General Project Management

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General Project Management

Introduction

By completing the activities in this chapter, you will gain an understanding of the activities involved in general project management. The following information is taken from the NCARB IDP Guidelines:

General Project Management
Minimum General Project Management Experience: 240 Hours
Definition: Includes planning, organizing, and staffing; budgeting and scheduling; leading and managing the project team; documenting key project information; and monitoring quality assurance.

Tasks
At the completion of your internship, you should be able to:
- Prepare and manage design contracts (owner/architect)
- Prepare and execute professional services contracts (architect/consultant)
- Attend, conduct, and record meetings throughout all phases
- Select, manage, and coordinate consultants
- Partner with the owner's project delivery team
- Prepare and manage design team schedule and budget (consultant and staff costs)
- Obtain client authorization to proceed per contract phases
- Present at public hearings
- Document project status and progress
- Monitor project construction costs
- Prepare owner/contractor agreement
- Conduct post-occupancy evaluation
- Identify the project design team members and their required scope of services, roles, and responsibilities (e.g., architects, engineers, specialty consultants)
- Identify the project delivery team's roles and responsibilities (e.g., owner, architect, contractor, program manager)
- Identify project delivery method

Knowledge Of/Skill In
- Construction procurement (e.g., bidding, negotiating)
- Contract negotiation (e.g., fees, scope, schedules)
- Contracts (e.g., professional services and construction)
- Designing and delivering presentations
- Electronic communications (e.g., virtual offices, video-conferencing, web-based networking)
- Interpersonal skills (e.g., listening, diplomacy, responsiveness)
- Invoicing for services
- Oral and written communications
- Permit and approval processes
- Post-occupancy evaluations
- Project budget management
- Project delivery methods
- Project records management

resources

Download the current Intern Development Program (IDP) guidelines at www.ncarb.org/Experience-Through-Internships.aspx.

The American Institute of Architects. Demkin, Joseph A., ed. *The Architect's Handbook of Professional Practice.* 14th ed. Hoboken: John Wiley & Sons, 2008.
- Chapter 13 - Project Management

The American Institute of Architects. Demkin, Joseph A., ed. *The Architect's Handbook of Professional Practice.* 13th ed. New York: John Wiley & Sons, 2001.
- Chapter 14 - Project Management

The American Institute of Architects, *The Architecture Student's Handbook of Professional Practice.* 14th ed. Hoboken: John Wiley & Sons, 2009.
- Chapter 9 - Project Management

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Knowledge Of/Skill In *Continued*
- Project scheduling (e.g., construction document setup, storyboarding, staffing projections)
- Risk management (e.g., professional and general liability)
- Team building, leadership, participation

notes

Take brief notes while reading the narrative and list key resources you used to complete the activities. Note discussion outcomes from meetings with your supervisor, mentor, or consultants. When finalizing the activity documentation (PDF), include your notes and the Emerging Professional's Companion *activity description.*

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Narrative

Most building design and construction projects involve multiple firms and many people. In these endeavors some people do the work and others direct the work. The latter role—that of project manager—can be a principal of the firm, director, designer, project architect, or job captain. Regardless of who takes on this role, however, the responsibilities of the project manager must be directed toward accomplishing the goals and objectives of the project. The design and construction industry is a project-based world. As such, project management is a key component for any architect or architecture firm.

Project management involves assigning, overseeing, directing, coordinating and monitoring the work of members of the project design team. It also involves managing employee, client, consultant, and contractor relationships. Although exact duties may vary all of these tasks depend on effective communication.

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.

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.

What Makes an Effective Project Manager?

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 to being a strong leader. The effective project manager must be willing to make decisions and take action. The project manager cannot do all of the work personally, and must delegate tasks and rely on others to do much of it. A willingness to believe in others is necessary, as well mentor colleagues and clients on how to view and participate in the project. Many project managers see the work being accomplished exactly as he or she would do it. Yet successful delegation of tasks involves understanding when the work being done is good enough.

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

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Ramroth, William G. *Project Management for Design Professionals.* Chicago, IL: Kaplan AEC Education, 2006.

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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 must be willing to see project circumstances from multiple points of view and to maintain a neutral attitude when conflicts arise. Nearly every aspect of project management requires give-and-take; it should be anticipated and embraced. The project manager who finds conflict threatening or frustrating will find successful outcomes difficult when disagreements arise.

Problem Solving

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 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.

Communication

Communication is the glue that holds all aspects of project delivery together. While the project manager is a distributor of information, a much more important responsibility is facilitating communication among the project participants. Since the project manager is in a position to oversee most of what is happening on a project, he or she is often in the best position to moderate discussions between the client and the design team or between the client and the contractor.

Client Expectations and Project Management

A significant ingredient in 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.

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 effectively with clients about the services they provide. Often they try to sugarcoat tough issues in an effort to be viewed as non-confrontational.

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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 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 share this with the client in plain language.

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.

"Absolute"Expectations: 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.

Risk Management in Project Management

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 from 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

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Abramowitz, Ava J. *Architect's Essentials of Contract Negotiation.* New York: John Wiley & Sons, 2002.

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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. 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 Word of Caution: 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.

Project Management Activities

In carrying out day-to-day duties and responsibilities, project managers marshal and apply their knowledge and skills to lead, solve problems, motivate others, advocate, measure, document, and communicate. The management of architectural projects consists of activities that can be grouped into several broad categories for which the project manager is responsible:

- Planning, organizing, and staffing the project
- Facilitating the work
- Monitoring progress
- Concluding the project

These groups of activities essentially embody the full range of tasks and responsibilities that project managers will encounter in their assignments.

Planning, Organizing, and Staffing

The project manager usually takes charge of planning, organizing, and staffing 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 Work Plan

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 on the following pages. Even on large projects, this information may take up no more than a few pages.

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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 one (1) through seven (7) can be presented to clients to illustrate how you plan to approach their projects. The work plan should include the following:

1. **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.

   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.

2. **Statement 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 provides a basis for developing the project schedule, staffing needs, and budget for the architect's work.

3. **Team organization.** 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.

Preliminary Organizational Chart

PROJECT MANAGEMENT TEAM

| Structural & MEP VP & PM's | Partner-In-Charge Project Manager Project Designer | Owner |

PROJECT DELIVERY TEAM

Project Designer Project Manager

| Parking, Site & Infrastructure Project Architect | Main Building Project Architect | Const. Admin. Project Architect |

| Special Consultant | Special Consultant | Special Consultant | Special Consultant |

4. **Responsibility 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 M/E/P engineer will "do the M/E/P engineering." A more detailed understanding would distinguish responsibilities such as these: "The electrical engineer will wire and circuit the landscape

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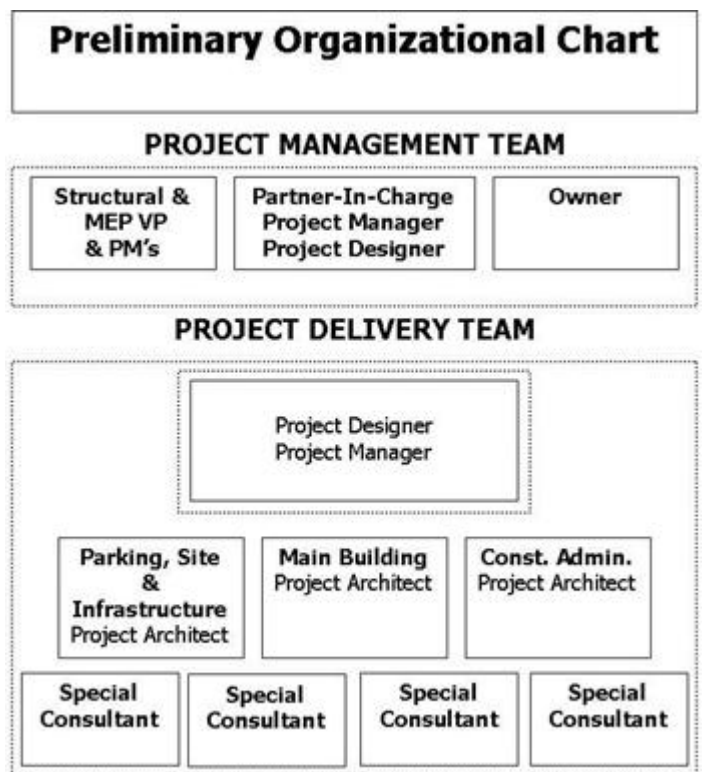
architect's lighting design," or "the M/E/P engineer will coordinate HVAC equipment selections with the acoustical engineer."

