, including all those that cannot be charged to a reimbursable, direct, or indirect expense account. Most often these expenditures are for the purchase of a capital asset.

Non-reimbursable (direct) expenses: Project-related expenses that are not able to be invoiced per the fee basis and terms of the project contract.

Notice of claim: A timely and written notice of events that could give rise to a claim or of intent to assert a claim. Many insurance providers have specific requirements for establishing a notice of claim.

Notice to bidders: A notice informing prospective bidders of the opportunity to submit bids on a project and setting forth the procedures for doing so.

Notice to proceed: Written owner's directive issued to the contractor, authorizing the contractor to proceed with the work and establishing the date for commencement of the work.

Nuisance settlement: A settlement in which the defendant pays the plaintiff purely for economic reasons—without the settlement the defendant would spend more money in legal fees and expenses caused by protracted litigation.

Observations of the work: That part of the architect's contract administration services in which the architect visits the site to become generally familiar with the progress and quality of the portions of the work completed, and to determine in general if the work observed is being performed in a manner indicating it will be in accordance with the contract documents when fully completed.

Occupancy permit: See *Certificate of occupancy.*

Occupational accident: Accident occurring in the course of one's employment and caused by inherent or related hazards.

Occurrence (insurance terminology): An event that triggers coverage under an occurrence policy.

Occurrence policy: An insurance policy that covers acts or omissions occurring during the policy term, regardless of when a claim against the insured is first asserted, even if the policy is no longer in existence; usually relates to general liability insurance. See also *Claims-made policy*.

Off-the-grid (OTG): Autonomous buildings that operate independently and do not rely or partially rely on public utility services such as electricity, gas, water, and municipal sewerage; also referred to as off-grid. Buildings designed with energy-producing and resource-conserving utility systems. See also *Carbon neutral*.

Open bidding: Method of soliciting bids in which a public notice inviting bids is published and bids are accepted from all who submit them; most frequently used to conform to legal requirements pertaining to public projects and usually published in newspapers of general circulation in those political subdivisions from which the public funds are derived or where the project is located. See also *Invited bidders*.

Opening of bids: See *Bid opening*.

Or equal: See *Approved equal*.

Organizational expense: Expenses incurred in organizing a corporation (e.g., attorney's and accountant's fees, incorporation taxes and fees, printing of stock certificates). These expenses are accounted for as intangible assets and are amortized over a period of years because it is generally felt that benefits of the expenses are felt over several years.

Other conditions (of the contract for construction): See *Special conditions*.

Outline specifications: An abbreviated set of specification requirements normally included with schematic design or design development documents.

Outstanding stock: The total shares of a corporation fully paid for and held by shareholders.

Overhead expense: See *Indirect expense*.

Overhead rate: The ratio of total indirect expenses to total direct labor.

Owner: A person or entity who retains services for building design and contracts for construction or acquisition of furniture, furnishings, and equipment; so called because this person or entity typically owns or is the lessee of the site or building premises.

Owner-architect agreement: A document that sets forth the contract between owner and architect for professional services.

Owner-contractor agreement: A document that sets forth the contract between owner and contractor for performance of the work for construction of the project or portion thereof.

Owner-controlled insurance program (OCIP): A single insurance policy purchased and controlled by the owner of a construction project that provides coverage for other participants in the project. Depending on its language, coverage typically extends to the owner, contractor, and subcontractors over a specified amount, and may extend to design professionals.

Owner's liability insurance: Insurance to protect the owner against claims arising from its ownership of property. See also *Commercial general liability insurance*.

Owner's representative: The person designated as the official representative of the owner in connection with a project.

Parti: A scheme or concept for the design of a building.

Partial occupancy: Occupancy by the owner of a portion of the project prior to completion of the entire project.

Partnership: An association in which two or more persons or entities conduct an enterprise as co-owners.

Patent defect: A "visible" defect in materials, equipment, or completed work that reasonably careful observation could have discovered. See also *Latent defect*.

Payment bond: A bond in which the contractor and the contractor's surety guarantee to the owner that the contractor will pay for labor and materials furnished for use in the performance of the contract. Persons entitled to the benefits of the bond are defined as claimants in the bond. A payment bond is sometimes referred to as a "labor and material payment bond."

