The AIA-MBA Joint Committee Best Practices Guide is a set of guidelines that are recommended industry procedures established by members of:

AIA Pittsburgh
A Chapter of The American Institute of Architects

MBA
Master Builders' Association
Of Western Pennsylvania, Inc.

Along with representatives from the aforementioned associations, the Best Practices Guide is also greatly assisted by many construction owners that not only utilize this resource but also voice their opinions to assure the owner community is represented in this guide. The following organizations have admirably represented the owners in keeping this guide relevant in today's evolving construction industry: Oxford Development; Point Park University; and, UPMC.

This Best Practices Guide is continuously reviewed by construction owners, architects, contractors and the legal community. The Guide is not intended to be rules which govern every project but instead a set of recommendations to assist in the smooth completion of construction projects. For more information on the AIA-MBA Joint Committee or its Best Practices Guide, please contact Eric Starkowicz at 412-922-3912 or estarkowicz@mbawpa.org.

GLOSSARY

ABA - American Bar Association.

Addenda - An update to a set of Bid Documents issued before bids are received.

ACEC - American Council of Engineering Companies.

AGC - Associated General Contractors of America.

Agency CM - A construction management system that manages the process of a construction project on behalf of the owner without physically delivering a construction project.

AIA - American Institute of Architects.

Allowance - A sum of money defined in the documents, to be included in the bid to cover the cost of work not fully defined by the documents.

Alternates - Amount to be added or deducted from the base bid if the corresponding change in project scope or alternate materials and/or method of construction is accepted.

ASCE - American Society of Civil Engineers.

Bid Documents - The documents used to obtain pricing from prospective contractors. In a competitive bidding process, these documents include the advertisement or invitation to bid, instruction to bidders, the bid form and the proposed construction contract documents including an addenda issued prior to receipt of bids.

Books Architect / Engineer Act - Federal Property and Administrative Services Act of 1949 which provides guidelines for Qualifications Based Selection of firms.

Builder's Risk Insurance - Property insurance that covers against physical damage to the work while construction is in progress.

BIM (Building Information Modeling) - A BIM is a digital representation of physical and functional characteristics of a facility. As such it serves as a shared knowledge resource for information about a facility forming a reliable basis for decisions during its lifecycle from inception onward.

BIM Execution Plan - A plan that is developed by the key stakeholders of a project at the inception of the project to identify the goals of the project, as they relate to the implementation of BIM, including who will implement what, and when the implementation will occur, in order to achieve the identified goals of the project.

BVC (Best Value Contracting) - A procurement method in which qualifications and price are weighted to select the constructor whose proposal represents the greatest value to the owner.

Central Model - The primary repository of information associated to a model, which re-incorporates the parts and pieces that are passed along to others for editing and updating via the use of worksets.

Certificate of Substantial Completion - The document that is prepared by the design professional, after an inspection of the work, to establish that the work, or portion of the work, is sufficiently complete in accordance with the Construction Contract Documents that the owner can occupy or utilize the work for its intended use.

Change Order - A written order to the contractor signed by the owner, or an authorized representative of the owner, authorizing changes in the work or adjustments in the contract sum and/or contract time. The change order must also be signed by the contractor to indicate acceptance of the adjustment in the contract sum and/or contract time. The contract sum or contract time may be changed only by change order.

Clash Detection - The ability to electronically review the objects in a model for confirmation that more than one object does not physically occupy a given space (coincide), or that the necessary clearances exist between two adjacent objects.

CM-@-Risk (Construction Management At Risk) - A delivery method which entails a commitment by the construction manager to deliver the project with a Guaranteed Maximum Price. The CM acts as a consultant to the owner in the development and design phases, and acts as the equivalent of a general contractor during the construction phase.

Competitive (Sealed) Bidding - A sealed bid process to demonstrate fairness and objectivity.

Constructability - Ability to construct the designed work in a timely and cost effective manner. The extent to which the design of a facility provides for ease of construction yet meets the overall requirements. The integration of construction knowledge and experience in the planning, design, procurement and construction phases of projects consistent with overall project objectives.

CM (Construction Manager) - An entity that typically contracts with the owner to provide construction management services. The CM may provide construction expertise, estimating and scheduling services. Additionally the CM may perform contracting, purchasing and supervising of construction.

COBie (Construction Operations Building Information Exchange) - A process that involves entering material information into the BIM as it is created during design, construction, and commissioning that primarily supports facilities management and building operations processes.

Database - A repository of information. In the case of BIM, the model is built around a database, allowing for objects to incorporate data describing the object (known as metadata), which provides an additional layer of intelligence to the information that can be shared via the model.

DBE (Disadvantaged Business Enterprise) - An entity that is at least 51% owned and operated by one or more socially and economically disadvantaged individual (s).

DBIA - (Design Build Institute of America).

Design BIM Authoring Tool - A computer program interface capable of generating parametric modeling components that contain physical, technical and spatial information in a relational database form that can be exchanged by open-source metadata.