5. **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 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.

Project managers must also learn that a project schedule is more than a simple bar chart that represents time periods. A project schedule is the graphic representation of an organized series of promises and commitments. It cannot be developed in a vacuum. It must be developed through collaboration and coordination.
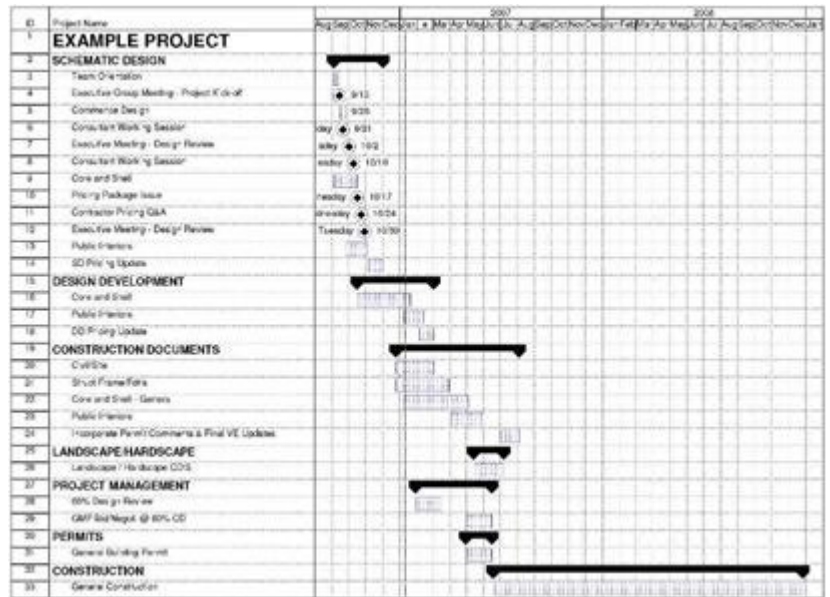
6. **Preliminary staffing needs.**
Preliminary staffing requirements can be estimated once the project scope has been delineated, the deliverables understood, the consultant's responsibilities defined, and a preliminary schedule developed. The project manager may work with upper management (in a larger 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.

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 members 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.

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7. **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.

8. **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 copy of this should be included in the work plan.

9. **Code information.** Code information is optional.

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.

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.

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 first 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

resources

Learn more about Project Management Best Practices via the Architect's Knowledge Resource (AKR): www.aia.org/practicing/bestpractices/AIAB091185

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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.

Effective Agendas: Many 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 additional 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.

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. With the advent of digital files and sheet-fed scanners, 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.

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.

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Managing Information

The project manager must be the driving force behind creation of the documentary record while the project is ongoing. Documentation includes preparing proposals and agreements, meeting agendas and reports, phase sign-offs, memoranda, and other correspondence that facilitates and explains communications between and among project participants. If a project manager has poor documentation habits, the rest of the team will tend to mimic those habits.

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.

Monitoring Progress

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.

When monitoring the progress of a project, the project manager must gauge and measure how well the client, contractor, consultants, and staff are accomplishing the goals established in the work plan. Here, more than in any other activity, the project manager must not adopt a passive stance. If monitoring the progress of the project against the work plan reveals inconsistencies, adjustments in course must be made. The project manager's lines of communication must be energized, and appropriate decisions put in place to bring the project back in line.

Tracking Required Services

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 set forth the foundation for project success or failure. Ideally, the project manager will be included in both 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.

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

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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.

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.

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.

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.

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.

Internal Budget Tracking and Management

Most project managers are asked to allocate portions of the fee to the various project phases in a proportion that matches the anticipated workload for each phase. Referred to as a job cost budget or a project budget, the purpose of these estimates is to budget for the firm's labor and other expenses and profit.

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Expenses include basic service consultants, unreimbursed expenses, and reimbursable expenses. Producing a realistic project budget requires an understanding of the firm's labor rates and project delivery and staffing practices. As the work progresses, the project manager periodically checks actual costs against the budget plan.

Some firms develop their labor budgets using worker-hour estimates only. When dollar-based estimates are preferred, firms may use actual employee hourly costs or average hourly costs. The advantage of worker-hour only or average hourly cost methods is that they remove any incentive to reduce costs by choosing only low-priced and/or potentially less experienced staff for the project. Considering that most firms calculate profit for distribution at the end of the year based on the firm's total income and expenses, even when employee-specific costs are used, everything averages out by the end of the year. However, for the firm's senior management, having access to and reviewing actual employee-specific costs means the exact financial position of each project can be determined at any time.

Tracking employee time records: Project managers in most firms check the time records of the employees they supervise on an ongoing basis. The time records are approved and sent to the accountants. If corrections are required, they are first returned to the employee.

Consultant invoices: The project manager also reviews invoices from consultants to determine whether the consultant's progress matches the amount invoiced. To simplify this process, some firms pay their primary consultants—such as structural and M/E/P engineers—on the same percentage complete basis as the invoice the architect submits to the client. In this approach, only reimbursable expense invoices are required from these consultants. However, some adjustment of payments is usually required when the consultant's work progress doesn't match the architect's progress, as would be the case with contract administration fees for the structural engineer, who is usually finished before the architect.

Reimbursable expenses: Most architects pass on certain expenses to the client, such as those for out-of-town travel and living, reproduction and printing, photography, postage and shipping, and renderings and models. The way reimbursable expenses will be handled or marked up is typically defined in the owner-architect agreement and must be coordinated and tracked to match the contract requirements.

Client invoices: Invoices should be reviewed before they are sent to the client to determine that the amount billed represents the status of the work that has been completed. This should involve making sure the work being invoiced matches current client work authorizations. Reimbursable expenses should be checked against contract provisions—particularly if there is a limit on the amount to be reimbursed. Some firms believe the close working relationship that project managers have with clients puts them in an ideal position to discuss any overdue invoices. Other firms prefer not to put managers in an adversarial position with clients if there are disputes about amounts due.

resources

AIA Contract Documents are considered the industry standard. Learn more at www.aia.org/contractdocs. In addition, samples of AIA Contract Documents are available for interns. View the list of sample contract documents and resources for interns.

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Maintaining Project Quality

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.

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 they will be perceived as a poor manager 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.

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 application 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.

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Concluding the Project

This management activity encompasses closeout tasks, such as delivering warranties and operating manuals to the owner, and housekeeping activities such as archiving project files. This activity should also include investigations to determine the quality of the services that were provided and efforts to obtain opinions from the owner, and possibly the contractor, about those services.