Payment request: See *Application for payment*.

Payroll journal: A book of "original entry" similar to cash journals, used to record the details of the firm's payroll expenses.

Payroll taxes: Mandatory taxes for FICA, FUTA, SUTA, Medicare, and workers' compensation insurance that are based on the payroll.

Peer review: The evaluation of work performance by other people in the same field in order to maintain or enhance the quality of the work or performance in that field, to determine if the work meets specific criteria, or to provide suggestions for improvement.

Pension plan: A plan established and maintained by an employer for the benefit of the firm's employees by which contributions are systematically accumulated based on actuarial assumptions and invested during the employment of personnel; pension benefits are payable to its member employees over a period of years after retirement. Funding of a pension plan is not discretionary based on profits, as are profit-sharing plans. Pension plans are subject to regulatory control.

Percentage fee: Compensation based on a percentage of construction cost; applicable to either construction contracts or professional service agreements.

Performance: The successful completion of a contracted duty.

Performance bond: A bond in which the contractor and the contractor's surety guarantee the owner that the work will be performed in accordance with the contract documents.

Performance specifications: A set of specified performance-related requirements to be satisfied by the contractor or subcontractor.

Permit: See *Building permit*, *Certificate of occupancy*, and *Zoning permit*.

Personal injury: Physical or mental injury to a human being.

Personal injury liability coverage: Personal injury insurance includes coverage for injuries or damage to others caused by specified actions of the insured, such as false arrest, malicious prosecution, willful detention or imprisonment, libel, slander, defamation of character, wrongful eviction, invasion of privacy, or wrongful entry. Occasionally the term "personal injury" will include bodily injury by definition in an insurance policy.

Petty cash: An amount of cash on hand for disbursements that are too small to justify the use of checks.

Phase (of professional services): An increment or phase of project delivery established by the architect for professional services.

Plan deposit: See *Deposit for bidding documents*.

Plat: A map showing planned or actual features of an area.

Postoccupancy evaluation: An evaluation by an architect of the performance of a building. Application varies widely in scope, as an evaluation may take place at any time after the building is occupied and may address one or more aspects of the performance of a building.

Postoccupancy services: (1) Under traditional forms of agreement between owner and architect, services rendered by the architect after issuance of the final certificate for payment or, in the absence of a final certificate for payment, more than 60 days after the date of substantial completion of the work; (2) under designated services forms of agreement, services necessary to assist the owner in the use and occupancy of the facility.

Power of attorney: A document authorizing a person or entity to act as another's agent.

Preconstruction (design-build): Preliminary design and budgeting phases of a design-build project.

Pre-design services: Services of the architect provided prior to the customary basic services, including services to assist the owner in establishing the program, financial and time requirements, and limitations for the project.

Preliminary drawings: Drawings prepared during the early stages of the design of a project.

Premium: The amount paid by an insured for coverage provided by an insurance company.

Prequalification of bidders: The process of investigating the qualifications of prospective bidders on the basis of their experience, availability, and capability for the contemplated project, and then approving qualified bidders.

Prime contract: A contract between owner and contractor for performance of the work or designated portion thereof, or between owner and architect for design services, where some architectural services may be subcontracted to other architects. See also *Subcontract*.

Prime contractor: Any contractor on a project having a contract directly with the owner. See also *Subcontractor*.

Prime professional: Any person or entity having a contract directly with the owner for professional services. See also *Architect of record*.

Principal: In architecture firms, most often a proprietor or any individual who has an equity position in the firm (owns shares in a corporation or is a partner in a partnership). Sometimes limited to owners holding a certain percentage of the business; sometimes expanded to include anyone in a significant leadership role in the firm.

Principal-in-charge: The architect charged with the responsibility for the firm's services in connection with a given project.

Prior acts coverage: See *Retroactive coverage*.

Privity of contract: The relationship between the parties to a contract. Parties without privity of contract are generally prevented from filing a legal action based on the contract. For the sale of goods, the requirement of privity has been relaxed under modern laws and doctrines of implied warranty and strict liability. Absent a state-specific exception, privity of contract is still required in suits for economic loss filed by third parties against design professionals.

Pro bono services: Literally "for the good," referring to work or services performed without compensation.