Delivery Method/System - The means by which design and construction work are provided.

Design-Assist - A procurement process in which prior to completion of a design, a constructor is hired to assist a design professional of record in completing the design.

Design-Bid-Build - A project method in which the owner engages a designer to prepare the design of the complete facility, including construction documents and other contract documents. Once completed, the bid package is presented to interested general contractors who in turn prepare a bid for the work.

Design-Build - A project delivery method in which a single team develops a project, including design and construction.

Fast Track - Any project and process where there is an overlap between two or more project phases.

Federated Model - A composite BIM that links together models produced by various project participants to perform more comprehensive project analyses such as coordination, logistical planning and cost/budget. Federated BIM recognizes the fact that most current project delivery models do not support the collaborative process of Integrated BIM.

4D - The inclusion of time coordinated with the 3D objects to produce a construction sequencing simulation.

5D - The inclusion of cost either embedded into or linked to the 3D objects for budget management as it relates to time, materials, and methods.

General Liability Insurance - The most common form of insurance carried by constructors.

Georeference - A coordinate system and base point that will be common between all models to ensure that all models are referenced properly.

GMP (Guaranteed Maximum Price) - The owner agrees to reimburse the costs of the work, up to a prescribed ceiling amount.

IFC (Industry Foundation Class) - An international standard that establishes information data exchange protocol for building elements, allowing for the use of files created in one software platform (i.e. Bentley Systems) to be utilized in a different software platform (i.e. Autodesk).

Integrated BIM - A model that is produced collaboratively between project participants in an

environment where data is openly shared and continually refined throughout the participants so that they may work collaboratively and requires a consistent BIM authoring platform.

IDP (Integrated Project Delivery) - An approach to a project where all parties sign a multiple party contract that includes the owner, the primary architect (s), the prime contractor (s) as well as other key members of the construction team. This incentivizes collaborative behavior and team risk-sharing to enhance project success.

Interoperability - The ability of technology used in the BIM process to exchange data without data loss or data repurposing. Interoperability between all involved parties should be outlined in the BIM Execution Plan.

Lean Construction - A management approach that focuses on maximum value and minimum waste. A system intended to manage and improve overall performance by using input from all team members.

LEED (Leadership in Energy & Environmental Design) - Developed by the U.S. Green Building Council, the LEED Rating System is a voluntary national standard for developing high-performance, sustainable buildings.

LEED AP (LEED Accredited Professional) - LEED accreditation is awarded to building industry practitioners with detailed knowledge of LEED project certification requirements and processes and a command of integrated design principals.

Level of Development - The extent of the physical and functional characteristics that are included in a 3D object representation of a building intended to be constructed. The amount and extent of information provided, as well as who is responsible for providing this information, should be fully defined as is expected through the design, fabrication, construction, and occupancy (life-cycle) of physical structure.

Lump Sum - The lump sum is a fixed price for the scope of the work described in the contract documents. The general contractor assumes the risk of cost increases to perform the work required to complete the scope of the work described in the original contracts documents.

MBA (Master Builders' Association of Western Pennsylvania).

Metadata - Data that is associated to the parts and pieces that make up the contents of a model.

MBE (Minority Business Enterprise) - An entity that is at least 51% owned and operated by a minority.

Multiple Prime Delivery - Instead of contracting with a single entity, the owner contracts with multiple trade contractors for the completion of the work and the owner assumes the responsibility for the coordination.

Neutral Schema - A collection of database objects, including tables, views, indexes, and synonyms

that are non-proprietary.

NBIMS (National Building Information Modeling Standard) - A living document drafted to promulgate standards for consistency in BIM. The document is a result of a project committee of the buildingSMART Alliance, which is a council of the National Institute for Building Sciences.

OmniClass - An emerging standard for comprehensively classifying the built environment that is attempting to unify the Uniform and MasterFormat systems.

OSHA (Occupational Safety & Health Administration).

PA Separations Act - Enacted in 1913, this law requires a public owner to bid and award at least four (4) separate and multiple prime contracts for one (1) construction project. Pennsylvania is one (1) of only three (3) states in the country to abide by such a requirement.

Parametric - The ability to make a change to a single view of a model and have the change automatically translated to all other views of the model, maintaining uniform relationship in all aspects of the model.

Payment Bond - A surety bond that secures a constructor's obligations to pay subcontractors, supplies and other lower tier entities beneath a general contractor.

Phasing - The ability to breakdown a model into chronological layers, allowing for the isolation of new items created / demolished during a particular phase, or the sequential build-up of a project from start to finish.

Prime Contractor - A contractor on a project that has direct agreement with the owner.

Project Manual - Contracting requirements and specifications usually bound into one or more volumes.

Punch List - A list made near the completion of work, indicating items to be furnished or work to be performed by the contractor and/or subcontractor in order to complete the work as stipulated in the construction contract documents.