Post-Construction Evaluation

The most valuable insight into the effectiveness of the architect's services can come from discussing those services with the owner and contractor immediately after occupancy of the project. At this time, minor irritations and recollection of bumps in the road are still fresh in their minds. While no architect wants to be beat up over minor issues, all want to improve the quality of their services. If a project is successful, the client and contractor may later decide not to mention the little things. The reality of professional service is that what the clients and contractors experience—as users of the architect's services—counts a great deal in determining the quality of the experience. Following are several ways to carry out post-construction evaluation:

- **Team roundtable and project debriefing.** When construction is complete and the architect's services are concluded, the project team may be scattered to the winds. Still, the project manager should gather the remaining troops and share insights gained from discussions with the owner and contractor, as well as detail the degree to which the firm's quality and financial goals were met. An equally important objective of a project debriefing is to allow members of the project team to discuss their experiences, and to offer suggestions and ideas for improving work on future projects.

- **Year-end review with the client.** While it is ordinarily an additional service, many architects make a post-occupancy evaluation part of their normal services, especially with repeat clients. A walk-through, or even an inspection is conducted approximately a year after occupancy. This is done with the owner, supervisory personnel, and operations and/or maintenance staff to compare programmed use with actual use, the effectiveness of the design, and the performance of materials and systems. The year-end review allows the architect to reinforce the positive aspects of the relationship with the client. It also provides a heads-up on any problems the owner may be having with the project. While no one enjoys learning of problems that may be brewing, it is certain that bad news—if it is present—does not get better with age.

- **Mistakes are reality.** Although no one likes reliving the mistakes they have made, mistakes are a reality. Architects rarely prepare perfect sets of drawings or provide perfect services. As the project team explores what they did wrong or what they can do differently next time, the project manager should remind them that the purpose of revisiting project experiences is to improve

resources

Learn more about project Quality Management Best Practices via the Architect's Knowledge Resource (AKR): www.aia.org/practicing/ bestpractices/AIAB091186

the architect's services—not to castigate participants. Nonetheless, when discussing mistakes, particularly with the owner, an attitude of contrition is preferable to one of defensiveness.

Conclusion

Good project management is critical to any architecture firm committed to providing excellent services. While the expansive nature of project management can be challenging to describe, its basic tasks include determining who, 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. 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.

Written by Grant A. Simpson, AIA
Grant A. Simpson has served as a project delivery leader for several firms, including RTKL Associates and HKS, where his responsibilities included construction documentation, project management, and loss prevention activities. Simpson served as chair of the 2006 AIA Practice Management Knowledge Community advisory group and currently serves on the AIA Risk Management Committee.

notes

3D

General Project Management

Technical Coordination Meetings
Supplemental Experience for eight (8) Core IDP Hours

Participate in a technical coordination meeting during or just following design development, at your firm or your mentor's firm. The meeting should include at least one of the engineering team members, preferably more. Prepare for the meeting, actively participate in it, and afterwards prepare meeting minutes.

Activity – Core

Prepare for the meeting by reviewing "in progress" drawings for the engineering disciplines along with the architectural drawings. Are the engineering systems supporting the architectural design ideas put forth in the schematic design? Are adjustments to the overall design agreed upon?

During the meeting, listen to the discussion and take notes. Be sure to ask questions if you don't understand an issue.

After the meeting use your notes and prepare a presentation for the project as if you were giving the meeting for the client, be sure to include in your presentation:
- Project's scope, quality, and cost.
- Any alterations to systems or designs.
- Any other issues that the client may need to know
- Explain details for specific components.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

AIA NCARB

Attend a Project Meeting & Write a Meeting Report
Supplemental Experience for eight (8) Core IDP Hours

Interaction with design team members, clients and contractors during project meetings is one of the most common activities of the project manager's daily professional life. Sometimes it seems that meetings will never end. Meetings are generally scheduled because there are important project issues to be discussed. Whenever important project issues are discussed, it is important to document those discussions.

Preparing accurate and detailed reports of meeting discussions is one of the most important aspects of managing and monitoring the flow of assignments and approvals on a project. The meeting report is one of the project manager's most important tools.

Some managers tend to put off the tedium of preparing reports. Your goal is to begin to develop an attitude that the report is an import and useful tool that should not be considered tedious or be put off to another day.

Activity - Core

Please reference the following source:
* *The Architect's Handbook of Professional Practice*, 14th ed. Chapter 13.2 - Managing Architectural Projects

Meet with your supervisor to make arrangements to attend a project meeting for a project in your firm or a mentor's firm. Ideally the meeting would involve 8 to 10, or more attendees, and take place during the design development or construction documents phase.

Before the meeting, meet with the project manager to discuss the project background. If possible, read the manager's meeting reports from the previous two or three meetings. Discuss the project manager's preferred meeting report format.

Attend the meeting, and as an endeavor separate from the formal report prepared by others, prepare a report recording your impressions of the events of the meeting. Afterwards compare your report with the formal report and note the differences.

As you prepare your report answer the following questions:
* Is it necessary to record every statement made by attendees?
* Is it possible to keep track of the important issues without actually taking down issues verbatim?
* Was the meeting well organized and easily followed?
* Was the agenda effective in stimulating conversation?
* Were the attendees prepared to discuss the issues?
* Did the issues that were important to be recorded in the report the subject of sufficient focus during the meeting?
* Were you able to identify report items that would help the team accomplish project management goals?
* Were the next steps agreed upon by attendees?

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

General Project Management

Study a Firm's Job Cost Budget Process
Supplemental Experience for eight (8) Core IDP Hours

Most firms require their project managers to monitor the financial performance of their projects. Some firms assess the project manager's performance on the basis of the profitability of their projects. However, there is no hard and fast set of rules for monitoring project profitability. Nonetheless, in most firms the project manager must understand the relationship of project delivery within the culture of the firm to the firm's profitability.

The architect's labor—the project staff—is the most expensive cost that the project manager can directly control. The project labor is further qualified by the professional knowledge and ability of each team member. Finally, there is no perfect project team, for the project manager's planning purposes; there are only average project teams.

Activity – Core

Please reference the following source:
- *The Architect's Handbook of Professional Practice,* 14th ed. Chapters 13.2 - Managing Architectural Projects and Chapter 13.3 - Project Controls

Meet with your supervisor or mentor to discuss how their firm allocates expertise, time and expenses to its projects. Discuss the project manager's role in developing performance budgets for its projects. Discuss the firm's accounting system and how costs are allocated and tracked. Discuss how the firm accounts for indirect expenses and overhead. The firm may have learning tools to help you understand these issues.

Working with your supervisor or mentor, select an example project from their office, in any service phase, for which you will hypothetically plan the job cost budget. This will be an iterative process. Meet and review your work with your supervisor several times to develop an understanding of how time and resources are consumed as the project is delivered.

Using available forms and processes, prepare a job cost budget and summary that addresses the questions listed:
- How many employees are required to produce the architectural work during each phase of service?
- Building upon the "work plan" concept, how long will each phase of service last?
- What hourly billing rate does your firm budget for each category of employee?
- Does your firm have a profit target budget, or is profit budgeted as what remains after expenses?
- What is the difference between a profit target and what remains?
- How does your firm budget the cost of consultants?
- What is the difference between "direct" expenses and "indirect" expenses?
- How does your firm budget for reimbursed expenses?
- How does your firm budget for non-reimbursed expenses?
- How often are project management reviews held? Every two weeks?