Pro forma: Provided in advance in prescribed form. For example, a pro forma income statement is a projected or budgeted income statement (profit plan), which shows the effects of planned financial activity during a planning period as if the events had taken place as forecast. Pro formas are also commonly developed as part of real estate financial feasibility studies.

Pro rata: In proportion. For example, if three partners owned 30 percent, 30 percent, and 40 percent of a partnership and profits were distributed pro rata based on ownership, the profits would be distributed according to these percentages.

Product data: Illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the contractor to illustrate a material, product, or system for some portion of the work. See also *Submittals*.

Product liability insurance: Insurance for liability imposed for damages caused by an occurrence arising out of goods or products manufactured, sold, handled, or distributed by the insured or others trading under the insured's name. Occurrence must take place after possession of the product has been relinquished to others and after the product has been removed from the possession of the insured.

Professional: A person who is deemed to have specialized knowledge and skills acquired through education and experience to be used in advising or providing services to others.

Professional engineer: A designation reserved, usually by law, for a person professionally qualified and duly licensed to perform engineering services such as structural, mechanical, electrical, sanitary, civil, and so on.

Professional ethics: Statements of principles promulgated by professional societies or public agencies governing professional practice in order to guide members or licensees in their professional conduct.

Professional fee plus expenses: A method of compensation for professional services separating the services from identified costs for reimbursable expenses, consultant services, and similar items.

Professional fee: See *Fee*.

Professional liability insurance: Insurance coverage for the insured professional's legal liability for claims arising out of damages sustained by others allegedly as a result of negligent acts, errors, or omissions in the performance of professional services. Claims-made coverage typically purchased annually to cover all claims on all projects during the coverage period (the "practice policy"). See also *Project-specific insurance policy*.

Profitability: The quality or state of being able to produce profits (income) from revenues generated in delivering the firm's services.

Profit margin: See *Margin*.

Profit-sharing plan: A mechanism for distributing a portion of the firm's profits to employees during or soon after the period in which they are earned (current profit-sharing plan) or to provide a later benefit to the employees (deferred profit-sharing plan). One of the prime purposes of a profit-sharing plan is to increase interest in current profitable performance since contributions are made only if there are profits.

Program (architectural or facilities): A written statement setting forth design objectives, constraints, and criteria for a project, including space requirements and relationships, flexibility and expandability, special equipment and systems, and site requirements.

Program management: The science and practice of managing large private and public projects.

Programming: The research and decision-making process that defines the problem to be solved by design.

Progress payments: Payments made periodically during progress of the work based upon the amount of work performed.

Progress schedule: A diagram, graph, or other pictorial or written schedule showing proposed or actual times of commencement and completion of the various elements of the work.

Project: A planned undertaking in which the architect provides a service or set of services to achieve a desired objective or set of objectives for the client. A project may or may not ultimately include construction work or result in the creation of physical space.

Project architect: See *Project manager*.

Project budget: (1) The sum established by the owner as available for the entire project, which for building projects includes the budget for the cost of the work; land costs; costs of furniture, furnishings, and equipment; financing costs; compensation for professional services; costs of owner-furnished goods and services; contingency allowance; and similar established or estimated costs. (2) The resources allocated by a professional design firm for performance of its obligations with respect to a particular project. See also *Construction budget*.

Project checklist: A list used to record the actions taken by the architect, beginning before the agreement with the owner has been signed, continuing with the range of services to be provided to the owner. For building design and construction services, AIA Document D200™–1995, Project Checklist, lists actions for pre-design, design, and construction increments of work.

Project closeout: Requirements established in the contract documents for substantial and final completion, submittal of required documentation, acceptance, and final payment on a construction project.

Project cost: Total cost of the project, including construction cost, professional compensation, land costs, furnishings and equipment, financing, and other charges.

Project delivery system: The method selected to allocate roles, responsibilities, risks, and rewards among the parties accomplishing the design, preparation of construction documents, construction, and management of a construction project.

Project expense: See *Direct expense*.

Project manager: (1) A term frequently used interchangeably with "project architect" to identify the individual designated to manage the firm's services related to a given project. Normally these services include administrative responsibilities as well as technical responsibilities. There also may be a designated principal-in-charge. (2) As to the contractor or construction manager, the term may refer to the individual designated by that entity to manage that entity's activities.