QBS (Qualifications Based Selection) - Selection based on qualifications of a firm, team, experience and project capability.

Quantity Take-Off - The ability to automatically generate and extract quantities from the objects within a model, from the individual selection of an object within a model, the creation and export of a schedule, or the user of third-party software that automatically extracts the information from the model.

Retainage - Money earned by the constructor but held by the owner pending completion of project.

RFI (Request For Information) - A written request for more specific information about a certain

aspect of a project.

RFP (Request For Proposal) - A written request from an owner, architect or constructor for cost proposal for design, management or construction services. The RFP defines the scope of proposed work.

RFQ (Request For Qualifications) - A written request from an owner, architect or constructor documenting a scope of work and requesting professional qualifications for that scope of work.

Schematic Design - The stage at which the design is developed on a conceptual basis.

Shop Drawings - Detailed drawings by suppliers and manufacturers of various material and equipment. They must confirm to the original drawings, but not construction contract documents.

Solibri Model Checker - A software solution that analyzes BIMs for integrity, quality and physical safety and provides some rudimentary code checking capabilities.

Spatial Coordination - Also called "clash detection", a model review that identifies interferences between objects within the BIM prior to work in the field.

Specifications - A description of the performance, materials and workmanship required for a construction project. The written material containing the standard provisions and special provisions as may be necessary, pertaining to the types and qualities of material to be furnished under the contract.

Standards - A rule or principal that is used as a basis for judgement as established by authority, custom or general consent as a model or example.

Submittals - Shop drawings, product data, samples, certifications, calculations and project closeout documents prepared and submitted to the design professional by the contractor / subcontractor. Submittals more fully describe the work the contractor will install that the design professional needs to review for general compliance with the design intent. The information is typically more detailed than what is shown in the construction contract documents and provides specific data on the material to be used. Submittals are not construction contract documents but they are contract requirements.

Substitution - This allows for the constructor to recommend different products from those specified.

3D - The representation of construction elements intended to be used in the actual physical construction that digitally and virtually represents size, geometry, and spatial relationship in an X, Y, and Z coordinate system.

Tri-Party Agreement - An agreement between Owner, Designer, and the Contractor that in essence creates a new single entity for the duration of a project, in which all members of the project team share in the potential risk and reward for a project, for the promotion of collaboration (see also Integrated Project Delivery).

Uniformat II - ASTM E1557 Standard that provides a common structure linking the building program, specifications, and estimates through its classification for building elements and related site work.

Unit Prices - These are used to identify costs of materials or activities when actual quantities can only be estimated prior to construction.

Value Engineering - A process whose objective is to affect economy in the cost of constructing a project or to improve the constructability without detrimental impact on project quality.

Virtual Design & Construction - A synonym of BIM.

WBE (Woman Business Enterprise) - An entity that is at least 51% owned and operated by a woman.

Worksets - The ability to breakdown a model into related parts and pieces, which can be temporarily separated, edited, and brought back together, allowing multiple people to "checkout" and work on different aspects of the project simultaneously.

XD - Any use of BIM that is not currently categorized as 3D, 4D or 5D (i.e. the incorporation of as-built documentation into a model).

Section B-1

Recording Significant Changes Made During Construction

The Joint Committee recommends that the term "as built" should not be used on drawings, contracts, correspondence or in discussion.

If documents recording significant changes made during construction are required by the Owner, the Architect shall revise the original tracings to reflect such deviations from the original contract drawings, based on data taken from change orders, approved shop drawings or sketches made by the various Contractors and tradesmen engaged in the work. The information and detail, location and related information regarding buried or hidden work is of particular significance. Under no circumstance should such revisions to tracings be made by anyone other than the Architect or Engineer whose seal they bear.

Since dependence upon these documents may lead to assumptions of accuracy and precision of location which are not inherent in normal construction processes, the Architect should be careful never to imply that his drawings show the construction exactly as it has been built. The term "as built" can unintentionally mislead some person to rely too precisely on the information shown. Care must be taken to call the attention of those who may use such documents in the future to the fact that much of the work indicated on any construction drawing is diagrammatic only, (for example, the actual installation of piping and conduits can rarely, if ever, be drawn in their precise location and detail).

Recommendations

If documents recording significant changes are ordered by the Owner, it is recommended that the Architect insert in the Special Conditions a requirement that the various Contractors and tradesmen shall keep accurate information and sketches regarding exact detail and location of their work as actually installed, recording such information and all significant changes on a set of prints, delivered by the Architect to be used for this specific purpose only. When the size or complexity of the project warrants it, recording such changes may be made the responsibility of an inspector or clerk-of-the-works, in which event, the Special Conditions should make this fact known.

Also, it is recommended that a notation, substantially as follows, be included on each such revised drawing:

NOTE: "This drawing has been prepared to reflect significant changes made during construction. It is not intended to set forth with complete accuracy and precision and exact detail, location, and related information regarding installation, but is intended for use only as a convenient reference to installations made during construction."