Compare your completed job cost budget with the firm's actual job cost budget and make notes about the differences in your summary.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Prepare a Proposal
Supplemental Experience for eight (8) Core IDP Hours

Most architectural firms submit a proposal for architectural services to prospective clients before they are awarded a new project commission. The proposal is usually proprietary to the firm, with different firms having different proposal philosophies. Some firms prefer very brief forms of proposal, while other firms prefer more detailed proposals that reflect lessons learned the hard way. The AIA helps architects with their proposals through the use of AIA 305™, Architect's Qualification Statement.

Proposals should have some fundamental components, including:
1. Description of the project
2. Scope of services to be performed
3. The fee quote
4. Payment terms
5. Discussion of schedule
6. Terms and conditions

Activity – Core

Please reference the following source:
- *The Architect's Handbook of Professional Practice*, 14th ed. Chapter 11 - Project Definition

View and download the following sample documents for reference:
- AIA B101™, Owner-Architect Agreement
- AIA A201™, General Conditions of the Contract for Construction
- AIA 305™, Architect's Qualification Statement

Working with your supervisor or mentor, select a project in their office that is in the proposal phase, or a recently awarded project for which a proposal was recently prepared. Obtain a copy of the firm's current AIA 305™, Architect's Qualification Statement. If the firm does not use the Architect's Qualification Statement, then obtain a copy of their current marketing material that lists the firm's qualifications. Also obtain a copy of the firm's form of proposal that will be used on this project, or a copy of a recent proposal from a different but similar project.

Discuss the following questions, and any others about the proposal process, with your supervisor or mentor.
- How will fees be quoted (percent of construction cost, lump sum, $ per square foot, etc.)
- How will the services to be provided be described?
- Who will pay for consultant's services?
- Who will pay for routine expenses, like travel, lodging, or postage?
- What terms and conditions will be proposed?
- What will be the payment terms?

Independent of the firm's actual proposal preparation, you are to prepare a draft proposal for the project. As you work through the proposal draft include the following information:
- What kind of project is it?
- How does the project complexity or schedule affect services and fees?
- What services are required?
- What fees are appropriate?

The first time you prepare proposal may be a confusing, possibly intimidating experience. Consult your supervisor frequently. Compare your draft proposal with the firm's actual proposal and mark up the differences. Share your work with your IDP supervisor or mentor and make suggested changes.

3D

General Project Management

Prepare a Draft Work Plan
Supplemental Experience for eight (8) Core IDP Hours

The very mention of preparing a work plan to show a client how a project will be delivered strikes fear in the hearts of most project managers. This chapter narrative and the corresponding narrative in Chapter 13.2 - Managing Architectural Projects in *The Architect's Handbook of Professional Practice* describe the fundamentals of a work plan. More information or less information can be compiled at the project manager's option. Preparing a work plan is not particularly tedious, nor is it a burdensome process, but it does require attention to detail to organize all of the components.

The work plan concept revolves around how you will manage a project. Components can be suggested, but final decisions about the components and their content will be a reflection of your own project management approach.

Activity – Core

Please reference the following source:
- *The Architect's Handbook of Professional Practice*, 14th ed. Chapter 13.2 - Managing Architectural Projects

Work with your supervisor or mentor to select a project in their office that is in the proposal stage to serve as a working exercise in developing a work plan.

Your work plan is to include, at a minimum, a preliminary draft at least 5 of the following components:
- Project description and client requirements
- Statement of deliverables
- Team organization chart
- Responsibility matrix
- Preliminary project schedule
- Preliminary staffing needs
- Project directory

As you prepare your work plan, answer the following questions:
- Who are the core players from the various companies who will be involved?
- What form of contract is contemplated?
- What kind of project is it?
- What are the owner's schedule goals and requirements?
- What consultants are required to assemble an appropriate project team?
- How many employees, and at what skill levels are required?
- What work is to be done, explained in terms of services and deliverables?
- What is an appropriate fee for the professional services you will manage and provide?

3D

Compare your draft work plan with the firm's actual work plan in place for the project, if there is one, and mark up the differences.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Devising a Schedule for the Production of Construction Drawings
Supplemental Experience for eight (8) Elective IDP Hours

Devising an efficient but realistic schedule for production of construction drawings takes considerable experience. The following are among the key factors in creating a production schedule for construction drawings:
- Total quantity of drawings to be produced (from assessments made while generating the mock-up set)
- Complexity of the work
- Clarity and consistency of decisions made during the DD phase
- Division of the work among members of the project team
- Number and relative experience of the individuals available to do the work
- Other work in progress at the office to which team members might occasionally be assigned
- Proper sequencing (some drawings can only be done after others have been completed)
- An understanding of the potential of your working tools and methods. (For example: CAD systems provide the architect with a range of tools to facilitate the drawing, review, and coordination of documents.)
- Document review, coordination, and approval processes by internal and external team members
- Consultants' working processes and efficiency
- Mode of project delivery (e.g., fast track or conventional)

Activity – Elective

At the beginning of the CD phase of a project in your office, use a mock-up set of drawings to devise a schedule for the production of construction drawings. Ask your mentor and/or the project manager for help. Consider the issues enumerated above. Ask senior colleagues in the office to review your work.

Update the schedule periodically, keeping track of the changes, until the end of the CD phase to reflect changes in the work and in your understanding of the project scope. Assess your ability to foresee the progression of the work.

Write a brief report on the schedule you created and be sure to answer the following questions:
- How similar is your initial schedule to the final schedule?
- What did you successfully account for in your schedule?
- What were you not able to account for initially?
- What would you have done differently with your schedule?

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

General Project Management

Observing Contractor Selection
Supplemental Experience for eight (8) Elective IDP Hours

While contractor selection procedures are well documented in AIA publications, architectural observation and judgment is a necessary component in choosing the right company for the job.

Activity – Elective

Set up a meeting to interview one of the senior members of your firm or your mentor's firm about their contractor selection and negotiation process. Look for answers to questions such as these:

- Is this contractor selection approach typical for your firm, or are different strategies used for different kinds of clients and projects?
- Does the process unfold smoothly, or are there bumps in the road?
- When does the discussion about the mode of contractor selection take place?
- Are any other options for project delivery considered, or is the choice obvious?
- Now, arrange to attend a meeting where contractor selection will take place. Write a narrative summarizing the selection process. Was it the same as your original interview revealed? Why or why not?

Prepare a report summarizing your observations on the process and its overall effectiveness.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

AIA   NCARB

Understanding Integrated Project Delivery Terminology in the Construction Phase
Supplemental Experience for eight (8) Elective IDP Hours

In this scenario, you have a repeat client who is very interested in integrated project delivery. The client is aware that your firm has transitioned over to Building Information Modeling capability. The client's favorite contractor has purchased 3-D CAD software, and he has indicated that he would like to be part of an IPD team.

The client calls and asks you to set up a meeting to discuss the possibility of everyone working together in an IPD scenario. She is aware that everyone is not familiar with IPD terminology, and she suggests that the first meeting would be a good time to review the IPD process and terminology. She requests that you send out a memorandum calling for the meeting and to also research an attached list of IPD terms in preparation for the meeting. The list includes the following terms:

- Building information modeling
- Collaborative estimating
- Collocation
- Concurrency
- Continuous design
- Design-assist contracting
- Design structure matrix (DSM)
- Early downstream information user input
- Information dependencies
- Integrated practice
- Integrated project planning
- Integrated project schedule
- Intersection criteria
- Project extranet
- Teaming agreement
- 4-D Modeling
- 5-D Modeling

Activity – Elective

Please reference the following source:
- *Integrated Project Delivery: A Guide*, by AIA National and AIA California Council

View and download the following sample document for reference:
- AIA Document A195™, Standard Form of Agreement Between Owner and Contractor for Integrated Project Delivery

Research the list and prepare a short narrative explaining each term. Realizing that IPD is a developing process, attempt to explain each term by relating it as much as possible to existing processes and terminology.

