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DIVISION 6: CONSTRUCTION & EVALUATION

Chapter

49

PRECONSTRUCTION ACTIVITIES

Many of the architect's roles and responsibilities during preconstruction will vary with the type of project delivery system being used. There are five major types of project delivery systems (with some minor variations).

- design-bid-build (or design-award-build)
- construction manager as adviser
- construction manager as constructor
- design-build
- integrated project delivery

Methods of project delivery are discussed in detail in Chap. 3, and general responsibilities of the architect defined in owner-architect agreements are discussed in Chap. 5.

Regardless of the project delivery system, the architect's duties will also include assisting in the selection of a contractor and in controlling costs.

DESIGN-BID-BUILD (OR DESIGN-AWARD-BUILD) PROJECT DELIVERY

The traditional method of completing a project is through the *design-bid-build* method of delivery. The architect designs the project, completes construction drawings, writes specifications, and estimates costs. The contract for the architect's work is typically based on one of the standard AIA owner-architect agreements, and it references AIA Document A201, *General Conditions of the Contract for Construction*, or similar documents to establish the contractual relationships and responsibilities of the parties. With this type of delivery method, the architect's preconstruction responsibilities consist mainly of assisting with the bidding process.

The contract documents are put out to bid, and the successful bidder (usually the firm that has submitted the lowest cost) is awarded the contract. Once the owner-contractor agreement is signed, the contractor constructs the building while the architect provides construction administration services, for which the architect is compensated by the owner.

Competitive bidding is popular with owners because it usually results in the lowest construction cost. However, the bidding must be conducted within clearly defined guidelines that protect the owner from disreputable contractors and unethical bidding practices.

For most public agencies, open public bidding is mandatory. In some jurisdictions, contractors for publicly funded projects can be selected through a *value-based selection* (VBS) process that considers more than just the lowest cost, but also factors such as quality, schedule, and contractor personnel.

In contrast, *negotiation* is the process in which the owner, with the assistance of the architect, works out a final contract price with one contractor. The contractor with whom the owner negotiates may be selected in one of two ways. The owner may already know which contractor he or she wants to complete the project, having worked with the contractor before, through a referral, or by reputation.

Competitive bidding is popular with owners because it usually results in the lowest construction cost.

Alternatively, the owner may select several possible contractors to be considered for the job. Each contractor is interviewed, and one contractor is selected based on qualifications (and possibly a fee proposal).

At the owner's request, the architect may assist with organizing and may participate in the selection interviews and the negotiation process. During the negotiation process, the contractor may point out potential problems, make suggestions, or propose changes to the design or specifications to reduce the cost of the project. If the agreement is negotiated with a general contractor, the subcontracts may still be open to competitive bidding.

Bidding Procedures

Through many decades of practice, the bidding procedure has been standardized and codified in various industry association documents. Everyone involved with the process is expected to know the rules and expectations. This chapter reviews the common procedures and documents used during this phase of the design-bid-build project delivery process. The duties of the architect are given in AIA Document B101, *Standard Form of Agreement Between Owner and Architect*, and in similar agreements.

Prequalification of Bidders

Bidding may be open to any contractor, or it may be restricted to a list of contractors who have been prequalified by the owner. Prequalification is usually based on the following information submitted by contractors.

- financial qualifications
- personnel
- experience
- references
- size of firm
- bonding capability
- any special qualities that make them particularly suited for the project under consideration

When prequalification is allowed in public work, it is usually based on the financial assets and size of the firm. Refer to the section on contractor selection later in this chapter for more information on prequalification.

The purpose of prequalification of bidders is to consider proposals from only those contractors who meet certain standards of reliability, experience, financial stability, and performance. An owner contemplating the construction of a multimillion-dollar laboratory building would likely not review the bid of a contractor who specializes in hotels or in small residential projects. Once all contractors have established that their companies meet the minimum standards needed for the project, the owner is better able to review the contractors' bids based primarily on price, personnel, and completion time.

Advertising for Bids

There are two ways to notify prospective bidders. When any contractor is permitted to submit a bid, an *advertisement for bids* is published in one or more newspapers, trade journals, or online publications. When contractors must be prequalified, the owner may send each selected contractor an *invitation to bid*.

An advertisement for bids is usually written by the architect, and it is typically placed in newspapers or other publications by the architect or owner. It can also be delivered to a physical or online plan room, advertised on the owner's website, or sent to a construction trade association that can distribute the information to its membership through its communications channels.

An advertisement for bids should include the following information.

- the fact that a call for bids is being made
- the project name and location
- the names and addresses of the owner and architect
- a brief description of the project, including building type, size, principal construction materials and systems, and other pertinent information
- when and where bids are due
- how and where bidding documents can be obtained and the deposit required, if any

- where bid documents may be viewed
- the type and amount of bid bonds required
- the procedures for submitting bids
- whether or not the bids will be opened publicly
- other information as needed, such as the owner's right to waive irregularities of the bidding process or to accept bids other than the lowest

Advertising for bids is usually required for public work. These clients may have specific guidelines for the number of times the advertisement must run, publications to which it is to be submitted, and other administrative guidelines. Private work can also be publicly advertised if the bidding is open.

An invitation to bid is sent to prospective, prequalified bidders. The invitation contains the same information that would be included in an advertisement for bids. It may also include a set of drawings and specifications, or instructions for obtaining these from an online plan room. When the list of bidders is limited to prequalified firms, enough bidders should be invited to encourage price competition.

Availability of Bid Documents

Bid documents can be distributed in several ways. Traditionally they are made available in hard-copy format through the architect's office. Each bidder receives the required documents, including prints of the drawings, specifications, bidding documents, bid forms, and other items. It is general practice to require prospective bidders to put down a deposit on each set of documents; the deposit may be refunded when the documents are returned to the architect in usable condition. In some cases the documents are loaned with no deposit required. Extra sets of documents can be purchased by the contractor.

If there is a selected list of bidders, then bidders, subcontractors, and material suppliers can receive and review the documents in one of the following ways.

- The documents may be sent directly to the bidders at no charge.
- Documents may be put on file in a central plan room.
- Documents may be available for purchase at printing companies, plan rooms, or similar places.
- Electronic versions of the central plan room or documents may be available on a project website.

Substitutions

During bidding, many contractors request that substitutions be considered for some of the specified materials. This happens when a project has proprietary specifications or a very limited list of acceptable manufacturers. The conditions under which substitutions will be considered and the procedures for reviewing submissions are clearly defined in the instructions to bidders, outlined later in this chapter.

Addenda

An *addendum* is a written or graphic document, issued by the architect during the bid period prior to the execution of the contract, that modifies or interprets the bidding documents by addition, deletion, clarification, or correction. During the bidding process, questions arise that need answers, errors are discovered, substitutions are made, and the owner or architect decides to make changes. Addenda are the instruments with which to do this

When an addendum is issued, it is transmitted to all registered bidders no later than four or five days before receipt of bids to give the bidders ample opportunity to study it and modify their proposals accordingly.

Pre-bid Conference

On some projects it is advantageous to hold a pre-bid conference. This is a meeting during which the bidders can ask questions and the architect and owner can emphasize important conditions of the project. Pre-bid conferences are particularly useful for renovation or addition projects, as they give the bidders the opportunity to see the existing conditions. On very large projects, there may be separate conferences for mechanical subcontract bidders, electrical bidders, and so on. During these conferences, complete notes concerning the items discussed should be taken, and copies of the notes should be sent to all bidders whether or not they were in attendance. Answers to significant questions received at the pre-bid conference should be formalized in an addendum.

Bid Opening

For public work, bids generally must be opened and read publicly. If the project is owned by a private individual or entity, the owner may choose to open bids privately, at the owner's convenience, and share the bid results at a later time.

The instructions to bidders should state whether bids will be opened publicly or privately; if publicly, the instructions should also include the date, time, and place at which bids will be opened and read.

Unless modified by addenda, the bid opening time and the methods of submitting and receiving the bids should be strictly observed. AIA Document A701, *Instructions to Bidders* states that bids received after the time and date established for receipt of bids must be returned unopened, even if the late bid is delivered before any bids have been opened.

Most public bid openings are conducted by the architect with the owner and bidders present. The bids are read aloud, and the presence or absence of any required supporting documentation is noted. The architect usually prepares a bid log to note the base bid amount, the amounts of alternates (if any), whether receipt of addenda was acknowledged, and other pertinent information. This bid log should be made available to the bidders in both open and private bidding.

When all the bids have been read, the architect thanks everyone for submitting and states that the submissions will be evaluated and a decision of award made within a certain time, usually seven to ten days. The architect should not announce the apparent lowest bid at the bid opening.

Evaluation and Awarding of Bid

The architect and the owner evaluate the bids together. This can include checking references, confirming insurance, rejecting bids with incomplete documentation, and any other review the owner thinks is needed. The architect and owner do not look simply for the lowest proposed contract sum; they also review the prices quoted for alternates, substitutions, lists of proposed subcontractors, qualification statements, and the other documentation required by the instruction to bidders.

The owner has the right to reject any or all bids, including bids that are not accompanied by the required bid bond or other required documentation, and bids that are in any way incomplete or irregular.

If, after the bids have been opened, a bidder discovers and can support the claim that a clerical or mathematical error has been made, the bidder is usually allowed to withdraw the bid. If this proposal was the low bid, the next lowest bidder is accepted.

When the final decision has been made, it should be sent to all the bidders, not just the one to whom the project is awarded.

If all bids exceed the project budget, and the owner-architect agreement fixes a limit on construction, the owner may take one of four possible courses of action.

- The owner may rebid the project. This requires the architect to assist in the process a second time with no additional compensation. Rebidding a project without revising its scope or details, however, will seldom result in any significant reduction in cost unless the bidding marketplace is changing rapidly.
- The owner may authorize an increase in the construction cost and proceed with the project.
- The owner may work with the architect in revising the scope of the project to reduce construction cost. This requires the architect to redesign and revise the documents and then rebid the project with no additional compensation.
- The owner may abandon the project.

Alternates are often used as a flexible method of deleting or substituting alternative materials or construction elements to help reduce costs. Because the alternates are priced along with the base bid, the owner and architect can quickly estimate the ramifications of selecting certain alternates.

Bidding Documents

The architect usually prepares bidding documents using standard AIA forms or forms provided by the owner. Clients who engage in a great deal of building may develop their own forms and procedures, but they are typically similar in content to the AIA forms. If the architect is not familiar with the form or document that the client plans to use, the architect should review it carefully to confirm the responsibilities that may be assigned.

Although the bidding documents are bound into the project manual, they are not part of the contract documents.

The bidding documents usually include the following.

- the advertisement or invitation to bid
- instructions to bidders
- supplementary instructions to bidders (if any)
- bid forms
- bid security information
- performance bond, if required
- labor and material payment bond, if required

Other documents that are sometimes added are qualification forms, a proposed subcontractor list form, certificates of insurance, certificates of compliance with applicable laws and regulations, and additional information available to bidders, such as geotechnical data.

In addition to the bidding documents, the bidding package also includes the drawings, specifications, general and supplementary conditions of the contract, special conditions (if any), addenda issued prior to the receipt of bids, and the form of agreement between owner and contractor.

Advertisement for Bids or Invitation to Bid

These are discussed earlier in this chapter. The advertisement for bids or invitation to bid is printed and bound into the project manual with the other bidding documents.

Instructions to Bidders

The *instructions to bidders* outline the procedures and requirements that the bidders must follow in submitting bids, how the bids will be considered, and submittals required of the successful bidder. AIA Document A701, *Instructions to Bidders* is often used; other organizations produce similar forms.

Instructions to bidders normally include the following items. (If the AIA form is being used and additional requirements must be included, it is suggested that supplementary instructions to the bidders be written; do not modify or rewrite the AIA form.)