History of Recommendation:

Revised January, 2009
Revised April, 1989
Revised September, 1980
Revised December, 1974
Approved November, 1971

Section B-2

Document Distribution for Bidding Purposes

In regards to document distribution for a prime bidder, the Joint Committee recommends one set of documents be provided for prime bidders at the expense of the Owner. Any additional sets should be purchased at the bidders' expense from the designated reprographics company. If a deposit is required it should be returned within the time frame designated within the bidding documents upon return. Electronic document distribution is highly recommended for bidding, but should only be used in addition to hard copy distribution. All electronic document distribution should be in read-only formats such as PDF, JPEG, TIFF, etc. In either case, any subsequent changes to the documents should also be provided to prime bidders free of charge in both hard & electronic copy as applicable.

The Joint Committee recommends that all Subcontractors (or those Subcontractors included in the Owner's 'Approved Subcontractor List') be allowed the opportunity to purchase full and/or partial sets of documents at their discretion at a designated reprographics company. It is strongly encouraged that the documents also be posted for view and/or purchase at local construction posting organizations; like the Pittsburgh Builders Exchange. Posting organizations should make bidding documents available to local Subcontractors and suppliers free of charge to the Owner and will result in more bidder participation. Again, electronic document distribution is recommended, but only in addition to hard copy distribution. All electronic document distribution should be in read-only formats such as PDF, JPEG, TIFF, etc. Again any subsequent changes to the documents should also be provided to Subcontractors free of charge in both hard & electronic copy as applicable.

To announce document changes, in all cases it is the responsibility of the person (s) distributing the bidding documents to the locations and organizations made available immediately to the bidding community to keep these documents current. All prime bidders should be made aware that document changes are made by (either or all) phone, email, and/or fax notification. Addenda should be supplied at no charge for every previously issued set of documents.

History of Recommendation:
Revised July, 2010
Revised November, 1993
Approved January, 1967

Section B-3

Drawings and Specifications for Successful Bidders

The Architect or Engineer should state in the bidding documents the number of sets of drawings and specifications which will be furnished to the successful bidder at no cost.

The number of sets so stated should be in addition to the number required for obtaining required permits.

The Architect or Engineer should advise the Owner of the above requirements and make arrangements for reimbursement. All additional copies of drawings should be provided at the Contractor's expense. The Architect or Engineer should make all arrangements for their reproduction, and the bidding documents should indicate the name and address of the printing establishment and the cost per sheet. The Contractor should include the cost of such additional sets in his bid. Additional sets of specifications should be obtained from the Architect or Engineer at a cost stated in the bidding document.

Electronic Document Distribution should be made available to the successful bidders distributed and updated in a manner agreed upon by the Contractor and Design Professional(s).

History of Recommendation:
Revised July, 2010
Reviewed April, 1987
Revised September, 1980
Revised January, 1975
Approved November, 1971

Section B-4

Submittals

The Joint Committee recommends the following be made regarding the relative responsibilities of Architects, Engineers, Prime Contractors and Subcontractors with respect to submittals and coordination. Each entity should make an attempt to be prompt and orderly in submissions and approval of shop drawings, product data and samples needed to maintain the construction schedule.

Submission:

- The Contractor should prepare a "log of submittals" for the Design Professional, coordinating with overall time schedule while allowing time for preparation, review, fabrication, and delivery.
- The Contractor should require a review of shop drawings, product data and samples by respective Subcontractors prior to making its own review and submittal to the Design Professional. Subcontractors should review shop drawings for completeness and accuracy, and submit them as needed to perform their work efficiently, on schedule, and in a manner that will not cause delays for the Contractors or Subcontractors.
- The Contractor should coordinate all shop drawings, product data, samples, and review them for accuracy, completeness, and contract compliance before submitting to the Design Professional. Submittals of interrelated items should be submitted to the Design Professional at the same time, whenever possible.
- The Design Professional and Contractor should assign qualified personnel to review and take action on the submittals. The Design Professional should review all submittals promptly in order to maintain the project schedule. The time allocated for review should be established in the General Conditions or by agreement between all parties once the construction phase of the project begins.

Review:

- Each reviewer should sign, date and initial the returned submittals and indicate the status of review.
- The Contractor should monitor the flow of submittals, and expedite it as needed to meet the project schedule.
- All submittals should be accompanied by transmittals indicating various reviews. Only the minimum number of copies should be submitted for review and return. A reproducible copy with all reviewers' comments and acceptances should be maintained.

Electronic Submittals:

- The use of electronic format data is strongly encouraged whenever practical. Electronic data should be in read-only formats such as PDF, JPEG, or TIFF files.
- An ftp site or other internet-based central exchange site should be established and one of the parties maintain accurate tracking of dates when data is posted by any party.