As you prepare your research, answer the following questions:
- What IPD terms are not on the list?
- What format can I use to make the presentation simple and easy to understand?
- Should I send out the list early for owner and contractor input prior to the meeting?

Prepare a memorandum requesting the meeting and list an agenda for discussion. As you prepare the memorandum, answer the following questions:
- What are the primary topics to be discussed?
- In what order should each attendee speak?
- How can I separate the topics under the categories of owner, architect and contractor?

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

General Project Management

Trying to Understand the Contractor's Point of View
Supplemental Experience for eight (8) Elective IDP Hours

Relationships between the owner, the design team, and the contractor are especially important in sustainable projects. Unfortunately these relationships can become adversarial. Efforts by the contractor can make or break project certification.

The sustainable design process used by the USGBC can be a vehicle for developing relationships based on shared problem solving that can resolve many issues before they fester. Jody Gittell, in her book The Southwest Airlines Way, describes how Southwest Airlines, the most unionized workforce in the airline industry, has developed productive relationships with the unions while other companies have suffered. In this scenario, early in the design process, before the contractor has been selected, the owner and PM are looking at the LEED for New construction checklist. The owner asks the PM about the feasibility of some of the credits that are primarily contractor responsibility.

Would selecting a contractor early help facilitate the LEED process? What can the PM say to support the importance of the owner selecting a contractor early in the process?

Activity – Elective

Please reference the following sources:
- AIA Sustainability webpage: www.aia.org/sustainability
- AIA 50to50: www.aia.org/about/initiatives/AIAS076530
- *LEED Reference Guide for Green Building Design and Construction*. U.S. Green Building Council, 2009. If your company does not have a copy it can be ordered at www.usgbc.org. (Note: the Reference Guide for Public Use and Display that is free to download on their web site does not have the tables you will be using for this exercise.)
- *The Southwest Airlines Way, Using the Power of Relationships to Achieve High Performance*. Jody Hoffer Gittell. 2003, McGraw Hill.

Working with your supervisor or mentor select a local LEED accredited contractor to interview. Interview the contractor to identify processes used to achieve the credits. Use the interview process to learn what contractors bring to the design of sustainable construction projects.

Identify all of the prerequisites and credits that are primarily the responsibility of the contractor by reviewing the "Table 1: Credit Characteristics" in the *LEED Reference Guide for Green Building Design and Construction* (there are 6 total listed on page 2 of the overview of each major category).

Questions you should answer:
- When is best for the contractor to become involved in the project?
- Are any points lost if contractor selection doesn't happen until Construction Documents phase or later?
- How is documentation different from non-LEED projects?
- How does LEED certification affect the value engineering process?
- What outcomes did the contractor like versus ones they didn't like?
- Do they have any lessons learned to share with the design team?

Write a report identifying successful contractor strategies for dealing with sustainable projects, and how the Contractor can help facilitate the design and construction of LEED certified projects.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

AIA   NCARB

Matching Delivery Mode to Client Needs
Supplemental Experience for eight (8) Elective IDP Hours

Client #1

Stratocaster School of Music is a small educational institution. It is governed by an executive director and a board of directors for major decisions and an administrative staff for day-to-day operations. Faculty, staff, students, alumni, and community members are the school's major constituent groups, and each has its own needs and agenda. The school plans to build a performance facility on a prominent site that will have an impact on both the campus and the surrounding neighborhood. The budget, funded by a private gift and alumni contributions, is fixed and too small to accommodate all of Stratocaster's needs, but the board values building function and aesthetics. Nonetheless, the executive director is under pressure from the board to get the facility built as quickly as possible. At the same time, the board is risk averse and thus unlikely to agree to begin construction before overall costs have been determined.

Client #2

Ivana Profit is a real estate developer who seeks the highest return on her real estate investments in the shortest possible time frame. Currently, she has an option to buy a site on which she plans to build an office building. The design will be determined by well-established criteria for commercial real estate development. Aesthetic requirements call for a moderately high level of finish and materials but mostly straightforward detailing. Tenant fit-out will be handled under separate contracts. Profit's finances must be in order before she can close on the property, but she is currently negotiating with a major tenant and has not determined a fixed construction cost. Consequently, Profit is paying for design services with speculative, out-of-pocket funds. As soon as the financing is set, the squeeze will be on for design time and money because Profit will want to get construction under way as quickly as possible.

Client #3

Magneto Systems is a growing automotive parts manufacturer with extensive operations in North America. It maintains a fairly lean in-house facilities engineering division that manages real estate, design, and construction services for manufacturing, administration, and research and development in North America. Magneto plans to build a large manufacturing facility in Malaysia, its first foray into overseas manufacturing. The company is under enormous pressure to get the facility built quickly and to get products manufactured and shipped to its Asian customers. The facilities engineering staff can provide detailed information about their needs, including preliminary drawings and specifications, but they do not have the expertise to manage design and construction overseas.

Activity – Elective

Consider the preceding client types and projects. For each client, determine which mode of project delivery seems most appropriate, and then write a memo describing the most suitable option to the client. Include a discussion of which type of project would be best suited for integrative project delivery. Be sure to include specific reasons the delivery method is best for the client's situation.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

General Project Management

Integrated Project Delivery Team Design
Supplemental Experience for eight (8) Elective IDP Hours

In this scenario, your firm has been selected to join a design and construction team that will use Integrated Project Delivery (IPD). The owner has asked you to be the Integrated Project Coordinator and the prime designer. The construction team will have a prime constructor and trade contractors that will provide cost, schedule and constructability information for the team during the criteria design (expanded schematic design) phase.

The project is a 15 story office tower you have designed in a downtown urban zoning district. To date, you as the prime designer, your engineering consultants and the prime constructor have formed an effective team working through the conceptualization (expanded programming) phase together and staying on the demanding budget and schedule the client has set out for you.

You have just completed a preliminary BIM (Building Information Model) showing the design with a bank of 4 elevators to service all floors of the building. The prime constructor has designated a local elevator trade contractor to provide the team with cost and scheduling information for the proposed design. Upon reviewing the model with the team, the elevator trade contractor hesitates when asked about the current elevator design. He does not agree with the choice of elevator manufacturer you have shown in the model because of the lead times required to deliver the elevator from that manufacturer. The elevator he proposes has a larger cab than the cab you have chosen and requires a larger shaft size. You start to wonder if there is some other issue that is affecting his decision making process about the elevator. If you enlarge the area to accommodate this new cab it will affect other programmed spaces that in turn will force a rethinking of the structural system. This, in turn, will impact the net rentable area negatively.

Ultimately, the team becomes very concerned about how this will impact the owner's financial model and the project in general. In short, you realize this is an issue of money versus time.

Who is right? Which issue should take priority? When do scheduling and constructability issues trump the concerns of the design? What do you say to the client as a team? How does the team resolve this conflict and set priorities for the review process as a team? Should the team replace the trade contractor? Who is going to make the final decision in this type of project delivery environment?