- *bidder's representations.* In making a bid, the bidder represents that the documents have been read and understood, the plans and specifications have been reviewed, and the site has been visited to familiarize the bidder with the conditions under which the work will take place. It is also implicit that the bidder understands that the bid is based on the materials, equipment, and systems required by the bidding documents, without exception.
- *bidding documents.* This article of the Instructions to Bidders states where the documents may be obtained, how many sets the bidders may have, and the amount of deposit, if any, required to obtain the documents. If the documents are returned to the architect in reusable condition within 10 days after receipt of bids, the deposit is usually returned. The cost of replacing any missing or damaged documents is deducted from the deposit. The bidder who is awarded the contract may keep the documents, and the bidder's deposit is returned. Bidding documents are not normally issued directly to sub-bidders unless specifically stated in the advertisement or invitation to bid.
- *interpretation or correction of bidding documents.* This article requires the contractor to carefully study the documents and examine the site and local conditions, and to report to the architect any errors, inconsistencies, or ambiguities discovered. If the bidders or sub-bidders need clarification or interpretation of any of the information in the bidding documents, they must make a written request to the architect at least seven days prior to the bid date. The architect must then issue any interpretations or corrections by an addendum, which is sent to all bidders. Bidders must acknowledge receipt of all addenda on the bid form.
- *substitutions.* The materials and products described on the drawings and specifications establish a standard for the work. If the bidder wants to propose a substitution, it must meet this standard. A bidder is required to submit a request for approval of a proposed substitution at least 10 days prior to the bid opening date. The request must include the name of the material or equipment for which the substitution is submitted, along with complete backup information about the proposed substitution. The bidder must prove the merit of the substitution. The architect then reviews the submission and may either reject it or approve it. If approved, the architect issues an addendum stating this fact and sends it to all the bidders. No substitutions can be considered after the contract award.
- *addenda.* According to the Instructions to Bidders, addenda must be transmitted to all bidders and made available for inspection wherever bidding documents are on file for that purpose. Addenda must be issued no later than four days prior to the date of bid opening. Addenda are discussed in more detail earlier in this chapter.
- *bidding procedures.* This article specifies how the bid form is to be completed, what kind of bid security will accompany the bid, and the procedure for submitting the bid. Bids are normally submitted in sealed envelopes, with the name of the party receiving the bid on the outside, along with the project name and the name of the entity submitting it. (Bid security is discussed later in this chapter.)
- *modification or withdrawal of bid.* Bids may not be modified after the designated bid time and date. Before that time, however, a bid may be modified or withdrawn by making notice in writing over the signature of the bidder. Writing over the signature confirms that the bid has been modified or withdrawn so that the original bid cannot be used. The person receiving bids must date- and time-stamp the request. Withdrawn bids can be resubmitted if they are in full conformance with the Instructions to Bidders.

- *consideration of bids.* The procedure for opening bids and reviewing them is explained in this article, including under what conditions bids may be rejected, how they will be evaluated, and conditions for award of the contract. The owner has the right to reject any or all bids and to accept alternates in any order or combination and to determine the low bidder on the basis of the sum of the base bid and alternates accepted.
- *post-bid information.* After the award of the bid, the contractor submitting the low bid must submit to the architect AIA Document A305, *Contractor's Qualification Statement*, unless it has already been submitted as part of the bidding process. The contractor must also furnish to the owner the following.
  - a summary of the work to be performed with the contractor's own forces
  - the names of the manufacturers, the products, and the supplier of the principal items proposed for the project
  - the names of persons or companies proposed to perform major portions of the work
- If requested by the successful bidder, the owner must furnish the bidder with reasonable evidence that the financial arrangements have been made to fulfill the owner's obligations. This must be done no later than seven days prior to the expiration of the time for withdrawal of bids.
- *performance bond* and *payment bond.* The required bonds and the time during which they must be delivered are outlined in this article. Normally, the cost of bonds is included in the bid price, unless the bonds are specifically required to be furnished after the receipt of bids and before execution of the contract. Performance and payment bonds are described in more detail later in this chapter.

Bid Forms

To ensure that all bids will be in an identical format, there should be a standardized form on which each bidder enters the required information. This makes it easier for the owner and architect to compare and evaluate the bids. The bid form should contain space for the amount of the base bid written in both numbers and words, the prices for any alternates or substitutions, the proposed unit prices (if any), and the number of calendar or work days in which the bidder proposes to complete the work. Space should be provided for the bidder to list and acknowledge receipt of any addenda. The bid form must be signed by someone legally empowered to bind the contractor to the owner in a contract and often includes a space for a corporate seal.

Bid Security

Bid security is required to ensure that the successful bidder will enter into a contract with the owner. Bid security may come in the form of a certified check, cashier's check, or bid bond. If the successful bidder does not enter into an agreement, the bid security may be retained to compensate for the difference between the low bid and the next lowest bidder. The amount of the bid security is either set as a fixed price or as a percentage of the bid; it is usually about 5% of the estimated cost of construction or the bid price.

Performance Bonds

A *performance bond* is a statement by a surety company that obligates complete construction of the project in the event that the contractor defaults on his or her obligations. If this happens, the surety company may complete construction by hiring another contractor, or it may simply supply additional money to the defaulting contractor to allow construction to proceed.

Performance bonds are usually mandatory on public work and are advisable on private work. The cost of the performance bond is paid by the owner and usually included in the amount of the construction price. The architect or owner must verify that the bond is written by a surety qualified to issue bonds in the particular state where the construction is to take place. Some states will not accept surplus-lines carriers who are based in a different state. In such cases the bond may be invalid.

Labor and Material Payment Bonds

Although a performance bond ensures the completion of the contract, it does not guarantee payment for labor and materials to suppliers, employees, or subcontractors by the defaulting contractor. As a result, if the general contractor defaults, subcontractors and material suppliers could file liens against the property or sue the owner to obtain compensation. Because of this, a labor and material payment bond is usually required along with a performance bond to protect the owner against these possibilities.

Example 49.1

With which kind of project delivery method are the architect's duties and responsibilities during preconstruction most limited?

(A) construction manager as adviser

(B) design-bid-build

(C) design-build

(D) integrated project delivery

Solution

When the integrated project delivery method is used, the architect's responsibilities are more limited than in the other three methods because the bidding or negotiation for large portions of the work has already been done. The architect is still responsible for working with permitting agencies to ensure code compliance, answering questions from subcontractors and vendors bidding for relatively small portions of the work, and reviewing prefabrication studies.

The answer is (D).

CONSTRUCTION MANAGER AS ADVISER

As described in Chap. 3, the owner may elect to use a construction manager (CM) to assist in project delivery. The CM can fulfill the following roles and duties.

- advising on constructability issues
- providing cost estimating
- establishing the project schedule
- managing the construction contracts
- making early material purchases of items with long lead times
- acting as a third-party adviser, working with the owner and architect on matters of constructability and cost
- acting as contractor, giving preconstruction advice, estimating cost, scheduling services, and construction services
- acting as agent, coordinating and assisting the activities of the owner, architect, and contractor

It is less common for the CM to act as agent than as adviser or constructor.

When the owner uses a CM as adviser, the responsibilities of the architect are governed by AIA Document B132, *Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition*, which is used along with AIA Document A132, *Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition*, AIA Document A232, *General Conditions of the Contract for Construction, Construction Manager as Adviser Edition*, and other documents in this family. The owner has the option to retain a construction manager and complete the project with either one contractor or with multiple prime contractors. Under AIA Document B132, the roles and responsibilities of the architect during

preconstruction are similar to those under the traditional design-bid-build project delivery method with the following exceptions.

The architect works with the CM during the design phases as the CM develops the cost and schedule of the project and advises on matters of constructability; providing cost estimates is not part of the architect's services under AIA Document B132. The architect submits a schedule of the design services for inclusion in the overall project schedule to the owner and CM. The architect also prepares schematic design documents and reviews them with the owner and CM, who uses these as a basis for a preliminary cost estimate. In developing a design that meets the owner's requirements, the architect must consider the owner's and CM's suggestions for alternative materials building systems, and other considerations based on the program and aesthetics. This process continues during the design development phase. The architect prepares and submits outline specifications that identify major materials and systems and establish their quality levels, and the CM adjusts the cost estimate to reflect this additional information.

If the CM's estimate of the cost of the work exceeds the owner's budget prior to the conclusion of design development, the architect must consult with the CM and make appropriate recommendations to the owner to adjust the project's size, quality, or budget. The owner must cooperate with the architect to make the necessary adjustments.

If the CM's estimate at the conclusion of design development exceeds the owner's budget, the owner has three options.

- give written approval to increase the budget for the project
- revise the project program, scope, or quality as required to reduce the cost
- implement any other mutually acceptable alternative

If the owner decides to revise the program, scope, or quality, the architect must incorporate the needed modifications in the construction documents phase to comply with the owner's budget without additional compensation. After the owner has approved the design development documents and made any adjustments in the project requirements and budget, the architect proceeds to complete the construction documents as with the traditional design-bid-build approach.

Once construction documents are completed the project can either be sent out for competitive bidding or the contract can be negotiated with a qualified contractor. If the project is bid, the roles and responsibilities of the architect are similar to those described in the previous section on design-bid-build projects. If the project is negotiated, the architect assists the owner and CM by facilitating the reproduction of proposal documents, participating in selection interviews with prospective contractors, and aiding in negotiations with prospective contractors. After the contractor is selected, the project proceeds through construction as with the traditional design-bid-build process, and the architect and CM provide construction administration services as defined in AIA Document A232 and discussed in Chap. 3.

The major differences between the CM as advisor and the CM as constructor, described later in this chapter, are that multiple prime contractors may be used, there is no guaranteed maximum price set by the CM, and bidding or negotiation is used to set the final cost of the project.

CONSTRUCTION MANAGER AS CONSTRUCTOR

When the owner chooses to hire a construction company that also provides construction management services, the responsibilities of the architect are generally governed by AIA Document B133, *Standard Form of Agreement Between Owner and Architect, Construction Manager as Constructor Edition*. AIA Document B133 is intended to be used with AIA Document A201, *General Conditions of the Contract for Construction*.

Under this agreement the roles and responsibilities of the architect during preconstruction are similar to those under the traditional design-bid-build project delivery method with a few exceptions. Most notably, the architect must work with the construction manager (CM) during the design phases as the CM develops the cost and schedule of the project and advises on matters of constructability; providing cost estimates is not part of the architect's services under AIA Document B133. The architect submits to the owner and CM a schedule of design services for inclusion in the overall project schedule. The architect

also prepares schematic design documents and reviews them with the owner and CM; the CM uses these as a basis for beginning to establish a proposal or cost estimate.

In developing a design that meets the owner's requirements, the architect must consider the owner's and CM's suggestions for alternative materials, building systems, and other considerations based on the program and aesthetics. This process continues during the design development phase with the addition of outline specifications that identify major materials and systems and establish their quality levels.

If the CM's estimate of the cost of the work exceeds the owner's budget prior to the conclusion of design development, the architect must consult with the CM and make appropriate recommendations to the owner to adjust the project's size, quality, or budget. The owner must cooperate with the architect to make the needed adjustments.

If the CM's estimate at the conclusion of design development exceeds the owner's budget the owner has three options.

- The owner may give written approval to increase the budget for the project.
- The owner may revise the project program, scope, or quality as needed to reduce the cost.
- The owner may implement any other mutually acceptable alternative.

If the owner decides to revise the program, scope, or quality, then in the construction documents phase the architect must incorporate the modifications needed to comply with the owner's budget. The architect receives no additional compensation for this. After the owner has approved the design development documents and made any adjustments in the project requirements and budget, the architect proceeds to complete the construction documents as with the traditional design-bid-build approach.

Under the owner construction manager as constructor agreement, the basis of payment is the cost of the work plus a fee, either with or without a guaranteed maximum price. At a time mutually agreed on by the owner and CM, the CM prepares either a guaranteed maximum price proposal or a control estimate for the owner's review and acceptance. This can be anytime during one of the design phases. At this point, the architect assists the owner in reviewing the CM's proposal or estimate. During this review, the architect is not responsible for discovering errors and omissions or for the assumption of any of the CM's responsibilities, but if the architect discovers any inaccuracies the owner and CM should be promptly notified.