History of Recommendation:

Revised July, 2010
Reviewed April, 1987
Revised November, 1980
Revised January, 1975
Revised November, 1971

Section C-1

Advertising and Receiving Bids

The Joint Committee recommends that the following principles be observed in connection with the advertising and receiving of bids:

1. Sufficient time should be allowed for the Contractors to prepare their bids to avoid the necessity of bid date extensions.
2. A complete set of Bid Documents including addenda, when issued, should be kept on file during the Bid Period at the local plan rooms (i.e. Pittsburgh Builders Exchange, F. W. Dodge, etc.).
3. Bids should be received, preferably between 2:00 and 5:00 p.m., and opened immediately thereafter. Due dates should be scheduled Tuesday through Thursday, excluding legal holidays, or on days prior to or following legal holidays. Architects and/or Engineers should make an effort to clear bid dates with the local plan rooms to avoid conflicts with other projects being bid.
4. In the absence of a public bid opening, Architects and/or Engineers should issue a complete bid tabulation to all bidders after the contract has been awarded.
5. In a circumstance where the low bid is substantially lower than other bids, raising concern as to its validity, the Architect should notify the low bidder or the concern and allow the bidder 48 hours to reconfirm or withdraw the bid.

COMMENT: Time constraints inherent in the competitive bid process, amplify the opportunity for error which can be punitive to both the bidder and the Owner. Besides having clear documentation, Contractors should be allowed an appropriate amount of time to schedule estimating work, review documents, and clarify questions in order to submit a responsible bid. It is generally acknowledged that a fair and responsive bid is better for both the Owner and Contractor rather than recovering from bidding errors.

The bidding process, by its very nature, suggests that the low bidder will be awarded the contract. Where not constrained by governmental bidding requirements, pre-qualification of bidders and limited bid lists increase the chances of getting the best results.

Contractors appreciate public bid openings because it assures them knowledge of the bid results and reduces the opportunity for irregularities.

History of Recommendation:
Reviewed July, 2010
Revised January, 1996
Revised December, 1991
Revised April, 1987
Revised April, 1981
Reviewed February, 1975
Revised November, 1971

Section C-2

Addenda

Addenda are written or graphic instruments which are issued prior to execution of the Contract, to modify or to interpret the bidding documents. Addenda will become part of the Contract Documents when the Construction Contract is executed.

Each bidder should examine the bidding documents carefully and, no later than seven days prior to the date of receipt of bids, should make written request to the Architect for interpretation or correction of any ambiguity, inconsistency or error therein which the bidder may discover. Any interpretation or correction should be issued as addendum by the Architect **at least four working days** in advance of the date of receipt of bids.

Items in Addenda should be identified in a numbered sequence with the text arranged in the sequence of the Drawings and the Project Manual, with each drawing item identified by the sheet and detail number of the Drawing, and each item of the Project Manual by section, article and paragraph number.

If the element of time is restrictive, it is acceptable for the Architect to notify all bidders by fax or email, as long as documentation of notice to all bidders is maintained and the notice is confirmed by a written addendum.

Major addenda items affecting the bidding may require consideration of postponement of the bids.

No bidder should rely upon any interpretation or correction given by any other method.

The bid form should provide for bidder acknowledgement of receipt of Addenda, with each Addendum identified by number and date of issue.

History of Recommendation:
Revised July, 2010
Revised January, 1998
Revised April, 1987
Revised February, 1981
Revised February, 1975
Revised November, 1971

Section C-3

Alternates

The Joint Committee recommends that the use of alternates be discouraged. However, when it is necessary to use them, the Joint Committee recommends an alternate be clearly defined and structured as a deduct alternate whenever possible. Further, if there is more than one alternate, the alternates should be listed by priority and intended order of selection.

COMMENT: It is recognized that alternates are inserted into the Contract Documents to provide greater flexibility in meeting budget goals. When the scope of an alternate is not clearly defined, bidders are left to make assumptions about the intent and scope of the alternate. Misinterpretation by a bidder can result in a cost proposal which compromises the value of the process and the results.

The number and extent of alternates should be minimized. Time constraints inherent in the competitive bid process, amplify the opportunity for error which can be punitive to both the bidder and the Owner. It is generally acknowledged that a fair and responsive bid is better for both the Owner and the Contractor rather than recovering from a bidding error.

History of Recommendation:
Reviewed July, 2010
Revised March, 1995
Reviewed April, 1987
Reviewed September, 1985
Revised November, 1977
Revised March, 1975

Section C-4

Bidders Information Sheet

The Joint Committee recommends that a complete and concise Bidding Information Document be included in the Project Manual.

The Joint Committee recommends that the following information be included within this document:

1. Date and time that the bid is due noting the prevailing time and identifying the official time clock. The committee recommends that the owner confirms the time of receipt of each bid with its respective bidder.

2. Acceptable methods of bid delivery (hard copy, fax, email, dedicated website). The committee recommends against acceptance of bids via email as there is potential for message blocking or server issues that would prevent timely receipt of bids. If owner elects to receive bids via email the committee recommends confirmation of receipt.