Activity – Elective

Please reference the following source:
  • *Integrated Project Delivery: A Guide*, by AIA National and AIA California Council

Review the above source for IPD principles as the relate to "Criteria Design" (Expanded Schematic Design). Review the outcomes and primary responsibilities for criteria design phase. List the differences between this type of project delivery and traditional design-bid-build during this phase of the project.

List the additional team members that are involved in the project during criteria design and would not be present during a typical schematic design phase.

Outline in memo form how you (as the prime designer) propose to resolve this dilemma regarding the elevators and address the questions posed above.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

AIA   NCARB

Prepare a Staffing Plan
Supplemental Experience for eight (8) Elective IDP Hours

An integral part of the project managers "work plan" is determination of which employees are available to work on the project, what are their capabilities and qualifications, and when and how long are they available. The capabilities and qualifications of the people available to work on the project rarely match the project manager's exact assessment of the needs of the project. An effective project manager will often have to work with the employees that are available, matching their personalities and skills to the assignment at hand, as best they can.

Accordingly, assessing the needs of the project, and arranging for appropriate staff is no simple matter. It is an issue imbued with availability, subjectivity, opinion and sometimes second guessing.

Activity – Elective

Please reference the following source:
- *The Architect's Handbook of Professional Practice*, 14th ed. Chapters 7.2, 7.3, 7.5, 7.6, 13.1, 13.2, and 13.3.

Work with your supervisor or mentor to select a project that will serve as a working exercise in learning to develop a staffing plan. For purposes of this application, much like actual practice, you will prepare an ideal staffing plan without regard to each employee's actual availability. Your primary focus will be to estimate the number and skill set of the ideal project team required to produce the work on your project.

In order to begin preparation of a staffing plan, obtain a copy the staffing/organizational chart template or form used by the firm (or you may use the chart in the *The Architect's Handbook of Professional Practice*, 14th edition, page 705, as a guide). Discuss how the form works in everyday practice at the firm.

Discuss the following questions with the actual project manager:
- What positions are required (draftsperson, job captain, project architect?)
- What levels of experience are necessary for each position?
- What actual employees are ideal for each required position and why?
- Is it appropriate to assign employees to positions requiring more than their current level of experience so they are continuously challenged?

Obtain the firm's resumes for each employee to be considered. As you prepare your staffing plan, answer the following questions on your own:
- Do you agree that they are the right person for your assignment?
- Is the employee's experience commensurate with the experience required?

Compare your draft staffing plan with the firm's actual in place staffing for the project and mark up the differences.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

Integrated Project Delivery Team for a Non-Profit Housing Corporation
Supplemental Experience for eight (8) Elective IDP Hours

In this scenario, you serve as a Member of the Board of Directors for a community based non-profit corporation named Housing for Sale. The Charter for the Corporation includes language that describes the goals for "Housing". Among these goals is a promise to deliver good quality projects that creates below market housing to the community. Also included in the delivery of a project is a promise to bring fair wages to the construction workers and others involved with the project.

The Board has authorized the start of a new 15 story housing project. "Housing" has been considering a particular Architect and General Contractor to team up to deliver the project. They are unsure how the team should be formed and want more information before a decision is made. In the past, Housing has used the Traditional Design-Bid-Build method and on more recent projects, Design-Build. The Board likes that single team approach and quickness of delivery of Design-Build but do not like the lack of control over any of the project aesthetics and detailing once most of the budget is committed and the construction of the project intensifies.

Housing for Sale is a very progressive organization and your friend, the Executive Director, has heard about Integrated Project Delivery or IPD. In fact, the interest in learning more about this has generated much conversation among members of the Board of Directors. They are hoping that this type of project delivery can improve the team aspect of design and construction while allowing the Board to have control over some of the aesthetic decisions that come up later in the project.

The Board has decided that before the Team can be selected, that you and the Executive Director make a presentation to review your understanding of the project, explain to the Board how this type of project delivery would be used for this project, discuss the advantages and disadvantages, and answer any questions they may have. The Executive Director shows his concern about how some of the Board policies could be enacted with IPD being used.

There are three concerns that almost all Board Members share about the project. The first is that Board policy requires open and competitive bidding for all trades. The second is that the project must embrace Fair Labor practices and in particular meet local union wage scales for all work performed. The last item relates to the Board being very proactive at the project level. Since it is a community-based corporation, they are very sensitive to how the overall community receives the project. As a result, the Board is interested in having control over the outcomes of the project.

Is IPD a good method of project delivery for this type of client and project? Or would another mode of delivery suit this project better? How will IPD benefit the project? How does the Owner control the outcomes of the project? How do you add good design to the list of desired outcomes? What is your obligation as a Board Member?

Activity – Elective

3D

Please reference the following source:
- *Integrated Project Delivery: A Guide*, by AIA National and AIA California Council

Review the principles of IPD in the above source as they relate to this situation and project type. Write a report to the Board of Directors with a minimum of 500 words that explains three specific advantages of using IPD for this project. Write a second report (400 words minimum) that addresses the following concerns that the Board has regarding the use of IPD: Competitive Bidding Practices, Fair Labor practices and local union wages, and How the Board will retain control of the outcomes of the project. Share your work with your IDP supervisor or mentor and make suggested changes.

Project Delivery & Firm Direction
Supplemental Experience for eight (8) Elective IDP Hours

While AIA documents provide a solid foundation in traditional project delivery procedures, new alternatives should be explored.

Activity – Elective

Conduct research on recent trends in alternative project delivery approaches, including integrated project delivery. Then interview principals and others to find out what these approaches may mean for the firm's future work. How might alternative delivery strategies affect the firm's:
- alliances and partnerships,
- client base and marketing,
- technologies and quality control,
- hiring and human resource management,
- and liability and insurance needs?

Create a short presentation on the range of project delivery alternatives available, highlighting their usefulness and particular characteristics. Discuss with your project manager if this would make a useful firm-wide lunchtime presentation.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

General Project Management

Understanding Design Development
Supplemental Experience for eight (8) Elective IDP Hours

As an emerging professional, you should have the experience of preparing a set of design development documents, with all the related activities. This process typically includes the following tasks, which often overlap:

- Attend consultant coordination meetings and client meetings.
- Establish final program verification and cost documentation.
- Participate in cost control and value analysis exercises.
- Coordinate and cross-reference documents.
- Identify conflicts between building systems, and coordinate the work of consultants to resolve those problems.
- Ensure that specifications and drawings conform to applicable codes.
- Overall, advance the design of the building, as approved from the schematic design phase.

Activity – Elective

Choose a project in your office or your mentor's office that has recently completed design development and prepare a case study of the activities performed. Speak with the team members, including the project designer, project architect, and project manager. Your overall job in this assignment is to illustrate in graphic format the timeline of this project for the DD phase, showing the various overlapping tasks. Follow the steps below and make a narrative of your findings. The narrative should be a more detailed look at specific changes to systems and functional abilities.

Download a sample copy of AIA Document B101™, Standard Form of Agreement Between Owner and Architect. Review the scope-of-work tasks outlined in AIA contract documents between owner and architect as well as the contract for the project. Do they differ with respect to the scope of services for design development? If so, why?

Speak with one or more technical consultants on the project. How was their work synchronized with that of the architectural team? See if you can add the tasks of some of these team members to the timeline.

Evaluate the timeline, as well as the design development documents. Was there sufficient time to address all of the design development issues, or were some of them addressed during construction documentation?

- What would be the ideal timeline for this project?
- What changes would you have done in DD?
- Keep track of the approximate cost for each design task

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

AIA NCARB

Understanding the Contractor's Involvement in Integrated Project Delivery
Supplemental Experience for eight (8) Elective IDP Hours

The elements of integrated project delivery (IPD) have been evolving for many years. Collaboration between team members has been effectively demonstrated in design/build, fast-track and currently with the building information model.