DESIGN-BUILD

When the owner uses a design-build approach to project delivery as described in Chap. 3, and the architect serves as a consultant to the design-builder, the responsibilities of the architect are governed by AIA Document B143, *Standard Form of Agreement Between Design-Builder and Architect*. Under this agreement, the roles and responsibilities of the architect during all phases of the project, including preconstruction activities, are defined in an exhibit to the agreement.

The design-builder, architect, and owner select services from a list which the architect will provide. For example, the architect may contract with the design-builder to provide design services only, while the design-builder provides construction procurement and construction administration services. In this case, the architect would have no roles or responsibilities related to bidding or negotiation. In contrast, if the architect and design-builder agree that the architect will provide construction procurement services, then the architect's duties would be the same as with a traditional design-bid-build approach.

If the proposed cost of the work for the architect's portion of the project exceeds the lowest bona fide bid or negotiated proposal, the design-builder has four options.

- The design-builder may give written approval of an increase in the budget for the architect's portion.
- The design-builder may authorize rebidding or renegotiation.
- The design-builder may terminate the agreement with the architect.

- The design-builder may cooperate in revising the project scope and quality as needed to reduce the cost of the work for the architect's portion of the project.

If the design-builder elects to use this last option, then the architect must modify the documents for which the architect is responsible, as directed by the design-builder, without additional compensation. If the design-builder is an architectural firm or a contracting firm with in-house architects, the design-build entity becomes responsible for preconstruction activities as well as all other services.

Example 49.2

In addition to making a base bid for a project as specified, each contractor is asked to state how much less his or her bid will be if eight large twin windows shown in the plans and elevations are replaced with smaller casement windows. This is an example of the use of

(A) add alternates

(B) allowances

(C) deduct alternates

(D) reduction

Solution

A request that the contractor supply, in addition to a base bid on the project as specified, a price for some variation, such as a change in materials or in some component of construction, is called an *alternate*. When the alternate will lead to a reduction in the bid, it is a *deduct alternate*.

The answer is (C).

INTEGRATED PROJECT DELIVERY

When the owner uses an integrated project delivery (IPD) approach as described in Chap. 3, the responsibilities of the architect are defined by various AIA documents depending on what type of approach is being used.

- transitional forms
- multi-party agreements
- a single purpose entity

If transitional forms are used, the main documents governing the architect's involvement during preconstruction are AIA Document B195, *Standard Form of Agreement Between Owner and Architect for Integrated Project Delivery* and AIA Document A295, *General Conditions of the Contract for Integrated Project Delivery*.

With any of these three approaches, the roles and responsibilities of the architect during preconstruction are fairly limited. In IPD terms, preconstruction is the phase that includes agency review and buyout.

Agency review includes the standard building code check by the authority having jurisdiction (AHJ) as well as any other reviews by permitting agencies. IPD encourages early involvement by permitting agencies. If building information modeling (BIM) data can be shared with the agency, this review is streamlined and may employ the use of electronic plan checking and analysis software. The architect's role during this phase is limited to working with agency representatives to ensure code compliance and coordinating any questions or communication issues related to the building information model.

Buyout is the process of selecting suppliers and finalizing prices from any remaining subcontractors and vendors that are not part of the IPD process. There is no major bidding or negotiating in the traditional sense because the prime contractor, major subcontractors, and major vendors have already been selected and have priced out their portion of the work. The architect may be required to answer questions from the remaining bidders and review prefabrication studies to ensure the integrity of the design intent. The

architect may be also be involved in the remaining bidding or negotiation efforts, but the contractor and owner are generally responsible for finalizing these arrangements prior to the start of construction.

CONTRACTOR SELECTION

The architect is often placed in the role of assisting with the selection of the contractor when the project is privately funded, or when the project is publicly funded and the local jurisdiction allows a value-based selection process, as mentioned previously. When the project delivery process for a public sector client is based strictly on the design-bid-build method, the contractor is commonly selected based solely on submission of the lowest bid.

In addition to cost, the architect should consider the following criteria when assisting with the selection of a contractor.

- previous experience in the project type being built
- references from past clients
- experience of personnel
- sufficient personnel to complete the project
- financial qualifications, including responsibility and past experience
- bonding capacity for types of bonds required
- ability to obtain the insurance required by the project
- history of past claims or other types of disputes
- history of work with subcontractors and vendors
- history of ability to complete jobs on time and on budget
- knowledge and experience with special construction methods, if required
- possession of special licensing or certification if required by the project

In addition to personally interviewing contractors the architect and owner can use AIA Document A305, *Contractor's Qualification Statement*, to gather the same information from a number of potential contractors. The contractor can use this document to provide a sworn, notarized statement with appropriate attachments to verify the contractor's capabilities.

COST CONTROL

The cost of a project is one of the most important concerns of the owner, and in the case of design-bid-build project delivery, the architect is obligated by contract to provide cost estimates and design a project to meet the owner's budget. Techniques for providing cost estimates during the various phases of a project and with different project delivery methods prior to preconstruction are discussed in Chap. 10 and Chap. 30.

Cost Control in Design-Bid-Build Project Delivery

With a design-bid-build project delivery method, the architect has limited ability to adjust project costs. Throughout the design process and up to completion of contract documents, the construction cost is only an estimate prepared by the architect or by a cost-estimating consultant on the architect's behalf. It is only with bidding or negotiation that the owner receives a firm price on the project. If the architect or cost consultant has been doing a reasonable job of tracking design changes and has a good idea of component costs, the bid price should be fairly close to the estimated amount.

The architect does not (and cannot) guarantee that the final construction cost will not vary from the estimate, because there are several variables that can affect the final bid price.

Bidding in the Marketplace

Bidding is a competitive activity. The price a contractor is willing to submit to an owner is dependent on the following variables.

- actual cost of subcontractor bids
- cost of the contractor's own labor and materials
- cost of equipment rental
- the contractor's indirect costs
- overhead
- profit

Bidding is also affected by the construction marketplace, which is itself competitive. For example, if the local economy is depressed, contractors, subcontractors, and material suppliers may be willing to lower prices or reduce profit margins in order to get work and stay in business. When work is plentiful, contractors are more selective about the jobs they choose to bid on and what profit allowance to put in their bids. They are not as concerned about reducing prices to get jobs.

Both the architect and owner should be sensitive to these types of market conditions. If there is some flexibility in the owner's schedule, it can be advantageous to either delay or accelerate design and bidding to match favorable market conditions.

Effects of Documents on Bids

One of the variables over which the architect and owner have control is the quality of the set of contract documents. What they contain and how they are put together, beyond the amount and quality of construction they represent, can affect the amount of bids they receive.

Poorly prepared drawings and specifications can raise questions in the mind of the contractor about what is specifically required, what may be implied or omitted. To cover possible unforeseen items, the contractor may add extra money in the bid to cover these unknowns. A complete and clearly coordinated set of documents gives the contractor confidence in the scope and quality of the work. The contractor can then bid with more confidence and include only those items shown. If a building information model is used and made available the contractor may have even more confidence, because BIM makes it possible to run coordination checks and find other problems before construction starts.

Alternates

An *alternate* is a request included in the bidding documents asking the contractor to supply a price for some type of variation from the base bid. This may be a change in materials or level of quality of a material, a deletion of some component, or the addition of some construction element. For example, the base bid may include carpet as a floor covering, whereas an alternate may be to substitute wood flooring for the carpet.

Alternates allow the owner some flexibility in modifying the cost of the project once the bids are in, by varying the quantity or quality of the project. Alternates also allow the owner to make certain decisions based on firm prices rather than on preliminary estimates. However, alternates seldom significantly lower the total cost of the project at bidding, because they generally represent a small percentage of the large cost items such as structure, mechanical systems, and cladding.

An alternate is called an*add alternate* if it adds to the base bid, and a *deduct alternate* if it reduces the base bid amount. Because alternates require more time for both the architect and bidders to prepare, they should be used carefully and should not replace conscientious cost estimating and reasonable design for the base bid amount.

When bids are evaluated, the selected alternates should be considered in deciding the lowest overall bid, but alternates should not be manipulated to favor one bidder over another.

Unit Prices

Unit prices are set costs for certain portions of work, based on an individual quantity. When required, they are listed on the bid form and provide a basis for determining the cost of changes to the contract. For example, if the full extent of paving is unknown at the time of bidding, a square-foot cost for asphalt paving may be requested. Even though the total cost may not yet be known, the unit costs of the bidders can be compared.

If unit prices are used when work is deleted from the contract, the amount of credit is usually less than the price for an additional quantity of the same item. Spaces should be provided in the bid form to add and deduct amounts when applicable.

Allowances

As described in Chap. 5, an *allowance* is a set amount of money estimated by the architect to cover a particular material or piece of equipment when the cost for that material or equipment cannot be determined precisely at the time of the bid or negotiated proposal. For bidding, an allowance provides a way to allocate some amount of money for an item in the bid, even if the exact quantity or quality of the item is not known. The allowance (or allowances) is stated in the appropriate section (or sections) of the specifications, so all bidders are using the same amount in their bids. The contractor must add to the allowance the cost for unloading, handling, and installing the item as well as costs for the contractor's overhead and profit. If the costs for the allowance are more or less than the original estimate, the contract sum is adjusted accordingly by change order.

Value Engineering

Value engineering (VE), or *value analysis*, can be used prior to bidding, or even after, but it is considered an additional service if the owner hires a value analysis consultant (per AIA Document B204). VE is best used earlier in the design process. See Chap. 30 for a discussion of VE.

Cost Control in Construction Management Project Delivery

When a project has a construction manager, the architect does not have direct responsibility for estimating or guaranteeing construction costs. Under AIA Document B133, the architect works with the CM to meet the project budget and considers requests for substitutions. The architect provides clarifications or interpretations regarding the drawings and specifications prior to the owner's acceptance of the GMP or control estimate. In addition, the architect assists the owner in reviewing the GMP or control estimate after the CM has provided these to the owner.

Cost Control in Design-Build Project Delivery

The extent to which the architect is involved in project cost control during preconstruction is based on the scope of services agreed to under the design-builder–architect agreement, AIA Document B143. It is possible that the architect will not have been contracted to provide any type of estimating services. However, AIA Document B143 may call for the architect to provide an evaluation of information furnished by the design-builder, including the budget for the cost of the work for the architect's portion of the project.

Alternatively, an estimate for the architect's portion of the work may need to be prepared. Under AIA Document B143, if the project is bid the architect may be required to provide assistance to the design-builder with bidding services. In this case, the architect would be providing services similar to those described by the design-bid-build approach.

The design-builder may be paid by the owner based on either a stipulated sum, the cost of the work plus fee, or the cost of the work plus fee with a guaranteed maximum price. If the design-builder contracts with an architect, the architect's work should align with the design-builder's cost commitment to the owner, because the two entities are working together throughout the design process. However, if the estimated cost for the architect's portion of the project exceeds the budget after construction documents are completed, the design-builder has four options, as previously outlined. If the design-builder chooses

to revise the project scope and quality to reduce costs, the architect must modify the documents for which the architect is responsible without additional compensation.

Cost Control in Integrated Project Delivery

Under an integrated project delivery method, the architect has very little ability to adjust project costs during preconstruction. However, such adjustments are generally unnecessary because of the contractor's input and the method by which the design is developed. At this stage, the contractor has already provided the owner with a guaranteed maximum price after the owner's acceptance of the detailed design documents (design development documents in traditional terms). If changes or substitutions need to be made to maintain the GMP, the architect will incorporate these into the implementation documents (construction drawings and specifications).