3. Location by street address, fax number, email address or dedicated website where the bids will be accepted and the name of the intended recipient of the bid.

4. Notice of intent to open bids privately or publicly. If bids are to be opened in public, specify who may attend and provide the date, time and location.

5. List of documents required for proposal submission including numbers of copies.

6. Notice of requirement for bid security including the amount (expressed in dollars or percentage of bidder's proposal) and the acceptable format (Bid Bond or Certified Check).

7. Date, time and location for the pre-bid conference with stipulation of mandatory attendance if applicable.

8. Notice of governing General Conditions of the Contract (with Special Conditions if applicable) and intended Form of Agreement. A copy of each should be bound within the Project Manual (following acceptable AIA reproduction practices if applicable).

9. Notice of requirement for Performance and Payment Bonds, General Liability Insurance, Builder's Risk Insurance and other insurance.

10. Notice of requirement for permits including the name of the authority having jurisdiction in the location of construction.

11. List of other documents that are available to bidders but are not included in the Project Manual (soil report, existing drawings) and the location where these documents can be obtained or viewed.

12. Notice of goals for MWBE participation.

13. Notice of goals for LEED requirements.

14. Notice of requirement to use a specified list of subcontractors.

15. Notice of any required wage or union stipulations.

Prior to preparing the Bidding Information Document, determination should be made with the Owner whether the bid process will be by invitation or by advertisement.

The bid form should be formatted to follow industry standards which allow adequate space for the bidder to include all necessary information requested including bid prices, alternates, unit prices and acknowledgement of addenda.

The committee recommends that a copy of the Bid Form and all other documents required for the bid submission be bound in the Project Manual.

History of Recommendation:
Revised April, 2009
Revised April, 1987
Revised November, 1985
Revised March, 1975
Revised November, 1971
Revised January, 1967
Approved April, 1963

Section C-5
Bidding on Unclassified Excavation

The Joint Committee recommends that Contract Documents allow Contractors the means to be fairly compensated for Work, and to that end, favors classifying types of excavation.

COMMENTARY: The Joint Committee believes that the purpose of the bidding process is to provide a means by which the Owner can obtain comparative pricing of like products. In the ideal world, the process produces a win-win relationship between the Owner and Contractor.

Excavation work has been specified as either classified or unclassified. Unclassified excavation makes no distinction between the requirements to remove loose fill at one extreme to rock at the other extreme. The Bidder, by accepting the conditions of unclassified excavation, assumes the risk for whatever appears. Because it is impossible, even with an investigation of the subsurface conditions, to know with absolute certainty what will be encountered during excavation, it is highly likely that someone loses.

Excavation should be classified with a description of material and a definition of the effort required for removal. It is recommended that specific language be incorporated into the specifications to quantify the anticipated type of excavation to be included in the base bid and clearly define rock excavation. An example of such language is:

1. Work, in general, consists of, but is not necessarily limited to:
   a. Bulk excavation for building pad and foundations, parking lots, access roads, sidewalks and other structures and site improvements as indicated on the Drawings.
   b. Trench excavation, backfilling, compaction, thrust blocks, and related items to complete installation of sanitary and storm sewers, natural gas piping, underground electrical service, water service, and other site utilities as indicated on the Drawings.
   i. All excavation shall be assumed to be earth (non-rock).
   ii. Bidder shall provide a unit price for rock excavation as an extra to the Contract.
   iii. Bidder shall provide a unit price for off-site disposal of unsuitable material and replacement with suitable backfill material compacted in place as an extra to the Contract.
2. Earth excavation includes excavation of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.
3. Rock Excavation:
   a. When rock is encountered within the limits of the excavation, immediately notify the Owner and Architect and do not proceed further until instructions are received and measurements made for the purpose of establishing the and volume of rock excavation.
   b. Volume of rock excavation shall be determined by the location of the "pay lines." Pay lines shall be determined with the Owner and Architect prior to commencement of rock excavation and shall be the basis for payment. Pay lines shall be defined as:
   i. The elevation of the bottom of the foundation of the structure or the designated over-excavation below pipes, conduits, floor slabs, foundations, site amenities, etc.
   ii. The vertical side planes which will afford an adequate and safe working area between the