The contractor's participation in integrated project delivery varies significantly from that in traditional project delivery methods. In order for the architect to effectively utilize IPD he or she must fully understand how and when the contractor is involved as well as their role in the overall process.

The purpose of this exercise is to understand the resources and the benefits that the contractor brings to IPD and how the owner and the architect interact, collaborate, and work as a team to deliver the project.

In this scenario, your supervisor has informed you that your firm has agreed to participate in an integrated project delivery on a small project with a repeat client and a well-known local contractor. You will be providing construction administration services, and you have been directed to become familiar with the contractor's involvement in IPD so that you can eventually set up office policies for the construction phase on IPD projects.

Activity - Elective

Please reference the following source:
- *Integrated Project Delivery: A Guide,* by AIA National and AIA California Council

View and download the following sample document for reference:
- AIA Document A201™, General Conditions of the Contract for Construction

Review the reference documents to understand the relationships between the owner, contractor and architect in integrated project delivery and the differences from a traditional project delivery. Prepare a description of responsibilities of the owner, architect and contractor during the project phases: conceptualization, criteria design, detailed design, implementation documents, agency coordination/final buyout, construction and closeout. As you prepare your work, answer the following questions:
- How does the architect's relationship with the owner differ from traditional project deliveries?
- How does the contractor's involvement with the building design differ from traditional project deliveries?
- What types of collaboration occur between the owner, contractor and architect during the conceptualization phase?

Describe in detail the development of the following contractor issues and prepare a comparative timeline to the overall project delivery:
- Project cost
- Contractor submittals
- Project schedule
- Project buyout

As you address the four items above, answer the following questions:
- How are project costs affected by IPD?
- How is the project time affected?
- How will the architect's submittal review time be affected?

Share your work with your IDP supervisor or mentor and make suggested changes.

3D

When Your Project is Over Budget
Supplemental Experience for eight (8) Elective IDP Hours

Management of the project construction cost budget is complicated, involves many different parties, is an area over which the architect often has little control, and can be intimidating. It is also an area of practice where the architect's opportunities and obligations may be heavily controlled by the owner architect agreement.

Activity – Elective

Please reference the following source:
- *The Architect's Handbook of Professional Practice*, 14th ed. Chapters 12.11 - Value Analysis and Chapter 14.2 - Maintaining Design Quality

View and download the following sample document for reference:
- AIA B101™, Standard Form of Agreement Between Owner and Architect

Meet with your supervisor or mentor to select a medium sized project from your office that has already been constructed and closed out. Obtain PDF files of a completed set of drawings and specifications for study and review. Assume that the following hypothetical events have now occurred on the project:
- Your owner architect agreement is an AIA B101™ that has not been modified.
- The owner has appropriately maintained the budget as required by §6.2.
- The owner has elected to proceed on the basis of § 6.6.4 and 6.7.
- Construction documents have been issued for bids.
- The project has been bid by several contractors, and the client has identified one contractor with whom to negotiate a final construction cost.
- The lowest bona fide bid is 20% over budget.

As you move to the next step of project management answer the following questions:
- What is the definition of construction cost applicable to this circumstance?
- Which owner's budget is the lowest bona fide bid to be compared with?
- What are your responsibilities for revising the design to meet the budget?
- What are your responsibilities for the construction cost?
- Are there options other than § 6.6.4 that the owner could consider?

Prepare a summary of your obligations as the architect for making adjustments to the design in order to comply with the requirements of B101™. Review the plans and specifications and begin preparing a list of design modifications (sometimes called value engineering or value analysis) that could be considered to reduce costs. After you prepare your summary of contract obligations and review the documents, outline a plan of action that addresses the following issues:
- Is it possible to modify the project scope to reduce costs?
- Will it be necessary to reduce the project quality to reduce costs?
- Is the contractor's bid reasonable? Is the architect the appropriate party to determine if the contractor's bid is reasonable?
- What is an effective way to present your suggestions to the client?
- How will redesigning at your own expense affect the firm's profits?

Prepare a report that enumerates your findings. Include a concluding discussion on the challenges of managing a project that is determined to be over budget late in the process.

Share your work with your IDP supervisor or mentor and make suggested changes.

3D

AIA NCARB

Examine Estimating Fees & Consider In-House Estimating Capabilities
Supplemental Experience for eight (8) Elective IDP Hours

In this activity, you will examine how your current firm or your mentor's firm handles cost estimating services and the potential benefits and risks associated with cost estimating services through a consultant and as an in-house service. To do this, have conversations with the firm's principals and managers. Since the vast majority of firms use outside consultants to provide cost estimating services, a cost consultant should also be interviewed. Explain to them that this is an IDP activity to examine issues and not necessarily to recommend a firm wide approach.

Activity – Elective

Begin this activity by interviewing experienced individuals in your firm or your mentor's firm who routinely handle cost estimating services and coordination with cost estimating consultants. Follow up with a cost consultant with experience with the firm. Develop a list of questions and discussion topics in advance so you make the most of your time together. Interview at least one principal, one senior manager and one current cost consultant on the following topics:

- *Experiences:* What has been the general experience working with cost estimating consultants? Has anyone internally prepared a cost estimate for a project? If so, at which stage(s) of the project?
- *Attitudes and inclinations:* What are the attitudes and characteristics of successful cost consultants? What are their attitudes toward working with your firm? Are they more or less comfortable and confident in dealing with specific people? What are the opinions of your firm's staff to cost consultants?
- *Coordination:* How much time is typically invested in coordinating the work of cost consultants in each phase of the project from conception to completion? How is this time spent, by whom and how is it spread throughout internal disciplines and engineering consultants?
- *Communications:* What special considerations or challenges arise in communicating the work, thought, and language of the design team to the cost consultant and vice versa – especially during early project stages? How are work product requirements and schedule communicated?
- *Scope of work:* Which tasks and work scope do cost consultants accept most and which do they tend to oppose? How are unanticipated changes handled?
- *Fees:* How much of the overall fee is typically allocated to cost estimating? Is there interest in your firm to hiring a cost consultant directly and/or conducting some of the work internally?

Examine the files from two projects completed by your firm, and summarize the preparation of estimates, particularly the flow and exchange of information. Review emails, memos, letters, agreements, and other written communications directly involving cost estimates. Examine the actual cost estimate work products for consistency, accuracy and format. Check for end client satisfaction.

Ask to attend several project meetings with cost estimating consultants on a project you are working on. Take notes and ask questions after the meeting.

3D

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

General Project Management

Consultants Who Report Directly to the Client
Supplemental Experience for eight (8) Elective IDP Hours

In this scenario, your firm has been retained to design a large apartment complex. The developer wants to use the same engineers he uses on all his projects. They are not firms with which you have a relationship. The developer wants these firms to be consultants to you, so he can hold you responsible for a completed, coordinated design.

There are problems from the beginning. The consultants have regular, direct design discussions with the client that do not include you or the architecture team. In addition, they are accustomed to providing much less analysis and documentation than you expect from other consultants you work with regularly.

The latest issue is the selection of the structural system. Based on experience with other projects you assumed that the building would use a flat plate concrete slab system with columns and shear walls. Instead, the structural engineer and the owner have decided to use a masonry bearing-wall system with a proprietary concrete plank floor structure. You are convinced that they have not thought through all the implications of using this system. The building will be 10 stories tall, and local contractors rarely use masonry bearing-wall systems for buildings of this height.