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CONSTRUCTION ADMINISTRATION

Construction of the project is the culmination of a great deal of planning, design, documentation, and organization and one of the most important phases of project delivery. The architect should be closely involved with this phase of the project to the extent of his or her contractual responsibilities. During this phase, the architect is responsible for the following areas.

- project delivery methods and construction administration services
- meetings and administration activities
- construction observation
- managing requests for changes in the work and supplemental documentation
- submittals and applications for payment
- ensuring conformance with contract documents
- additional construction administration activities

PROJECT DELIVERY METHODS AND CONSTRUCTION ADMINISTRATION SERVICES

The extent of the architect's participation and responsibility is governed by contractual requirements, which, in turn, are dependent on the type of project delivery method being used. The roles and responsibilities of the architect described in this chapter are based on the traditional design-bid-build method of project delivery under AIA Document B101, *Standard Form of Agreement Between Owner and Architect*, and AIA Document A201, *General Conditions of the Contract for Construction*. See Chap. 5 for a discussion of the architect's duties enumerated in these two documents.

Variations of these responsibilities for other types of project delivery methods are briefly described in this section.

Construction Manager as Adviser

The architect's roles and responsibilities under AIA Document B132, *Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition*, and AIA Document A232, *General Conditions of the Contract for Construction, Construction Manager as Adviser Edition*, are similar to those under a traditional delivery method, with some exceptions.

- The architect and construction manager (CM) jointly provide administration of the contract. AIA Document B132 requires that the architect "advise and consult with the owner and construction manager."
- The architect reports to the CM results of site visits, but the CM also has a representative at the site and reports to the architect any known deviation from the contract documents and schedule and any defects and deficiencies observed in the work.
- Unlike the traditional delivery method, the owner and contractor communicate through the CM with copies to the architect. Communications with the architect's consultants still go through the architect.
- Both the architect and CM have the authority to require inspections and testing and to reject work.
- Submittals are reviewed by both the CM and architect.
- The CM, not the architect, prepares change orders and construction change directives. Change orders must be signed by the CM as well as by the architect, owner, and contractor.
- The CM receives and reviews requests for information from the contractor and forwards each to the architect with the CM's recommendation. If necessary, the architect prepares and issues supplemental drawings and specifications in response to requests for information.

The architect remains the initial decision maker on claims between the owner and contractor.

Construction Manager as Constructor

When the project is being delivered with a CM as constructor method, the architect's roles and responsibilities are almost identical to those assigned with the traditional design-bid-build method. In this case the CM is really serving as the standard "contractor." In fact, AIA Document B133, *Standard Form of Agreement Between Owner and Architect, Construction Manager as Constructor Edition*, is intended to be used in conjunction with AIA Document A201, *General Conditions of the Contract for Construction*. There are three main differences to note.

- The architect must advise and consult with both the owner and construction manager during construction.
- Under AIA Document B101, the owner-architect agreement, the architect's start of construction phase services commences with the award of the contract for construction. Under AIA Document B133, however, the architect's responsibilities for the construction phase begins with the owner's acceptance of the CM's guaranteed maximum price (GMP) proposal, the owner's approval of the CM's control estimate, or the owner's issuance of a notice to proceed.
- Applications for payment are still submitted to the architect by the CM for the architect's review and signature. The CM issues the certificate for payment to the owner, but a more complex method is used to calculate the amount of each progress payment. This method is described in detail in AIA Document A133, *Standard Form of Agreement Between Owner and Construction Manager as Constructor.*

Design-Build

When the owner uses a design-build approach to project delivery as described in Chap. 3 and the architect serves as a consultant to the design-builder, the responsibilities of the architect are governed by AIA Document B143, *Standard Form of Agreement Between Design-Builder and Architect*. Under this agreement, the roles and responsibilities of the architect during all phases of the project, as well as construction administration activities, are defined in an exhibit to the agreement. The design-builder, architect, and owner select from a list of services that the architect will provide. These construction administration services may include the following. The exact language of each provision is essentially the same as the descriptions of the tasks included in AIA Documents B101 and A201.

- provide administration of the contract for construction between the design-builder and the contractor for the *architect's portion of the project*. This consists of all elements of the project designed or specified by the architect.
- review requests by the contractor for additional information about the contract documents and issue necessary supplemental drawings and specifications to clarify the requirements.
- make site visits on behalf of the design-builder to determine the progress of the job, to endeavor to guard the design-builder against defects, and to determine if the work is meeting the requirements of the contract documents. These site visits are to review and comment on the architect's portion of the project only.
- reject work that does not conform to the contract documents and, if necessary, require inspection or testing of the work.
- review the contractor's applications for payment and make recommendations for payment to the owner as needed.
- review and approve submittals for the architect's portion of the project.
- review and prepare proposed change orders and construction change directives.
- issue orders for a minor change in the work.
- make the substantial completion observations.
- process the final payment request.

- receive from the contractor and forward to the design-builder various documents, including the consent of surety for release of retainage, affidavits, receipts, releases, waivers of liens or bonds indemnifying the owner and design-builder against liens, written warranties, and other documents required by the contract documents.

When one or more services are selected, the architect provides the service in the same way as with a traditional design-bid-build project delivery method. See Chap. 5 for a more detailed discussion of these services.

If the architect is in the employ of the design-builder, then all services provided by the architect fall under the umbrella of services provided by the design-builder. These follow the traditional construction administration activities of the architect, but the architect isn't mentioned specifically. For example, periodic requests for payment are made by the design-builder directly to the owner instead of to the architect.

Integrated Project Delivery

With this type of project delivery method, once the project reaches the construction phase, the architect's roles and responsibilities are basically the same as those under AIA Document A201. This is true with transitional documents, a multi-party agreement, and a single purpose entity (SPE) agreement. The architect's tasks in the construction administration phase focus on quality control and cost monitoring because so much of the design and coordination work has been done prior to this phase. In theory, there should be fewer on-site problems or requests for information because all parties have been involved in resolving issues during the detailed design and implementation documents phases.

MEETINGS AND ADMINISTRATIVE ACTIVITIES

One of the key elements of successful contract administration, and project management in general, is good communication. One of the most useful tools for facilitating communication between all team members is the face-to-face meeting. Two types of construction meetings are especially important: the preconstruction conference and the periodic project meeting.

Preconstruction Conference

The construction phase of a project should begin with a preconstruction conference. For a traditional design-bid-build project, the architect is responsible for organizing and conducting the meeting. The conference should be attended by the architect, owner, personnel from the contractor's office who will be responsible for the project (project manager, supervisors, etc.), major subcontractors, design consultants as required (structural, mechanical, electrical), and any other participants whose involvement the architect deems important.

The agenda should include the following

- how communications will be handled
- construction and submittal schedules
- access to the site and restrictions on site usage, including parking, security, and use of or provision of resources such as restrooms, electricity, temporary heat, phones, and space for a construction office or trailer
- insurance requirements
- submittal requirements
- procedure for requests for information
- changes in the work
- nonconforming work
- sustainability requirements

- site visits by the architect and others
- reporting required by the contractors
- tolerances required for critical elements
- separate contracts by the owner
- partial occupancy
- coordination among the contractors

Project Meetings

Project meetings may be organized by the architect, contractor, or owner, but they are typically organized by the architect. Project meetings should be attended by the architect, design consultants as required, the contractor or contractor's representatives, major subcontractors if required, and any specialty sub-subcontractors or vendors whose attendance is vital for the progress and successful completion of the work. The owner may be required to attend some of these meetings as well. The architect's project meetings are separate from any meetings the contractor may organize to coordinate the efforts of the contractor's personnel. The standard owner-architect agreement requires that the architect attend project meetings regardless of who organizes them.

CONSTRUCTION OBSERVATION

The architect visits the site at intervals appropriate to the stage of construction or as agreed to in the owner-architect agreement.

The purpose of the architect's observation is the following.

- to become generally familiar with the progress and quality of the work and to keep the owner informed
- to endeavor to guard the owner against defects and deficiencies in the work
- to determine if the work is progressing in such a way that it will be in accordance with the contract documents when completed

During the construction administration phase, lines of communication among the parties are established by the *General Conditions of the Contract for Construction*. During this time the owner and contractor must communicate through the architect, unless otherwise stated in the owner-architect agreement and the *General Conditions*. Communications between the contractor and design consultants should also be through the architect. Communications between the architect and the subcontractors and material suppliers should be through the contractor.

The number and timing of visits to a job site are left to the judgment of the architect, based on a few factors.

- the size and complexity of the project
- the type of construction contract being used
- the exact schedule of construction operations

During each site visit, the architect should make complete notes of the observations and include these in appropriate field reports. The form most commonly used for this is AIA Document G711, *Architect's Field Report*. Reports may be distributed in hard copy format or electronically.

A field report should include the following items.

- report name and the architect's project number (and a project number assigned by the owner or contractor, if applicable)
- field report number

- date and time of the observation, and the weather conditions at the site
- work currently in progress
- number of workers present at the site or an estimate of the number, if the project is large
- observations made, including any problems, which may include photographs documenting the conditions at the site
- an assessment of the conformance with the construction schedule and the estimated percentage of completion
- list of items to verify, and action or information needed from owner, contractor, or consultants
- list of any attachments, and the name of the person making the report

Copies of the field reports are sent to the contractor and to the owner, to keep everyone informed of the progress of the work. Unless otherwise agreed to in writing in the owner-architect agreement, the architect is not responsible for exhaustive or continuous on-site inspections, nor is the architect responsible for the contractor's failure to carry out the work, for the means, methods, or techniques of construction, or for safety precautions on the job.

Example 50.1

During construction, the architect is obligated to visit the site to keep the client informed about the progress and quality of the work. According to the basic provisions of AIA Document B101, these visits must occur

(A) every week

(B) every two weeks

(C) as appropriate to the stage of the contractor's operations

(D) only if they have been written into the agreement as additional services

Solution

Site visits are part of the basic services of contract administration, but no specific time interval for them is given in the contract. AIA Document B101 states that the architect shall visit the site at intervals appropriate to the stage of the contractor's operations or as agreed by the owner and architect.

The answer is (C).

Uncovering and Correction of Work

There are two situations where work may have to be uncovered. The first occurs when a portion of the work has been covered contrary to the architect's request or to specific requirements in the contract documents. In this case, the work must be uncovered for the architect's examination. The cost for uncovering and for replacing the construction is paid by the contractor. The second situation occurs when the architect has not specifically made a request to view a portion of the work and the work has already been covered. If the architect then requests that the work be uncovered and it is found that the work does conform to the contract documents, the owner must pay for the uncovering and replacement through a change order. If the work does not conform, it must be corrected and replaced, and the cost must be borne by the contractor. However, if the owner or a separate contractor caused the unsatisfactory work, the owner must pay the costs.

Example 50.2

An architect suspects that blocking has been installed in the wrong location and asks that a portion of the work be uncovered. When the drywall is removed, the blocking is found to be in the correct location. Who is responsible for paying for the removal and replacement of the portion of the wall?

(A) architect

(B) owner

(C) contractor

(D) architect and owner should split the cost

Solution

The owner is responsible for paying for uncovering and rebuilding the wall. Presumably, the architect requested that the drywall be removed because there was a reason to suspect that the construction was in error and the architect was protecting the owner's interests.

If the blocking had been in the wrong location, the contractor is responsible for the cost of uncovering and repairing the work.

The answer is (B).

Safety

The contractor is solely responsible for safety on the job site. If the architect volunteers suggestions or directions concerning construction means and techniques in regard to safety issues, the architect may also assume legal responsibility and be held liable for accidents or other problems.

If the architect observes an obvious safety violation, it should be called to the attention of both the contractor and owner and followed up with a notice in writing, but the architect should not suggest how the safety violation can be corrected. If the safety problem is not corrected, the architect should notify both the contractor and the owner in writing.