Project manual: The volume usually assembled for the construction work, which may include the bidding requirements, sample forms, conditions of the contract, and the specifications.

Project specific insurance policy: A professional liability insurance policy written to provide coverage for claims arising out of a specific project over the life of the project and an extended reporting period. Recent offerings include coverage for delivery options such as design-build and integrated project delivery.

Project representative: The architect's representative at the project site who assists in the administration of the construction contract.

Project revenues: The value received (or anticipated to be received) based on invoiced fees to the client for services rendered (or to be rendered). Excludes reimbursable revenues, which are offset by reimbursable expenses.

Project work plan: (1) A strategy by which the firm intends to produce a project on time, within the client's budget, and within the firm's project budget; (2) the document spelling out the details of the strategy. See also *Contractor's work plan*.

Property damage insurance: Insurance coverage for the insured's legal liability for claims for injury to or destruction of tangible property, including loss of use resulting therefrom, but usually not including coverage for injury to or destruction of property in the care, custody, or control of the insured.

Property insurance: Coverage for loss or damage to property. See also *Builder's risk insurance*, *Extended coverage insurance*, and *Special hazards insurance*.

Proposal request: A document issued by the architect to the contractor after contract award that may include drawings and other information used to solicit a proposal for a change in the work; sometimes called a "request for a change" or "bulletin."

Proximate cause: The cause of an injury or of damages that, in natural and continuous sequence, unbroken by any legally recognized intervening cause, produces the injury and without which the result would not have occurred.

Public authority: Local, state, or federal government body having jurisdiction over the work or project. See also *Authority having jurisdiction*.

Public liability insurance: Insurance covering liability of the insured for negligent acts resulting in bodily injury, disease, or death of persons other than employees of the insured and/or damage to property other than that owned by or within the care, custody, or control of the insured. See also *Commercial general liability insurance* and *Contractor's liability insurance*.

Public-private partnership (PPP or P3): (1) A contractual arrangement formed between public and private sector partners to renovate, construct, operate, maintain, and/or manage a public facility or system; typically the private sector partner provides some or all financing and the completed public facility returns cash flow to the private partner over a period of years; or (2) a description of this manner of project financing and development.

Punch list: See *Inspection list*.

Punitive damages: Damages in addition to proven loss (compensatory damages) that may be assessed against a defendant as punishment or as a deterrent to others.

Qualifications-based selection (QBS): The procurement of professional design services based on evaluating the qualifications of firms being considered prior to considering the price of the services. This approach is sometimes part of a two-step process that involves other criteria. See also *Best-value procurement* and *Cost-based selection*.

Qualified bid: A bid the bidder has conditioned or restricted in some manner.

Quantity survey: Detailed listing and quantities (bill of quantities) of all items of material, equipment, labor, and overhead necessary to construct a project; prepared by a quantity surveyor in the United Kingdom, and a cost engineer in the United STates.

Quantum meruit: A judicial doctrine that allows a party to recover losses in the absence of an agreement or binding contract based on the reasonable value of the services or materials provided.

Quotation: A contractor's or vendor's cost estimate for a given job or product. Sometimes shortened to "quote."

Reasonable care and skill: See *Standard of care*.

Record drawings: Construction drawings revised to reflect and represent the actual conditions of the project as it was constructed, usually based on marked-up prints, drawings, and other data furnished by the contractor to the architect. This term is preferable to as-built drawings. See also *As-constructed record drawings*.

Registered architect: See *Architect*.

Reimbursable expenses: Amounts expended for or on account of the project that, in accordance with the terms of the appropriate agreement, are to be reimbursed by the owner.

Reinsurance: An arrangement between two insurance companies whereby one assumes all or part of the risk of loss under the terms of a policy issued by the other.

Rejection of work (by the architect): The act of rejecting construction work that does not conform to the requirements of the contract documents or substitutions not properly approved.

Release of lien: An instrument executed by a person or entity supplying labor, materials, or professional services on a project that releases, in whole or in part, that person's or entity's mechanic's lien or right to assert a mechanic's lien against the project property.

Remedies: The legal means a party may have to obtain redress for a loss or injury or to prevent the occurrence of a loss or injury.

Request for information: A documented process of requesting information from the owner, architect or contractor on the project. Refer to AIA Document A716, Request for Information.