structure wall and face of the cut.
c. Rock excavation consists of the removal of hard igneous, metamorphic, and/or sedimentary rock which cannot be excavated without blasting or by means of a track mounted power excavator, equivalent to Caterpillar Model No. 215C LC, and rated at not less than 115 HP flywheel power and 32,000 pound drawbar pull and equipped with a short stick and a 42 inch wide, short tip radius rock bucket rated at 0.81 cubic yard (heaped) capacity, and all boulders or other detached stones each having a volume of ½ cubic yard or more. Trenches in excess of 10 feet in width and pits in excess of 30 feet in either length or width are classified as open excavation.
d. Unit Prices, measured in place, shall be provided for:
i. Mass cut, spoiled - over 7'-0" wide, fractured by blasting or machine, loaded, removed, and disposed of on-site.
ii. Mass cut, hauled - over 7'-0" wide, fractured by blasting or machine, loaded, removed, and disposed of off-site.
iii. Trench cut, spoiled - under 7'-0" wide, fractured by blasting or machine, loaded, removed, and disposed of on-site.
iv. Trench cut, hauled - under 7'-0" wide, fractured by blasting or machine, loaded, removed, and disposed of off-site.
v. Hand removal, spoiled - rock fractured by hand tools (i.e. pneumatic) loaded, removed, and disposed of on-site.
vi. Hand removal, hauled - rock fractured by hand tools (i.e. pneumatic) loaded, removed, and disposed of off-site.
e. Unit prices shall be used to calculate the net change to the contract amount by means of multiplying the volume of rock excavation determined under Section 2.b by the Unit Price determined under Section 2.g less the value of earth excavation for this volume already included in the contract.

4. Unsuitable Material:
   a. Materials unsuitable to be used for fill include:
   i. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.
   ii. Expansive clay or carbonaceous soils.
   iii. Materials such as coal ash, wood chips, stumps, branches, boughs, or construction and demolition debris.
   iv. Satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

It is recommendation of this Committee that all project budgets have a contingency included in anticipation of excavation of unsuitable material. Users are directed to AIA/MBA Joint Committee Best Practices Guide C-7: "Investigation of Soil and Sub-Surface Conditions" for related information regarding excavation and D-6: "Unit Prices" for related information regarding cost control of excavation.

History of Recommendation:
Revised October, 2008
Revised May, 1996
Revised April, 1987
Reviewed January, 1967

Section C-6

Substitutions

The Joint Committee recommends that the contract documents clearly indicate the products used for basis of design. The Joint Committee further recommends that when alternative products would be acceptable for use, those products should be listed by manufacturer and should include product model numbers and/or names.

If the contract documents allow for substitutions to be part of the bidding process, there should be clear language that outlines the procedure for submission, the time required prior to bid for a substitution to be properly evaluated, and the criteria that will be used to evaluate the substitution. An addendum should be issued by the Architect which indicates that the requested substitution is acceptable for use under the terms of the contract documents.

Substitutions after the bid date are to be considered Value Engineering and should abide by the Value Engineering recommendations made by the Joint Committee.

The use of terms such as "or equal" and "or approved equal" is discouraged without clear indication of what the architect would consider to be an equal product.

History of Recommendation:
Approved June, 2010

Section C-7

Investigation of Soil and Sub-Surface Conditions

The Joint Committee recommends that, prior to bidding, Owners obtain the services of a geotechnical engineer to investigate subsurface conditions. The extent of the investigation should assure that the geo-technical data and bearing capacity tests necessary to make foundation recommendations are secured for the building site. The geotechnical report should also address areas of major excavation and grading required to support site utilities and significant site amenities. Areas of excavation which will be unsuitable for reuse as fill, areas of rock excavation, and anticipated groundwater levels should be delineated in the report.

The full geo-technical report including data pertinent to the sub-surface conditions and foundation design recommendations should be made available to Bidders. It is recommended that the geo-technical report, including design recommendations of the geotechnical engineer, be included as part of the Contract Documents, not simply attached 'For Information Only'. The design professional should follow the recommendations of the geotechnical engineer in execution of the Contract Documents or provide alternative design criteria used instead as an amendment to the geotechnical report. Further, we recommend that the contract documents require monitoring and testing by a geotechnical engineer during construction to confirm suitable bearing conditions and compliance with the recommendations. And, in addition, if the recommendations of the geotechnical engineer requires the evaluation of qualitative rather than quantitative performance criteria to determine compliance, we recommend that the construction monitoring and testing services be contracted directly with the owner.

COMMENT: It is possible for a project to be completed without conducting a subsurface investigation. It is however, considered good and prudent practice to review subsurface conditions to insure that proper bearing capacity can be developed to carry the anticipated loads of the structure, as well as the suitability of the material upon which the structure will bear. Neither the Architect nor the Contractor has the expertise to evaluate subsurface conditions and, therefore, they rely on the recommendations of the geo-technical engineer. A contract with the Owner establishes an independent, non-conflicting evaluation of the sufficiency and quality of the work completed by the Contractor

By making the geo-technical report available to the Contractor during bidding, the Contractor can develop reliable costs based upon conditions that will be encountered during construction. If such information is not available, the Contractor may qualify or adjust their bid to reflect the added risk associated with respect to the unknown sub-surface conditions. Consideration needs to be given to a time extension of the excavation schedule, and overall construction schedule, if rock or unsuitable subsurface soils not identified before the award of Contract are encountered during the course of the work.

Users are directed to AIA-MBA Joint Committee Best Practices Guide Section C-5: "Bidding on Unclassified Excavation" for related information regarding excavation.