Field Tests

When tests and inspections are required by the contract documents, laws, regulations, or orders of public authorities (building departments), the contractor is responsible for making arrangements with testing agencies acceptable to the owner or with the appropriate public authorities. The contractor pays for the tests and must give the architect timely notice of when and where the test is to be made so that the architect can observe the procedure.

If the architect, owner, or public authorities require additional testing beyond what is required in the contract documents, the architect should instruct the contractor to make arrangements, but only after obtaining written authorization from the owner. In this case, the owner pays for the tests.

The architect should not suggest how the safety violation can be corrected.

Regardless of whether the tests were required originally by the contract documents, or later by the architect or public authorities, if a test shows that a portion of the work does not conform to the contract documents (including violating building codes or other laws), the contractor must pay all costs needed to correct the problem. This includes the cost of additional testing required and compensation for the architect's services related to the issue.

In some cases special inspections of portions of the work may be required by provisions of the IBC. These are inspections that are required of materials, installation, fabrication, erection, or placement of components requiring special expertise to ensure compliance with the construction documents and referenced standards. Examples include prefabricated items, steel, concrete, sprayed fire-resistant materials, or systems designed to address seismic requirements. According to the *International Building Code* (IBC) the architect is required to develop a Statement of Special Inspections and submit this to the code official for review and approval. The owner, or the architect as the owner's agent, must engage a qualified, independent special inspection firm (not the contractor) to do the work. The owner pays for the costs of these services and tests. The results of the inspections and test must be submitted to the code official for evaluation and approval.

Documentation and Communication

During all phases of the architect's service, but especially during the construction administration phase, the architect should maintain complete documentation of the progress of the job. This includes the following.

- the standard forms used to administer the contract, such as change orders, certificates of payment, and the like
- correspondence
- memoranda
- meeting notes
- emails
- telephone logs
- similar written or electronic material that records the daily who, what, why, when, and how of the project

All documentation should have a date and the project name and/or number on it. This kind of documentation is important to have on file in case disputes arise or the client objects to fee payments for extra services of the architect. Even conversations should be documented if they affect the project. Written or electronic notes of the conversation should be recorded and a copy sent to those affected by any decisions made during the conversation.

One valuable documentation and communication tool is the project website. This can either be a website developed specifically for the participants in a project to use to share information and communicate with each other, or it may be a feature of a project management software program. The information shared can be made available to all participants, or access can be restricted to designated people. Some project management software also provides tools to facilitate communication and documentation of discussion, decisions, and documents related to the project, such as RFI responses and submittals, as well as time and expense tracking for the architectural firm.

Conformance with Sustainability Requirements

When a project is completed under AIA Document B101 SP, *Standard Form of Agreement Between Owner and Architect, for use on a Sustainable Project*, AIA Document A201 SP, *General Conditions of the Contract for Construction, for use on a Sustainable Project*, and one of the owner-contractor agreements for sustainable projects, the contract documents contain one of more of the following.

- the owner's goals for sustainability
- the objective to achieve a green building rating system certification (LEED certification, for example)
- desired benefits to the environment to enhance the health and well-being of building occupants
- guidelines for improving energy efficiency

One of the contract documents is the *sustainability plan*, which describes the following.

- targeted sustainable measures
- implementation strategies
- the owner's, architect's, and contractor's roles and responsibilities associated with achieving the sustainable measures
- details about design reviews, testing, or metrics to verify achievement of each sustainable measure
- the documentation and format required

During the construction administration phase, the architect has the following responsibilities. Refer to Chap. 5 for a summary of the architect's responsibilities prior to the construction administration phase and other details of contract requirements when a project is completed using AIA sustainability project documents.

- The architect must advise and consult with the owner regarding the progress of the project toward achieving the sustainable measures. As part of the field reports prepared during regular site visits, the architect must notify the owner of any known deviations from the contract documents that might impact achievement of sustainable measures.
- If a proposed design or construction change that is needed to address a field condition might impact a sustainable measure or the sustainable objective, the architect must notify the owner.
- The architect must respond to the contractor's requests for information when the contractor asks the architect to describe how a product, material, or equipment was intended to satisfy the requirements of a sustainable measure.
- The architect must register the project with the certifying authority. Any fees paid by the architect to do so are deemed reimbursable expenses.
- The architect must collect the sustainability documentation from the owner and contractor, organize and manage the information and confirm that it is in an appropriate format, and submit the documentation to the certifying authority as required for the sustainability certification process.
- The architect must prepare and submit the application for certification to the certifying authority and, if needed, prepare responses to any additional questions or documentation required by the certifying authority.

Assuming the architect receives timely notice from the owner or certifying authority, the architect must prepare and file necessary documentation to appeal a ruling or interpretation denying a requirement to achieve a sustainability certification.

Accelerated Schedules

While many construction scheduling problems involve delays, there are some instances where the schedule is actually accelerated. There are three primary causes for this. With *directed acceleration*, the owner instructs the contractor to speed up and agrees to pay the additional costs associated with the change, which is directed through a change order. With *voluntary acceleration*, the contractor may decide to accelerate the work because the work has fallen behind the original schedule, the construction company is trying to finish early to collect a bonus, or they want to move personnel to another job. With *constructive acceleration*, a situation may occur that causes an excusable or unavoidable delay, such as caused by weather, deliveries, or change orders, but the extra time is neither requested by the contractor nor granted by the owner. The contractor must determine how to speed up the process to meet the project deadline. The contractor may choose to file a claim for damages if the extra time is warranted but not given and the contractor had to incur extra expenses to complete the work on time.

Example 50.3

Which of the following is the contractor NOT solely responsible for?

(A) field reports to the owner

(B) selection of subcontractors

(C) scaffolding

(D) reviewing claims of subcontractors

Solution

Scaffolding is part of the means of construction, which is the contractor's responsibility.

Field reports are the responsibility of the architect. Selection of subcontractors is subject to the approval of both the architect and the owner. If a subcontractor makes a claim to the contractor, the contractor in turn makes a claim to the owner that is reviewed by the architect.

The answer is (C).

CHANGES IN THE WORK AND SUPPLEMENTAL DOCUMENTATION

During construction, changes in the work are usually needed. They may be necessitated by errors discovered in the drawings, unforeseen site conditions, design changes requested by the client, rulings of building officials, and many other factors. During bidding and prior to contract award, changes are made by addenda. Any costs associated with changes made by addenda are included in the contractor's bid. During construction, changes in the work are accomplished in one of three ways.

- minor changes in the work
- construction change directives
- change orders

Minor Changes in the Work

When a change does not involve modification of the contract sum or time and is consistent with the contract documents, the architect may issue a written order directing the contractor to make a minor change. For example, moving a door opening over 6 in before the wall is framed would be a minor change; if this change was requested after the wall was framed, however, the modification would have time or cost implications and would be handled through a change order. AIA Document G710, *Architect's Supplemental Instructions*, may be used for this purpose, as discussed later in this section. The architect may issue an order for such a minor change without the approval of either the owner or contractor.

Construction Change Directives

When a change needs to be made right away to allow the project to proceed, but the owner and contractor cannot agree on a price or time revision, the architect may issue a *construction change directive*. This is a written order prepared by the architect directing a change in the work before the owner and contractor agree on an adjustment in contract cost, time, or both. AIA Document G714, *Construction Change Directive*, may be used for this purpose, as discussed later in this section.

The construction change directive gives the owner a way to unilaterally order changes to the contract without changing the terms of the contract. It is used in the absence of total agreement on the terms of a change order. The change in the work may involve additions, deletions, or other revisions. The construction change directive must be signed by both the architect and the owner, but does not have to be signed by the contractor.

In addition to describing the changes needed, the directive should include a proposed basis for determining the adjustment of cost or time or both. If the directive involves a cost adjustment, the architect's proposed basis of adjustment must be based on one of four methods.

- a lump sum, properly itemized and mutually accepted
- unit prices previously agreed to in the specifications
- costs to be determined by mutual agreement on a fixed or percentage fee
- as provided for in a subsequent clause as summarized in the following paragraph

Under provisions of the *General Conditions of the Contract*, the contractor must proceed with the work described in the construction change directive in a timely manner and advise the architect of the contractor's agreement or disagreement with the basis for cost and time adjustment. If the contractor agrees with the architect's proposal, the change is recorded as a change order. If the contractor disagrees, the architect determines the appropriate adjustment based on evaluation of reasonable expenditures for additional labor and materials required, and calculated savings for deleted work. In addition to the actual cost of the work, the architect must include costs related to workers' benefits, equipment rental, supplies, premiums for bonds and insurance, field supervision, permit fees, and reasonable contractor profit.

While the parties make a determination of the total cost of the construction change directive, the contractor's applications for payment may include a request for payment for work completed under the directive. The architect must make an interim determination whether the costs are justified and, if so, include them in the monthly certification for payment. The architect's interim determination adjusts the contract sum on the same basis as a change order.

Change Orders

A *change order* is a document authorizing a variation from the original contract documents that involves a change in contract price, contract time, or both. Technically, a change order is issued by the owner because the owner has the agreement with the contractor, but it is prepared by the architect. It must be approved by the owner, architect, and contractor.

Any of the three parties may suggest a change order, but most of the time, the architect submits a proposal request to the contractor. This request is accompanied by supporting drawings or other documents as required to fully describe the proposed change. The contractor submits a quotation of price and time change to the architect for review. The architect evaluates the proposal and recommends approval of, modifications to, or rejection of the proposal to the owner, who makes the final decision. If the specifics are acceptable to the owner, the formal change order document is prepared and signed by all three parties.

Supplemental Contract Documentation

Questions inevitably arise during construction, not only from the contractor but from the architect and the owner as well. These questions should not be asked in informal phone calls or emails; more formal documentation should be used.

One way to proceed formally is to use AIA Document G716, *Request for Information* (RFI). This is a standard form that the owner, architect, and contractor may use to request further information from one another during construction. The form provides a space for the requesting party to list the relevant drawing, specification, or submittal reviewed in attempting to find information. The response to the RFI may include text as well as drawings but is neither a specific or implied authorization for work that increases the cost or time of the project.

When a minor change in the work is needed, the architect should issue AIA Document G710, *Architect's Supplemental Instructions* (ASI). This is intended to allow the architect to perform his or her obligations as interpreter of the contract documents in accordance with the owner-architect agreement and the *General Conditions of the Contract*. An ASI is a means for the architect to address minor changes to the extent that AIA Document A201 authorizes, and may include both written instructions and drawings.

When the owner and contractor cannot agree on a proposed change in the contract sum and/or time, the architect may issue AIA Document G714, *Construction Change Directive*. This directs the contractor to make a change, with the change in cost or time to be decided later. The directive may include both written instruction and drawings.

SUBMITTALS

After the contract is awarded, the contractor is responsible for providing those *submittals* that are called for in the contract documents. These include the following.

- shop drawings
- samples
- product data
- documents related to sustainability issues, where applicable

Submittal requirements are listed in each specification section; the requested information may vary depending on the type of material under consideration. The submittals are sometimes prepared by the contractor, but most often they are prepared by subcontractors, vendors, and material suppliers and reviewed by the general contractor for coordination before they are submitted to the architect. Although all submittals show in detail how much of the work is going to be built and installed, they are not contract documents.

Shop drawings are drawings, diagrams, schedules, and other data prepared to show how a subcontractor or supplier proposes to supply and install work to conform to the requirements of the contract documents for this specific project. Shop drawings are usually very detailed, showing how portions of the work will be constructed, and may include drawings showing how the particular product or assembly will fit into the building.

A *sample* is a physical example of a portion of the work, intended to show exactly how a material, finish, or piece of equipment will look in the completed job. A collection of samples may also be submitted so that the architect can choose a color or finish when this choice is not specifically identified in the specifications. Samples become standards of appearance and workmanship by which the final work will be judged. *Product data* include brochures, charts, instructions, performance data, catalog pages, and other information that illustrate some portion of the work. These data are usually published by the product manufacturer and is less specific than the information included in shop drawings, since the same documents may be used for multiple projects. A *cut sheet* is a short-format summary of a material or product's properties and characteristics and is often included in the product data submission. If the standard published data includes products other than those proposed for incorporation into the work, the contractor should clearly indicate which products are being submitted.