Request for payment: See *Application for payment*.

Request for qualifications (RFQ): A document describing a project in enough detail so that potential providers of services or products can determine if they wish to compete. Building owners typically issue RFQs as part of a two-stage process in which an RFQ is followed by the issuance of an RFP.

Request for Proposal (RFP): A document of solicitation, in which an organization publicizes that a specific project is available for companies to place bids for the project's completion. This document typically summaries the bidding process, contract terms, and provides guidance on bid format. Typically, the solicitation is open to a wide range of bidders to create open competition.

Responsible bidder: See *Lowest responsible bidder.*

Restricted bid: See *Qualified bid.*

Restricted list of bidders: See *Invited bidders.*

Retainage: A sum withheld from the progress payments to the contractor and later paid in accordance with the terms of the agreement between owner and contractor.

Retained earnings: The portion of net income (income after income taxes) that is accumulated in a corporation and is not distributed as dividends.

Retroactive liability coverage: In a liability insurance policy, coverage for claims made during the policy period related to occurrences prior to the date of the policy; also referred to as "prior acts coverage." Sometimes the retroactive coverage commences at a specific date referred to as the "retroactive date," which is either the inception date of a claims-made policy or an agreed-upon date set earlier than the inception date.

Revenue: The value received from clients as a result of the firm rendering its services (operating revenues); the value received as capital gains from the sale of long-term (fixed) assets or from aspects of the business not central to the primary purpose, such as rents from rental properties or royalties from designs (non-operating revenues).

Risk: Exposure to the chance of injury or loss.

Risk management: The strategies and processes used to minimize the probability and severity of an unfavorable outcome at the lowest long-term cost to an individual or organization.

Salary: Regular payments to staff for services; also used to designate the regular withdrawals by a proprietor or by partners to pay for the value of the professional services they render to the firm.

Samples: Physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the work will be judged. See also *Submittals*.

Schedule (architect's): (1) Of drawings: a supplemental list, usually in chart form, of a project system, subsystem, or portion thereof; (2) of specifications: a detailed written list included in the specifications; (3) of tasks and deadlines: usually by trades for tasks with a desired completion date.

Schedule (contractor's): (1) Of project construction schedule/ progress schedule/ master schedule: a baseline sequence of events for ensuring that a project is completed in a timely and cost-efficient manner. (2) of submittals: a sequence of required submittals closely coordinated and correlated with the project schedule.

Schedule of values: A statement furnished by the contractor to the architect reflecting the portions of the contract sum allocated to the various portions of the work and used as the basis for reviewing the contractor's applications for payment. This term is preferable to "contractor's breakdown."

Schematic design: Services in which the architect consults with the owner to ascertain the requirements of the building project and prepares schematic design studies consisting of drawings and other documents illustrating the scale and relationships of the building components for approval by the owner. The architect also submits to the owner a preliminary estimate of construction cost based on current area, volume, or similar conceptual estimating techniques.

Schematic design documents: Drawings and other documents illustrating the scale and relationship of project components.

Seal: (1) An embossing device, stamp, electronic image, or other device used by a design professional on drawings and specifications as evidence of registration in the state where the work is to be performed; (2) a device consisting of an impression upon wax or paper, or a wafer, which was formerly used in the execution of a formal legal document such as a deed or contract.

Separate contract: One of several prime contracts for design or the construction of the project.

Separate contractor: A contractor on a construction project, other than the contractor identified in the agreement between owner and contractor, who has a contract with the owner.

Settlement: An agreement ending a dispute or lawsuit. See also *Nuisance settlement*.

Shop drawings: Drawings, diagrams, schedules, and other data specially prepared for the work by the contractor or a subcontractor, sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the work.

Site: Geographic location of the project, usually defined by legal boundary lines.

Site analysis services (of the architect): Services described in the schedule of designated services in some AIA documents necessary to establish site-related limitations and requirements for a building project.

Site observation: See *Observation of the work*.

Site observation report: Also referred to as a field observation report. A written description of the architect's observations of the work during a visit to the project site.

Soil survey: See *Geotechnical investigation*.

Sole proprietorship: A form of business organization that is owned entirely by one person.

Solvency: The ability of the firm to meet its financial obligations as they mature.