This system choice was made between the engineer and the developer before the architects were brought into the discussion. It is early in the design phase, but you can see a pattern developing that will lead to more serious problems in later phases.

Activity – Elective

Please reference the following sources:
- *The Architect's Handbook of Professional Practice*, 14th ed. Chapters 6.2 - Communicating with Clients, Chapter 6.3 - Building Client Relationships, and Chapter 9.1 - Risk Management Strategies

View and download the following sample document for reference:
- AIA B101™, Standard Form of Agreement Between Owner and Architect

Ask your supervisor or mentor to help you arrange an exploratory discussion of the issues with a structural engineer and/or a major masonry contractor. Make notes of your discussions. Answer the following questions:
- What critical issues are involved in building a bearing-wall structure of 10 stories in height?
- Are there likely to be issues about the proposed bearing wall system that will be particularly problematic for the proposed apartment use?
- Is the concrete plank floor structure appropriate for apartment use?

Write a memo to the client outlining your concerns related to the proposed bearing-wall structural system.

As you prepare your studies, answer the following related questions:
- Why shouldn't the structural engineer have private meetings with his client about the project?
- Why should you be concerned that the developer and the other consultants are making design decisions without including you?
- Are their potential liability issues inherent in this scenario?

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

AIA   NCARB

Being the Client's Advocate: Advising of Fast-Track Risks
Supplemental Experience for eight (8) Elective IDP Hours

Architects tend to be and must be advocates for the design team. It is also a tenet of modern practice that architects can benefit in their relationships with their clients if they are advocates for their clients.

Some clients are pleasant to work with and make it easy to advocate on their behalf. Other clients like to point fingers and are more difficult. Nonetheless, all clients are more likely to appreciate your efforts if they believe you are looking out for their interests and concerns.

In this scenario, you are the project manager on a new $30 million lifestyle retail center for one of your firm's best clients. As the project has developed, the client has signed up major new retail tenants. The tenants require certain changes that will take time to make, but they also must be open for business by the major end of summer shopping cycle. These changes will push the project into a fast track design and construction schedule.

Even though this is a repeat client, they are traditionally design-bid-build oriented, and your firm has no fast track experience with them. You've heard war stories of clients asking the architect to pay for mistakes that are virtually inevitable in a fast-track scenario. You resolve to try to educate the client about risks inherent to fast-track.

Activity - Elective

Please reference the following source:
- *The Architect's Handbook of Professional Practice*, 14th ed. Chapter 13.4 - Managing Fast-Track Projects

After reviewing the above source, prepare a report comparing options for discussing the issue of fast-track with the client. Prepare a memo or a letter to the client explaining the risks inherent to fast-track.

As you prepare your report and letter, answer the following questions:
- Can an architect who prepares designs based on assumptions about future issues, ever be entirely accurate?
- How would you respond to an owner who demanded that each fast-track package be complete and completely coordinated with all future packages?
- Should an owner budget the contingency funds to cover the risks inherent to fast-track?
- Can an error, made solely to support the owner's quest for speed, be considered betterment?
- Who benefits most from the owner's quest for speed?
- How does the architect's service as an advocate for her client benefit the architect in this scenario?
- Does the letter or memo help set the client's expectations for the architect's services?

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

General Project Management

Project Management During Construction Phase
Supplemental Experience for eight (8) Elective IDP Hours

Construction administration is one of the most complex and risk intensive areas of architectural practice for the project manager. Duties and responsibilities are defined by contract during this phase of service more so than in any other phase. Some firms augment the project manager with a dedicated construction contract administrator during this phase. Some firms assign the originating project manager to provide the services during this phase.

Many questions about the services to be provided by the architect arise during construction. These questions can generally be answered by a thorough review of the owner-architect agreement and the general conditions of the contract for construction. These documents are not always AIA documents. For this activity we will assume that they are.

Activity – Elective

Please reference the following sources:
- *The Architect's Handbook of Professional Practice*, 14th ed. Chapter 12.5 - Construction Contract Administration

View and download the following sample documents for reference:
- AIA B101™, Standard Form of Agreement Between Owner and Architect
- AIA A201™, General Conditions of the Contract for Construction
- AIA G702™, Application and Certificate for Payment

After reviewing the sources above, prepare an outline report delineating the architect's primary responsibilities during the construction phase as related to means and methods, answering questions about the architect's documents, shop drawings and certification that the work is being constructed in accordance with the contract documents.

As you prepare your report, answer the following questions, and cite the AIA document section that addresses the issue:
- Who is responsible for means and methods of construction?
- Who is responsible for deciding how the Work will be apportioned among the bidders?
- Who is responsible for scheduling and sequencing the Work?
- Is the Contractor responsible for attempting to answer RFIs before they are sent to the Architect?
- Who is responsible for initially checking shop drawings and submittals?
- Who supervises the Work?
- Who sequences the Work?
- Who inspects the Work to determine that subsequent Work can proceed?
- Who initially certifies that the Work is in accordance with the contract documents?
- Who warrants the Work, and to whom is the Work warranted?

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

3D

AIA   NCARB

Professional Liability Insurance/Risk Management
Supplemental Experience for eight (8) Elective IDP Hours

Understanding your contractual responsibilities is paramount to initiating a successful project. There are numerous variations of the services to be provided. Additionally, how a consultant's work is incorporated and how a consultant is contractually obligated to a project can be established in various ways. This activity is to determine what to include in the preparation of a proposal, and most importantly, which consultants will share your liability. Consider the following critical questions:
- Who is the client—who is paying the architectural fee to my firm?
- Is the site location confirmed? Are documents available that legally describe the project site dimensions, elevations, setbacks, right of ways, zoning regulations, and any other restrictions which may apply to the site or the project?
- Has the client contracted with a civil engineer?
- Has the client provided you with a zoning report prepared by a zoning attorney?
- Has the client provided a space program for the project?
- Has a geotechnical investigation been provided for the project site? Has the client contracted a geotechnical consultant?
- What consultants will be required for the project? Will they be contracted to the client or the architect?
- Do I have sufficient information to prepare my proposal, or how must I clearly identify my contractual responsibilities for my work and my consultants' work?

There are many additional questions that apply, but for our purposes we will limit the list to the items above. Consult with peers who have experience in this area, and be sure to consult your legal counsel prior to signing any contract. Gain as much information as possible about a project prior to finalizing your proposal. Be unambiguous about your duties and responsibilities and of your consultants.

Activity – Elective

The client has provided you with a draft of his typical contract for architectural services, used on similar projects and modified for this project. You have received and reviewed the draft contract with your legal counsel and you will meet with the client to review the draft contract. The following contract clauses are presented for your use in the proposed contract for this project:

- The contract has the standard wording related to project schedule, which says the architect will deliver the project by a certain reasonable date. There is also wording which states the architect is responsible for managing all of the consultants on the project, and for the accurateness of their work, and for their work being properly coordinated in the construction documents.
- The architect is responsible for the accurateness of the construction documents for the project in a manner consistent with the degree and skill ordinarily exercised by design professionals practicing in this state.
- The architect is responsible for receiving the shop drawings submissions from the contractor, logging and tracking and distributing the shop drawings to all of the consultants, also for all of the consultant's timely and accurate review of the shop drawings, and for receiving the reviewed shop drawings and returning them to the contractor and other parties.

Write a letter to the owner's attorney identifying the above problem clauses and include the reason why it is a problem for you and a suggest alternate clauses for each.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

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