When shop drawings and other submittals are prepared by subcontractors and material suppliers, they are sent to the general contractor, who is responsible for reviewing and approving them. By reviewing them, the contractor confirms that field measurements have been verified, materials have been checked, and other construction criteria have been coordinated. If there are any decisions required of the architect (such as selection of a color or finish), these items should be identified on the submittal. After this review the contractor must give the submittals to the architect in accordance with the submittal schedule approved by the architect or, in the absence of an approved submittal schedule, with reasonable promptness and in sequence so there is no delay in the work.

The architect reviews the submittals only to check for conformance with the information given and the design intent. The architect is not responsible for determining the accuracy of measurements and completeness of details, for verifying quantities, or for checking fabrication or installation procedures. The architect's review does not relieve the contractor of the responsibilities set down in the contract documents.

If the submittals require the review of one of the architect's consultants, the architect forwards them to the consultant, who returns the submittals to the architect after review. The architect then reviews them

and returns them to the contractor, who returns them to the subcontractor or material supplier who prepared them. The architect may indicate that no exceptions are taken, that marked corrections should be made, that the submittals should be revised and resubmitted, or that they are rejected.

Firms usually stamp submittals (either with a rubber stamp and ink pad, or electronically) with series of check boxes indicating the possible responses and the date and initials of the reviewer. The architect can use the check boxes to indicate the action taken as a result of the review. The stamp generally includes a statement that the submittal has been reviewed for conformance to the design intent and requirements of the construction documents only, and states that the contractor is responsible for coordination or dimensions, quantities, and construction techniques.

The architect may also include comments or questions for the contractor and indicate the responses to any questions posed by the contractor. It is possible that the response to such questions may necessitate a change to the project time or cost; if this is the case, the architect can request that the contractor submit an RFI on the issue, which can initiate the change order process as necessary.

The architect's review does not relieve the contractor of the responsibilities set down in the contract documents.

The architect must review submittals in accordance with the submittal schedule prepared by the contractor and approved at the beginning of the project by the architect. In the absence of an approved submittal schedule, the submittals are approved with reasonable promptness while allowing sufficient time in the architect's professional judgment to permit adequate review.

The issue of time is generally dealt with in two ways. First, the *General Conditions of the Contract for Construction* require the contractor to prepare a construction schedule for the project, which must include a schedule of submittals that allows the architect a reasonable amount of time for review. Second, in the section on submittals in Division 01 of the specifications, the architect should indicate the procedure for making submittals, including the time that the contractor must allow for review. When establishing the construction schedule, the contractor factors in this review period requirement and allows for the possibility that submittals may not be approved and will require resubmission.

Submittals are generally marked in one of four ways, although the language used varies by firm.

- approved
- approved with changes
- revise and resubmit
- rejected

Marking a submittal "approved," "no exceptions taken," or "reviewed" implies that the product or assembly may be incorporated into the work as submitted and is in compliance with the requirements of the contract documents. Submittals may also be marked "approved with changes noted," "approved as noted," or "note markings." This means that if the changes indicated are made, the product or assembly may be used on the project. If submittals are marked in either of these ways they do not require resubmission by the contractor or additional review by the architect.

Submittals for items that do not comply with the contract requirements are marked "revise and resubmit" or "rejected." "Revise and resubmit" is usually used when the product may be suitable for use on the project but the information provided is inadequate for performing a thorough review, or when there are significant errors or conflicts in the submittals package. "Rejected" indicates that the product proposed does not comply with the contract requirements and may not be used on the project. If submittals are marked in either of these ways, they are returned to the contractor with comments, and the contractor must prepare additional or revised submittal data and submit it to the architect again.

Model specifications often designate submittals as action or informational submittals. An action submittal requires the architect's review and approval before the product may be used on the project. If the contractor proceeds without obtaining the architect's approval, the item is provided at the risk of the

contractor, and if the properties of the item do not comply with the contract requirements, the contractor may be required to remove and replace it at the contractor's own expense. Informational submittals do not require a response from the architect.

According to the owner-architect agreement, the architect must keep a log of submittals as well as copies of the submittals. For each submittal, the log should include the submittal name or other identification and the date it was received by the architect. The log should also include the date the submittal was sent from the architect to the consultant (if necessary), the date it was returned to the architect by the consultant, and the date it was returned to the contractor. The action taken on each submittal should be noted.

Shop drawings and submittals are not a way for the architect to make changes in the design or refine details. Although minor corrections and changes can be made, the contractor may request a change order if the architect's modification of the shop drawings or samples results in an increase in project cost or time.

APPLICATIONS FOR PAYMENT

During the course of a job, the contractor is entitled to receive periodic payments, usually monthly, against the total contract sum. These payments reflect progress to date and allow the contractor to have a stream of income with which to pay for materials and compensate employees and subcontractors for services provided to date.

Under the *General Conditions of the Contract*, the architect is responsible for making sure that the amounts requested are consistent with the amount of work performed and the quantities of materials stored.

Intermediate Payments

In order to receive periodic payment, the contractor must submit to the architect a notarized application for payment at least 10 days before the date established for each payment in the owner-contractor agreement. This application should include the value of work—both labor and materials—completed up to the date of the application, in addition to the value of materials purchased and in acceptable storage but not yet incorporated into the work.

The actual time and money expended can be compared to the budgeted amounts to determine how the project is progressing.

In most cases, 'acceptable storage' means stored at the site. However, if approved in advance by the owner, payment can also be authorized for materials and equipment suitably stored off site at a location agreed to in writing. When the application for payment includes off-site storage, the amount must also include costs of applicable insurance, storage, and transportation to the site.

Certification of the application for payment requires confirmation by the architect that the work has progressed to the point indicated and that, to the best of the architect's knowledge, information, and belief, the quality of the work is in accordance with the contract documents. Certification is *not* a representation that the architect has

- made exhaustive on-site inspections
- reviewed construction methods, techniques, or procedures
- reviewed copies of requisitions received from subcontractors and material
- determined how and for what purpose the contractor has used money previously paid

Sometimes a subcontractor may want to know if the contractor has been paid for work performed by the subcontractor but has not received payment from the contractor. AIA Document 201, *General Conditions of the Contract for Construction* allows the architect to provide, upon request by the subcontractor, the percentages of completion or amounts applied for by the contractor.

The amount due to the contractor is based on the *schedule of values* that the contractor submits to the architect after the award of the contract. This allocates the total contract sum to various portions of work, such as site work, foundations, framing, and so forth. The contractor indicates the percentage of completion of each line item on the pay application. The difference between the quantities between one application for payment and the previous represents the amount of work completed during the payment period and the amount of money due to the contractor.

A project management technique that is often used to determine the schedule of values is the *earned value management* method (sometimes called *earned value analysis*). This technique attempts to predict both the time and money (or percentage of overall project budget) that is required to complete certain tasks. The actual time and money expended can be compared to the budgeted amounts to determine how the project is progressing.

If the application for payment is approved, the architect signs it and sends it to the owner for payment. An amount, called the *retainage*, is withheld from each application until the end of the job or another time during the work that is agreed on by both the contractor and the owner. This is usually about 10% of the total contract sum. The retainage gives the owner leverage in making sure the job is completed and can be used to provide money to satisfy lien claims. As the project nears satisfactory completion, the retainage amount may be reduced.

The architect may withhold all or a portion of the funds requested on applications for payment in order to protect the owner, if the architect cannot represent that the amount of work done or materials stored is in conformance with the application. The architect may also withhold payment for any of the following reasons.

- defective work not remedied
- third-party claims or evidence of probability of third-party claims
- known failure of the contractor to make payments to subcontractors (however, approval of an application for payment does not indicate that the architect has confirmed that the contractor is making such payments to subcontractors)
- reasonable evidence that the work cannot be completed for the unpaid balance of the contract sum
- damage to the owner or a separate contractor
- reasonable evidence that the work will not be completed on time and that the unpaid balance will not be sufficient to cover damages due to the delay
- repeated failure of the contractor to carry out the work in accordance with the contract documents.

Public projects that require the use of prevailing wage rates may require submission of payroll records with applications for payment.

Final Payment

After the final punch list inspection, the contractor notifies the architect in writing that the work is ready for final inspection and submits a final application for payment. If, after a final inspection, the architect determines that the work is complete and acceptable under the conditions of the contract documents, a final certificate for payment is issued to the owner. At this time, the withheld retainage may be released and paid to the contractor.

Before the certificate can be issued, however, the contractor must submit to the architect the following items.

- an affidavit stating that payrolls, materials, and other debts for which the owner might be responsible have been paid (AIA Document G706, *Contractor's Affidavit of Payment of Debts and Claims*, is often used)
- a certificate showing that insurance required by the contract documents to remain in force after final payment will not be canceled or allowed to expire without at least 30 days' written notice to the owner

- a written statement that the contractor knows of no reason that the insurance will not be renewable
- the consent of surety to final payment, if applicable (AIA Document G707, *Consent of Surety to Final Payment*, may be used for this purpose)
- any other data required by the owner that establishes evidence of payment of obligations, such as releases and waivers of liens

If final completion is delayed through no fault of the contractor, the owner may, with certification by the architect, make partial payment for that portion completed without terminating the contract.

NONCONFORMANCE WITH CONTRACT DOCUMENTS

During any project there are aspects of construction that do not conform to the contract documents. Elements may be missing, incorrectly installed, of the wrong type, or of a quality not meeting the requirements of the specifications. In most cases it is a minor problem, like a door being the wrong size. Sometimes it is a major problem, such as an incorrectly installed structural detail that could threaten building collapse.

Although the architect is not required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work, if the architect notices something that deviates from the contract documents, the contractor and owner must be notified. Although the architect may make an informal verbal comment to the contractor when the deficiency is identified, this observation must be documented in writing in a field report; the format most commonly used is AIA Document G711. These reports are sent to the contractor, owner, and other designated parties. The nonconforming work should be tracked until it is corrected.

Ultimately, however, the architect is *not* responsible for the contractor's failure to perform the work in accordance with the requirements of the contract documents, as stated in AIA Document A201.

Rejecting Work

Under AIA Document A201, *General Conditions of the Contract*, the architect has the authority to reject work that does not conform to the contract documents. Because rejecting work will result in extra time and expense for the contractor, the reasons for rejection should be carefully documented, and the owner should be kept informed of the situation.

The architect has the authority to require inspection or testing of work when it is suspected that it does not conform to the contract requirements, whether or not such work is fabricated, installed, or completed. However, this action does not give rise to any duty or responsibility of the architect to the contractor, subcontractors, or anyone else performing portions of the work.

The contractor must promptly correct work rejected by the architect or work not conforming to the contract documents, whether discovered before or after substantial completion. The contractor pays for the cost of correcting such work.

As discussed in Chap. 5 describing the terms of AIA Document A201, if the contractor fails to correct work not in conformance with the contract documents, the owner may order the contractor to stop the work until the issue is resolved. The owner also has the right to carry out the work if the contractor fails to correctly do so and to charge these expenses to the contractor.

Accepting Nonconforming Work

At times, an element of the construction does not conform to the design intent or the requirements of the contract documents, yet may be determined to be acceptable in terms of appearance, functionality, and quality. For example, the contractor may apply a vinyl wall fabric from a different manufacturer than specified, but the product may be essentially the same color and weight and perform in the same way as the specified product.

Rather than rejecting the work and possibly delaying the project or causing other problems, the architect may accept it with the approval of the owner. The deviation should still be noted on the field report as required by contract. If the accepted product or work is determined to be less expensive that the specified product would have been, the owner has the right to request a credit for the difference. If the installed product or work is more expensive than the work required by the contract documents, and the error is the contractor's or the substitution was made without the owner's approval, the contractor will bear the cost.