Sovereign immunity: A long-standing doctrine to the effect that government entities cannot be sued without their consent. Federal and state laws allow suits against government agencies under certain circumstances.

Special conditions: A section of the conditions of the contract, other than general conditions and supplementary conditions, that may be prepared to describe conditions applicable to a particular project.

Special hazards insurance: Insurance coverage for damage caused by additional perils or risks to be included in the property insurance (at the request of the contractor or at the option of the owner). Examples often included are sprinkler leakage, collapse, water damage, and coverage for materials in transit to the site or stored off the site.

Specifications: A part of the contract documents contained in the project manual consisting of written requirements for materials, equipment, construction systems, standards, and workmanship.

Staff leveling: The process by which needs for staff generated by project services are matched to available sources or staff in an attempt to minimize either the unmet demand for services or the underutilization of staff.

Standard form of agreement: A document setting forth in printed form the general provisions of an agreement, with spaces provided for insertion of specific data relating to a particular project.

Standard of care: Usually defined as what a reasonably prudent architect, in the same community at the same time, facing the same or similar circumstances would do. It is the measure by which professional negligence is judged. The standard of care is established in the common law of each state, or may be written into the services agreement. Expert witness testimony is normally required to establish a breach of the standard of care.

Statement of account: A summary of outstanding invoices sometimes listed by number, date, and amount (rendered to but not paid by the client); total earned revenue, total paid, and total due are usually shown. Sometimes, outstanding invoices are listed by number, date, and amount.

Statute of limitations: A statute specifying the period of time within which legal action must be brought for legal relief after an alleged injury or damage has occurred. The lengths of the periods vary from state to state and depend upon the type of legal action.

Statute of repose: A statute limiting the time within which an action may be brought, without relation to whether injury has yet occurred or been discovered. The time begins when a specific event occurs, such as substantial completion of a project, and the statute of repose may extinguish the remedy even before a cause of action has accrued.

Statutory bond: A bond, the form or content of which is prescribed by statute.

Stipulated sum agreement: Contract in which a specific amount is set forth as the total payment for performance of the contract. Also called a fixed-fee agreement.

Strategic facilities plan: Plan that integrates facilities into the organization's strategic business plan and forecasts the supply and demand for physical space, options for acquiring space, location of the space, and budgets and schedules. Strategic facilities plans are based on goals set in business plans. See also *Business plan*.

Strict liability: Liability without proof of negligence but based on one or more conditional requirements.

Sub-bidder: A person or entity who submits a bid to a bidder for materials or labor for a portion of the work.

Subcontract: Agreement between a prime contractor and a subcontractor for performance of a portion of the work at the site. See also *Prime contract*.

Subcontractor: A person or entity who has a direct contract with the contractor to perform any of the work at the site. See also *Prime contractor*.

Submittals: Documents and physical samples prepared by the contractor, subcontractors, suppliers, or manufacturers that describe in detail how the contractor will construct the work, submitted to the design professional for its review and processing. Submittals are closely scheduled and coordinated with the project construction schedule and include shop drawings, project data, physical samples, and similar submittals, which can include coordination drawings, details, calculations, and other supporting data as specified. See also *Submittal schedule*.

Subpoena: A writ issued under the authority of a court or arbitrator to compel (1) the appearance of a witness for deposition, trial, or arbitration hearing; or (2) the surrender to the court of documents and records related to a project.

Subrogation: The substitution of one person for another with respect to legal rights such as a right of recovery. Subrogation occurs when a third person, such as an insurance company, has paid a debt of another or claim against another and succeeds to all legal rights that the debtor or person against whom the claim was asserted may have against other persons. Commonly, it means "to step into the shoes of."

Substantial completion: The stage in the progress of the work when the work or designated portion thereof is sufficiently complete in accordance with the contract documents that the owner can occupy or use the work for its intended purpose.

Substitution: A material, product, or item of equipment accepted for use in place of that specified.

Sub-subcontractor: A person or entity who has a direct or indirect contract with a subcontractor to perform any of the work at the site.

Subsurface investigation: See *Geotechnical investigation.*

Successful bidder: The bidder chosen by the owner for the award of a construction contract. Also called "selected bidder."

Successor: A person or entity who succeeds to a title, estate, or office.

Summary judgment: Upon a motion, the decision of a court made as a matter of law without hearing evidence, because the pleadings show no issue of material fact.

Summons: A legal citation served on a person named as a defendant in a legal action notifying him or her to appear before a court; also used to require nonparty fact witnesses to appear for depositions or at the trial or arbitration hearings.

Superintendent: The contractor's representative at the site who is responsible for continuous field supervision, inspection, coordination, completion of the work, and, unless another person is designated in writing by the contractor to the owner and the architect, for the prevention of accidents.

Supervision (during construction): Direction of the work by the contractor's personnel.

Supplementary conditions: A part of the contract documents that supplements and may also modify, change, add to, or delete provisions of the general conditions.

Supplier: A person or entity who supplies materials or equipment for the work, including that fabricated to a special design, but who does not perform labor at the site.

Supply bond: A bond by which a surety guarantees that a supplier will furnish goods or materials.

Surety: A person or entity that guarantees, in writing, the performance of an obligation by another.

Surety bond: See *Bond.*

Survey: (1) Mapping the boundary, topographic, and/or utility features of a site; (2) measuring an existing building; (3) analyzing a building for use of space; (4) determining owner's requirements for a project; (5) investigating and reporting required data for a project.

Suspense date: The date something is due, is returned, ends, or expires.

Sustainability: The concept of meeting present needs without compromising the ability of future generations to meet their needs.

Sustainable design: Design that seeks to avoid depletion of energy, water, and raw material resources; prevent environmental degradation caused by facility and infrastructure development over its life cycle; and create environments that are livable, comfortable, and safe and that promote productivity.

Tail coverage (insurance): An extended reporting period on a claims-made liability policy to cover claims made after the policy's expiration or cancellation date that arise from covered acts or omissions committed during the policy period (on or after the retroactive date and prior to the cancellation date). Tail insurance issues arise when an architect loses coverage because he or she leaves a practice, whether due to a change of job, change or location, retirement, separation, or the buyout of a business shareholder, or when a firm closes its doors.

Termination (of contract): The canceling of a contract by one party, with notice to the other party. Either party may terminate for cause, because "cause" is equated to the other party's material breach, or default, of the contract. Termination for convenience can be made, if permitted by the contract, without regard to whether contract obligations have been fulfilled.

Termination expenses: Expenses directly attributable to the termination of an agreement, including an amount allowing for compensation earned to the time of termination.

Third-party beneficiary: Someone who is not a party to a contract but has a direct interest in some or all of the terms and conditions of the contract.

Time and material (T&M) contract: A contract whereby the owner is charged for all of the hours of work performed at a fixed hourly rate that includes overhead and profit, any direct expenses incurred, and material purchased during project delivery. Also referred to as labor and materials. Unlike cost-reimbursable contracts, a T&M contract does not ordinarily impose cost restrictions or goals on the contractor, or provide incentives for cost control or labor efficiency. See also *Cost-reimbursement construction contract*.

Time extension: A time extension contract clause generally provides a remedy of extending contract performance time and provides relief to the contractor from responsibility for delayed completion under certain events.

Time impact analysis: A method of assessing and proving contractor delay claims using critical path method (CPM) scheduling.

Time of completion: Date established in the contract, by calendar date or by number of calendar or working days, for substantial completion of the work. See also *Contract time*.

Time utilization: See *Utilization ratio.*

Timely completion: Completion of the work or designated portion thereof on or before the date required.

Timely notice: Notice given within time limits prescribed by contract or in reasonably sufficient time to allow the party receiving notice to take appropriate action.

Tort: A violation of a duty or invasion of a right created by operation of law; a private or civil wrong or injury.

Trade discount: The difference between the seller's list price and the purchaser's actual cost, excluding discounts for prompt payment.

Turnkey: A construction process in which one party agrees to deliver to another party a fully completed project, ready for the other party's use and occupancy by "turning the key."

Umbrella liability insurance: Insurance providing coverage in an amount above existing liability policies and sometimes providing direct coverage for losses not insured under existing policies; frequently specified deductible amounts are required.

Unbilled revenue: Revenue that has been earned but for which the client has not been given an invoice. See also *Work in process.*

Unearned revenue: Revenue from services the firm has a signed commitment to render but which the firm has not yet rendered.