There are also times when nonconforming work is not acceptable to the architect but acceptable to the owner. For example, the wood grain pattern on paneling may not be what the specifications called for, and the architect may object to the final appearance, but the owner does not view the difference as objectionable and is willing to accept it. In this case, the owner has the final authority to accept the deviation, but the architect, as required by contract, must note the difference as not conforming to the contract documents. On the certificate of substantial completion, the architect should note the difference as a nonconforming exception. The contractor must document the deviation on the as-built drawings as required by AIA Document A201 or a similar agreement.

Disputes and Claims

Disputes and claims are a part of any construction project, and these typically occur during the construction phase. The procedure to be followed if a claim or dispute arises is outlined in the *General Conditions of the Contract*.

A *claim* is a demand or assertion by the contractor or owner seeking payment of money, an extension of time, an adjustment or interpretation of the contract terms, or other relief from terms of the contract. Claims must be made by written notice to the other party and to the architect. They also must be initiated within 21 days from the occurrence of what prompted the claim or within 21 days after the person making the claim first recognized the problem. Whoever makes the claim must substantiate it with documentation or other evidence.

Claims are first referred to the initial decision maker (IDM). The IDM is usually the architect unless the owner and contractor agreed to name a third-party IDM in the owner-contractor agreement. (See Chap. 5 for a more detailed discussion of this.)

If the owner or contractor has a dispute or makes a claim, the IDM must take certain preliminary action within 10 days of receipt of the claim. Such action may include

- requesting additional supporting data from the claimant
- suggesting a compromise
- accepting the claim
- rejecting the claim
- advising the parties that the IDM is unable to resolve the claim because of a lack of sufficient information
- advising the parties that it would be inappropriate for the IDM to resolve the claim

In evaluating claims, the IDM may consult with or seek information from either party or from anyone with special knowledge or expertise relevant to the situation. The IDM can ask the owner to authorize the retention of experts at the owner's expense. If the IDM asks either the owner or the contractor to respond to a claim or provide additional information, that person must respond within 10 days and must either give the response or information, tell the IDM when the response will be furnished, or tell the IDM that no supporting data will be provided.

The approval or rejection of a claim by the IDM is final and binding on the parties but is subject to mediation and binding dispute resolution. A demand for mediation can be made by the claiming party at any time. Mediation is a condition precedent to arbitration, litigation, or the institution of other legal proceedings and these procedures are discussed later in this section.

Although claims can arise from a multitude of conditions, there are two that are especially common.

- *claims for additional time*. If the contractor feels that extra time is needed, the reasons for the request must be submitted and include an estimate of the cost. If weather conditions are the basis for the claim, the contractor must submit evidence that weather conditions were abnormal for the time period, could not have been reasonably anticipated, and had an adverse effect on the construction schedule; this evidence may be obtained from a source such as the National Weather Service.
- *claims for concealed or unknown conditions*. Sometimes there are surprises on the job site once construction begins. When this happens, the contractor may make a claim for additional time or money. However, to be valid, the unknown conditions must meet one of two criteria: (1) they must be subsurface in nature or otherwise physically concealed, causing the site to differ from what is shown on the contract documents, or (2) they must be of an unusual nature that is different from what would ordinarily be found as part of construction activities for the project type. For example, test borings may indicate a standard type of soil, and the contractor may budget for normal excavation. If a large boulder is discovered that requires blasting or special excavation techniques, the contractor would be entitled to extra money and possibly an extension of the contract time. According to the *General Conditions of the Contract*, claims of this type must be made within 21 days from first discovery.

Mediation and Arbitration

Mediation and *arbitration* are methods of resolving claims and disputes without the lengthy and costly procedure of litigation. Both methods make use of neutral third parties to help the parties reach a resolution. Mediation is not legally binding; arbitration is. Under the *General Conditions of the Contract*, if a dispute cannot be resolved by the IDM, the owner and contractor must try to resolve it through mediation before they may resort to a legally binding method such as arbitration or litigation. (See also Chap. 5.)

In mediation, a mediator facilitates a discussion between the parties using techniques in compliance with the Model Standards of Conduct for Mediators. The mediator defines and limits the issues, puts the issues in perspective, and sees that each side in the dispute hears and understands the opposing point of view. The mediator does not judge the case; the role of the mediator is to guide the parties toward reaching their own settlement.

Arbitration is a more formal process. Under the *General Conditions*, arbitration proceedings are conducted under the Construction Industry Arbitration Rules of the American Arbitration Association and any applicable state laws.

Under arbitration, the two parties agree to submit their claims to an arbitrator or a panel of three arbitrators and agree to abide by the arbitrator's or arbitrators' decision. The arbitrator or arbitration board is knowledgeable about the construction industry and listens to evidence, reviews documents, and hears witnesses before making a decision.

Arbitration has the advantages over litigation of speed, economy, and privacy. However, unlike a trial, there are no rules of evidence, and the decision cannot be appealed.

Example 50.4

A pressure test on plumbing supply piping required by the specifications reveals a leak in the system. According to AIA Document A201, the responsibility for fixing the leak and paying for a follow-up test rests with the

(A) owner

(B) contractor

(C) plumbing subcontractor

(D) owner and contractor jointly

Solution

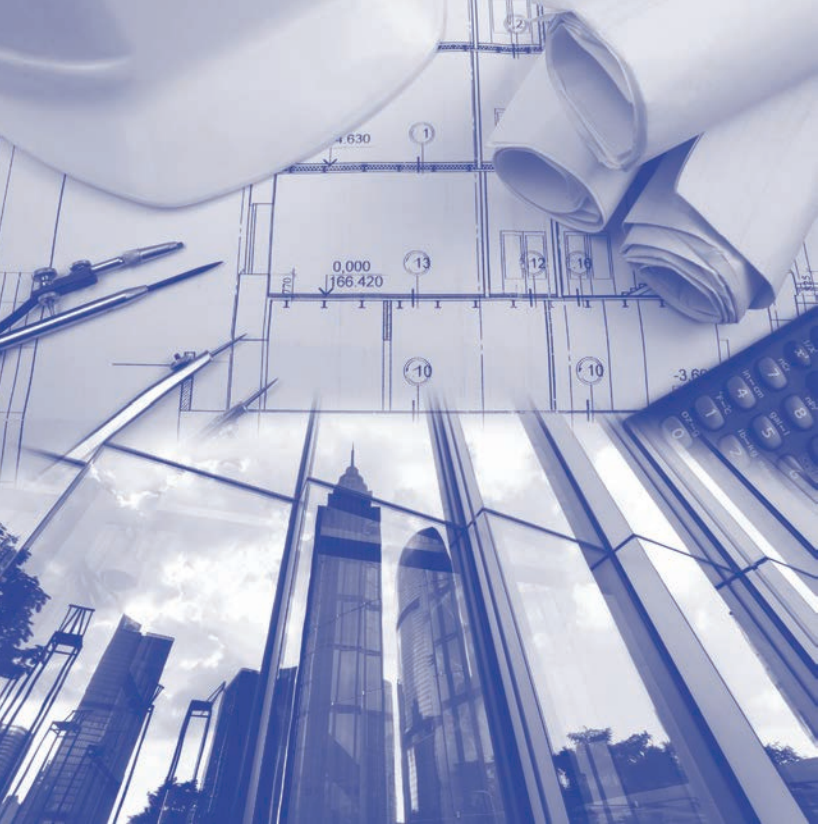
AIA Document A201, Sec. 13.5.3, requires the contractor to be responsible for all costs made necessary by failures, including costs of repeated tests.

The answer is (B).

ADDITIONAL CONSTRUCTION ADMINISTRATION ACTIVITIES

In addition to the construction administration duties discussed in this chapter, the architect is responsible for completing the following project management tasks.

- verifying that the owner has received the required performance bonds and labor and material payment bonds
- verifying that the contractor issues acceptable certificates of insurance to the client
- establishing a site visit schedule based on contract and project requirements
- receiving the construction schedule from the contractor.
- receiving field reports from design consultants and forwarding copies to the client
- reviewing and approving design consultant's billings
- monitoring the contractor's progress against the construction schedule and notifying the client of any problems that may be identified
- monitoring the architect's fees expended and conformance to the architect's schedule
- monitoring allowances and contingencies
- maintaining all documentation of construction administration activities, including issuance of architect's supplemental instructions, responses to requests for information, construction change directives, and change orders
- verifying issuance of certificate of occupancy by the building official
- monitoring conformance to sustainability requirements and process reports, certificates, and other forms as required by the type of sustainability certification being used



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PROJECT CLOSEOUT

The process by which a project is deemed complete must be executed with as much care as any of the project's earlier stages. There are also several important activities to be carried out after the project is completed.

- building commissioning
- project follow-up
- post-occupancy evaluation

PROJECT CLOSEOUT

Project closeout is the final portion of the construction administration phase. During this time the building work is completed, the structure is made ready for occupancy, and all remaining documentation is finalized.

One of the most important milestones of a project is the date of *substantial completion*. This is the point in the project at which the work is sufficiently complete in accordance with the contract documents so that the owner can occupy or utilize the work for its intended purpose. The date of substantial completion has many legal and administrative implications. For example, in many states, the statute of limitations for errors or omissions caused by the architect begins with the date of substantial completion.

The contractor's schedule for the project ends at the date of substantial completion. If there are early completion bonuses or liquidated damages involved, they are based on this date. The date of substantial completion also establishes responsibilities of the owner and contractor for security, maintenance, utilities, warranties, damage to the work, and insurance.

The architect then makes an inspection to determine whether the work (or a portion of it) is substantially complete.

As detailed in AIA Document A201, *General Conditions of the Contract for Construction*, the contractor begins closeout procedures by notifying the architect in writing and submitting a comprehensive list of items still to be completed or corrected. The architect then makes an inspection to determine whether the work (or a designated portion of it) is substantially complete and whether there are more items that need to be added to the list.

The list of items made by the architect as a result of the inspection is called the *punch list*. During this inspection for substantial completion, the architect notes work that needs to be completed and items that need to be corrected because they are not in accordance with the contract documents. The contractor must correct these items, after which another inspection is held.

If this second inspection determines the work to be substantially complete, the architect prepares a certificate of substantial completion that establishes the date of substantial completion. AIA Document G704, *Certificate of Substantial Completion*, may be used for this purpose. The architect should include a statement of time within which the contractor must correct or complete any remaining items, as well as a list of any nonconforming work that the owner has accepted. The certificate of substantial completion is submitted to both the owner and contractor, for their written acceptance of the responsibilities that the certificate assigns to them.

If, based on the site inspection, the architect determines that the work is not substantially complete, the architect notifies the contractor of work that must be completed before a certificate of substantial completion can be prepared. The owner may choose to move into and use the building (or part of it) while punch list work is still being corrected, or the owner may choose to wait until the entire project is complete.

After the contractor has completed all remaining work, the contractor notifies the architect in writing that the work is ready for a final inspection and acceptance. The contractor sends a final application for payment with this request, and the architect schedules and performs the final inspection. As a part of the work following the substantial completion date, the contractor must also complete final cleaning,

instruct the owner or owner's representatives in the operation of systems and equipment, complete the keying for locks and turn keys over to the owner, and restore any items damaged by the contractor. If the specifications require the contractor to provide *attic stock*, or extra materials for future repairs, this material should be delivered and documented.

If the architect finds the work acceptable and in compliance with the contract requirements, the architect issues the final certificate for payment and the entire balance due to the contractor, including retainage, is due and payable. Final completion is documented by the architect's issuance of the final certificate for payment. (There is no AIA document published for this purpose; the *General Conditions* outline the necessary steps and documentation.) The architect's consultants may issue separate certificates of completion for their portions of the work, such as electrical, HVAC, and so forth.

Before authorizing final payment, the architect must receive the following documentation from the contractor.