Uniform Commercial Code (UCC): A model statute dealing with certain commercial transactions that has been adopted by every state except Louisiana. UCC provisions do not normally apply to professional services.

UniFormat™: A system for classifying building products and systems by functional subsystem (e.g., substructure, superstructure, exterior closure, etc.). UniFormat is published jointly by the Construction Specifications Institute (CSI) and Construction Specifications Canada. ASTM publishes a similar version as UniFormat II, ASTM standard E1557-09.

Unit price: Amount stated in the bid as a price per unit of measurement for materials or services, as described in the bidding documents or in the proposed contract documents.

Unit price contract: A contract based on acceptance and incorporation of unit price quotations for the various portions of the project.

Universal design: The design of building environments to be usable by all people, with and without disabilities, to the greatest extent possible, without the need for adaptation or specialized design.

Unjust enrichment: A legal concept that one person should not be unjustly enriched at the expense of another. It prevents a party from receiving money or a benefit to which he or she is not entitled. Rather, the party is required to make restitution for the money or benefit unjustly received.

Upset price: See *Guaranteed maximum price.*

Utilization ratio: (1) Time utilization is a ratio of direct hours charged to projects to the total hours reported; (2) payroll utilization is the ratio of direct salary expense to total salary expense. Can be calculated for an individual, a group of individuals, or the entire firm.

Value analysis: An organized effort directed at analyzing systems, equipment, facilities, services, and supplies for the purpose of achieving essential functions at the lowest life cycle cost consistent with the required performance, reliability, quality, and safety. (Also referred to as value management or value engineering.)

Value-enhanced design: The process of analyzing the elements of a building design in terms of its cost-effectiveness, including the proposed substitution of less-expensive materials or systems for those initially suggested, or higher-quality materials or systems for the same initial cost.

Vandalism and malicious mischief insurance: Insurance against loss or damage to the insured's property caused by willful and malicious damage or destruction.

Variance: (1) A limited waiver from the requirements of a zoning ordinance that may be granted because of special circumstances regarding the subject property; (2) an actual value less a budgeted or planned value.

Vicarious liability: Indirect liability imposed on a party resulting from the acts or omissions of another person or entity for whose conduct the party is responsible.

Vouchers: Forms of receipt or statements used to recognize the existence of an expense and to justify a cash outlay, serving as evidence of an obligation owed by the firm.

Waiver of lien: A document by which a person or entity who has or may have a right of mechanic's lien against the property of another relinquishes such right. See also *Release of lien.*

Waiver of subrogation: The relinquishment by an insured of the right of its insurance carrier to recover damages paid on behalf of the insured.

Warranty: Legally enforceable assurance of quality or performance of a product or work or of the duration of satisfactory performance.

Work (in the AIA documents): The construction and services required by the contract documents—whether completed or partially completed—including all labor, materials, equipment, and services provided or to be provided by the contractor to fulfill the contractor's obligations. The work may constitute the whole or a part of the project.

Work changes proposal request: A request, typically prepared by the architect, to obtain price quotations needed for negotiating changes in the contract for construction. Refer to AIA Document G709™-2001, Work Changes Proposal Request.

Work in process: Work the firm has under way for a client that has not been invoiced. Work in process is a current asset and may be carried at cost or at the value of expected revenue, in which case it can also be called "unbilled revenue."

Workers' compensation insurance: Insurance covering the liability of an employer to employees for compensation and other benefits required by workers' compensation laws with respect to injury, sickness, disease, or death arising from their employment. Previously referred to as workmen's compensation insurance.

Working capital: The minimum amount of liquid capital needed to maintain the flow of capital from cash to work in process (unbilled revenue) to accounts receivable and again to cash, plus an amount as contingency.

Working drawings: See *Drawings.*

Write off: The transfer of an amount previously regarded as an asset (e.g., an account receivable) to an expense account or to the profit-and-loss account.

Zero carbon: See *Carbon neutral.*

Zoning: Local ordinances regulating the use and development of property through the use of standards for things such as minimum building setbacks, maximum heights, and minimum open spaces.

Zoning permit: A permit issued by appropriate government authority authorizing land to be used for a specific purpose; required prior to obtaining a building permit. See also *Building permit.*

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