- an affidavit that payrolls, bills for materials and equipment, and other project-related expenses have been paid
- a certificate proving that insurance required by the contract to remain in force after final payment is currently in effect
- a written statement that the contractor knows of no substantial reason that the insurance will not be renewed
- consent of surety to final payment, if applicable
- other data establishing payment or satisfaction of obligations arising out of the contract
- all warranties, maintenance contracts, operating instructions, certificates of inspection, and bonds
- all documentation required to be submitted with the application for final payment (as described above)
- a set of as-built drawings, if required by the owner-contractor agreement
- the certificate of occupancy as issued by the building department (this is part of the permit process originally paid for by the contractor)
- extra stock of materials as called for in the specifications

The architect's services may terminate when the final certificate for payment is issued, if so described in the owner-architect agreement. In AIA Document B101, *Standard Form of Agreement Between Owner and Architect*, and similar agreements, construction administration services provided by the architect beyond the date of substantial completion are considered an additional service.

Example 51.1

The punch list is created and maintained by the

(A) architect

(B) authority having jurisdiction

(C) contractor

(D) owner

Solution

The punch list is a list of items still needing completion. It is created and maintained by the architect.

The answer is (A).

BUILDING COMMISSIONING

Building commissioning is the process of planning, designing, installing, inspecting, testing, starting up, and adjusting building systems and then verifying and documenting that they operate as intended and meet the design criteria of the contract documents. Commissioning is an expansion of the traditional testing, adjusting, and balancing (TAB) that is commonly performed on mechanical systems, but with a greatly broadened scope.

The commissioning agent is ideally involved with the project throughout the design and construction process and provides post construction evaluation services. Building commissioning is often thought of as a quality control process for enhancing the delivery of a project; usually a third party, separate from the design team and the contractor, provides these services. Commissioning of the energy systems is a prerequisite for LEED certification.

The Commissioning Process

The extent of the building commissioning process varies with the size and function of the project and the amount of time and money the owner is willing to expend for these services. There are three basic stages of commissioning: determining performance requirements, planning the commissioning process, and performance and functional testing. The commissioning agent should participate in the project from the programming phase through post-occupancy and should document the whole process of commissioning.

Determining Performance Requirements

Building commissioning begins during the design phase, or even the pre-design phase, with the determination of which systems will be commissioned and what the criteria for acceptance will be, and the preparation of commissioning specifications to outline the requirements for subsequent phases. One of the documents developed during this stage is the *owner's project requirements* (OPR), which is a summary of the critical planning requirements and owner expectations. This statement can be extensive if the project is complex or includes multiple buildings, and it should be updated by the commissioning team as the project progresses. This stage of the commissioning process may take place in parallel with the overall programming phase of the project.

The OPR is developed into a *basis of design* (BOD) document during the design phase. The BOD explains how the OPR have been satisfied by the proposed design. While the OPR are broad statements regarding the performance of the building and its systems and energy efficiency goals, the BOD is a more technical document used for systems selections, integration, and sequence of operations.

Planning the Commissioning Process

Drafting a commissioning plan includes determining the scope of the commissioning activities, establishing a budget, setting a schedule, establishing a testing and inspection plan, developing specifications, determining special testing needs, and writing a commissioning plan. The commissioning plan is a written statement that may include

- introduction and description of the scope of the commissioning
- list of the systems and other elements to be commissioned
- responsibilities and identification of team members
- commissioning schedule
- commissioning protocols
- documentation required during the process
- test procedures and inspection plans
- construction checklists

Performance and Functional Testing

The most important part of the commissioning process occurs near the completion of the construction phase, when the various building systems and other elements slated for commissioning are started up and tested to determine whether they meet the design criteria. The contractor adjusts, corrects, and repairs incorrectly functioning equipment as needed to comply with the performance standards. The operation and maintenance of the building systems controls and equipment are demonstrated, and training is conducted for the building operators (owner).

During this phase, the commissioning agent generates a *commissioning report*; this report summarizes the results of the construction-phase commissioning tests and provides detailed operation and maintenance instructions for each of the systems. The commissioning agent also reviews the equipment manufacturers' product information and manuals and may include this documentation in a report to the owner.

Finally, commissioning activities and evaluation should continue into the post-occupancy phase. Ideally, this testing should occur one year after initial occupancy to verify that systems continue to operate as intended under normal occupancy and operating conditions. Adjustments and corrections should take place at this time if necessary. Ideally, the contractor's warranty should be coordinated with the commissioning activities so that the contractor can make any corrections under warranty.

Elements of Building Commissioning

Which building systems and construction elements require commissioning will depend on the complexity of the building and the needs of the owner. For example, a hospital will require more thorough commissioning of a greater number of types of systems than a small office building will. These elements may include some or all of the following.

- mechanical systems (including heating and cooling equipment, air handling equipment, distribution systems, pumps, sensors and controls, dampers, and cooling tower operation)
- electrical systems (including switchgear, controls, emergency generators, fire management systems, and safety systems)
- plumbing systems (including tanks, pumps, water heaters, compressors, and fixtures)
- fire suppression (sprinkler) systems (including standpipes, alarms, hose cabinets, and controls)
- fire management and life safety systems (including alarms and detectors, air handling equipment, smoke dampers, and building communications)
- energy efficiency and water efficiency
- vertical transportation systems (including elevator controls and escalators)
- telecommunication and computer networks
- exterior envelope
- accessibility
- security and safety
- survivability
- space functionality
- maintainability

The Commissioning Provider and Team

Because commissioning a large, complex building is an involved process, a knowledgeable person should be responsible for coordinating the efforts of everyone on the team. In most cases the *commissioning provider* (CxP, also known as the *commissioning agent* or CxA) should be an independent, third-party agent who specializes in this service and is hired by the owner. The CxP may also be a construction manager

if the CM is serving as advisor and not part of the contractor's firm. Occasionally, an architectural or engineering firm may act as CxP, provided it has the expertise and can provide these services with objectivity. Architects may use AIA Document B211, *Standard Form of Architect's Services: Commissioning*, for contractual agreement to provide these services to the owner.

The following people should participate in building commissioning.

- commissioning provider
- architect
- mechanical, electrical, and plumbing engineers as well as other design consultants as appropriate
- general contractor
- various subcontractors providing elements of the systems to be commissioned, such as mechanical, electrical, fire protection, and so on
- owner, owner's operation personnel, and owner's maintenance personnel
- others directly involved with the construction process, including the owner's agent, code officials, and construction manager

Example 51.2

In most cases, the person responsible for coordinating the process of commissioning a large building should be

(A) the architect

(B) the constructor

(C) the owner

(D) a third-party agent

Solution

Commissioning a large building can be a complicated process, and in most cases it should be done by an independent, third-party agent.

The answer is (D).

PROJECT FOLLOW-UP AND ADDITIONAL SERVICES

In addition to the administrative tasks required by the contract documents, project closeout may include other activities that can benefit both the owner and the architect. Maintaining a good follow-up program has several advantages for the architect's firm.

- Helping an owner through the difficult period of a move creates a lasting good impression of the firm. Satisfied owners are good references for future projects and one of the most important components of any firm's marketing program.
- Continued follow-up makes it possible to maintain contacts within the owner's organization for future business development, either for expansion of the owner's building, work on other projects with which the owner may be involved, or for referrals to other organizations.
- Follow-up provides the opportunity for evaluation of a completed, occupied design. The knowledge gained should be placed in an office database and reused for future projects to continually upgrade the quality of the firm's services. This knowledge may include written notes, drawings of details that worked well (or didn't work), well-written specifications, photographs, and other information. However, this knowledge base should be maintained without reference to specific projects, to avoid liability issues.

Moving into a new building can be a difficult experience for an owner; both operational processes and personnel must adapt to a new situation. Even if the new building is an improvement over the old one, people can find it hard to make changes and get used to a new environment. Problems and complaints are often common during the first few weeks or months of occupancy, as furniture and equipment are installed, occupants begin using building elements, and the owner and owner's staff begin getting to know the building.

The architect can assist the owner with minor problems in a hand-holding capacity by forwarding problems to the appropriate persons, explaining new features of the building, suggesting modifications to how the building is used, and answering relevant questions from the occupants.

It is also helpful to both the client and the design firm to make follow-up visits at six-month and one-year intervals. At these visits, a representative of the firm can review maintenance problems, look for defects that should be repaired under the contractor's or manufacturer's warranties, and see how materials and other design decisions are withstanding the test of time.

These services should be expected when preparing the initial agreement, because AIA Document B101, *Standard Form of Agreement Between Owner and Architect*, provides that the owner may request that the architect, without additional compensation, conduct a meeting with the owner to review the facility operations and performance. This meeting must take place within one year of the date of substantial completion.

Additional follow-up activities may include

- verifying that all operating instructions, guarantees, maintenance guidelines, and other documentation required by contract have been forwarded to the client
- verifying that the owner has received all lien waivers
- photographing the project
- sending a gift to the client, to arrive in time for opening ceremonies, if any
- holding an in-house review of the project
- evaluating the performance of consultants on the project
- compiling information about schedule performance, design fees, and construction costs for in-house records
- completing a job history for office records and use by marketing staff
- filing all project-related documents, to be kept for the required retention period

POST-OCCUPANCY EVALUATION

A *post-occupancy evaluation* (POE) is a review of a completed project after the client has occupied it for some time, typically from three to six months. A POE is not a standard part of the architect's services, but can be incorporated by including it in the original list of services in one of the standard AIA owner-architect agreements, or by using AIA Document G802, *Amendment to the Professional Services Agreement*. A POE can also be contracted for separately after the project is complete. From the architect's standpoint, it may be preferable to use AIA Document G802 because any POE services are added to the original agreement; the statute of limitations thus begins on the date of substantial completion, rather than the much later date when the POE is completed.

Most often, the client will be unwilling to pay extra for a formal evaluation of a new building unless the client intends to construct additional, similar facilities. In most instances, then, a POE is an informal review undertaken at the architect's own expense and for the benefit of the architecture firm.

Regardless of how it is accomplished or who pays for it, a POE provides valuable information for the architect. As mentioned above, it is a good public relations effort, and it allows the architect to maintain

contact with the client for marketing purposes. A POE can also be turned into a more rigorous and extensive research effort to provide the basis for evidence-based design as described in Chap. 30.

POEs are performed to provide answers to some or all of the following questions. These issues may also be considered as a part of a one-year walkthrough, if requested by the owner prior to the one-year date from substantial completion.

- Is the design image consistent with the owner's stated goals?
- Does the final design satisfy the original program requirements?
- Is adequate flexibility and expansibility provided, consistent with the owner's original needs?
- Are rooms and spaces of adequate size for their intended function?
- Were all required adjacencies provided?
- Are all site features working as intended?
- Have any structural problems been identified?
- Is the exterior envelope, including the roof, functioning as designed?
- Are construction details adequate for their use?
- Are materials and finishes holding up to use?
- Is the lighting adequate for all spaces?
- Are the HVAC systems functioning as designed?
- Are the plumbing fixtures working properly?
- Is the fire protection system working properly?
- Are the acoustics adequate?
- Were adequate power and communication networks provided?
- Are energy conservation systems and products performing satisfactorily?
- Are the actual users of the space satisfied with the performance of the building?
- Is the owner satisfied with the project?

In addition to evaluating the building itself, the architect should review in what ways the project delivery process worked and did not work, so that improvements can be made for future jobs. The firm should also review design processes, programming information, project management techniques, scheduling, fee allotment, specification and detailing methods, and construction documentation procedures.

Example 51.3

Which of the following statements about post-occupancy evaluations (POEs) is true?

(A) typically made three to six months after occupancy

(B) a standard part of an architect's services

(C) typically paid for by the client

(D) performed for the benefit of the client, not the architect

Solution

A post-occupancy evaluation is a review of a completed project, typically made three to six months after occupancy. However, it is not a standard part of an architect's services. It is most often performed at the architect's expense for the benefit of the architectural firm.

The answer is (A).