Users are directed to AIA-MBA Joint Committee Best Practices Guide Section D-6: "Unit Prices" for related information regarding cost control of excavation.

History of Recommendation:
Revised October, 2008
Revised January, 1996
Revised April, 1987
Reviewed September, 1981
Revised February, 1976
Revised November, 1971
Approved May 4, 1970

Section C-8

Listing Subcontractors

Owners often wish to know what Subcontractors/ Suppliers a General Contractor intends to engage to assess their qualifications. Asking for these names at the same time as the bid is due is contrary to the procedures established in the AIA General Conditions. In accordance with the AIA General Conditions, when a Subcontractor list is required, the apparent low bidder should be allowed to submit their list after bids have been received by the Owner. This allows the Bidder to carefully analyze the Subcontractor's and Supplier's bids to determine the accuracy and scope of the bid.

Upon reviewing the proposed list, the Owner should have the option of requesting changes to the Subcontractors. If an Owner's suggested Subcontractor's price is more than the General Contractor's listed Subcontractor, the Owner should be willing to pay the cost difference.

History of Recommendation:
Approved April, 2010

Section C-9

Contract Documents

The Joint Committee recommends that prior to the award of the contract, the Architect make available a revised set of contract documents which incorporates all changes to those documents resulting from bulletins, addenda, and all accepted alternates, issued prior to the contract date. These documents will be used as the basis for the contract and as the signature set, if required. The Supplementary General Conditions should state if this service will be provided.

The Joint Committee further recommends that when any drawing or specification page is issued to replace an existing page, all changes should be clearly indicated to identify the affected area. A key to indicate the date of the change should also be included in the document.

History of Recommendation:
Reviewed July, 2010
Approved March, 1988

Section D-1

Changes in the Work

Whenever a change in the work is required, the Joint Committee recommends that an adjustment in the contract sum be made on a lump sum basis. The amount for such changes is to be submitted by the contractor, and agreed to by the Architect and Owner, with a formal change order issued, before the work is commenced.

When a lump sum agreement is not practical, the changes may be performed on a cost-plus basis, with a reasonable allowance for overhead and profit, or an agreed-upon unit price basis in accordance with the requirement of the General Conditions of the Contract.

A change in the work may also require a change in the contract time. Time extension should be agreed upon at the same time as the change in the contract sum. All parties involved in the project, including all subcontractors, should be allowed to evaluate changes and be notified of all agreed-upon changes and/or time extensions.

History of Recommendation:
Revised October, 2009
Revised January, 1990
Reviewed April, 1987
Revised December, 1981
Revised September, 1981
Reviewed April, 1976
Revised November, 1971
Revised January, 1967
Approved September, 1958

Section D-2

Final Acceptance of Contract Work

It is recommended that the following procedures be observed:

1. As the work nears completion, the Contractor shall review the requirements of the Contract Documents, shall inspect the work, and shall inform all parties involved of work to be corrected or completed deeming the project is substantially complete. "Substantial Completion" should be established as the date the Owner can occupy and utilize the work or a designated portion for its intended use.

2. Upon receipt of a written statement from the Contractor signifying that work is substantially complete and containing a list of items to be corrected or completed, the Architect will visit the site to verify. If the Architect agrees that the work is substantially complete in accordance with the Contract Documents, he will make a pre-final inspection in the presence of a representative of the Contractor and will prepare a "Certificate of Substantial Completion."

3. The Architect will confirm the list of required corrections and attach the punch list to the Certificate of Substantial Completion. This document shall establish (a) the date of Substantial Completion; (b) the responsibilities of the Owner and Contractor for security, maintenance, temporary utilities, damage to the existing building, and insurance; and (c) the timeframe in which the Contractor shall finish all items on the punch list. The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment ofretainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents. A sum equal to one and one-half times the value as estimated by the contractor and the architect will be withheld until the punch list work is complete. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. *(See also section D-5: "Retained Percentage" for related information regarding retained percentage and substantial completion.)*

4. The Contractor shall divide the list into each trade, with provision on the list for indicating satisfactory completion by a mutually agreed upon date. When the Contractor has satisfied all items on the list have been satisfactorily corrected or completed, the Contractor shall notify the Architect in writing and make Application for Final Payment.

5. The Architect will make the final inspection to confirm the Contractor's statement and, based upon the condition of work inspected, the Architect will take appropriate action.

6. Punch list work should not delay normal approval of Contractor request for payment, including Certificates for reduction and/or elimination of retained percentage due the Contractor provided a sum sufficient to complete remaining work is withheld.

7. It is the Contractor's responsibility to notify the Architect of "Substantial Completion," in order to

minimize thepunch list being prepared by the Architect. The Architect/Engineer shares a responsibility to make the Contractor aware, throughout the course of the work, of conditions known that would eventually become punch list items if not promptly corrected, thus minimizing corrective work and reducing the number of final punch list items.

8. Whenever possible, there should only be one punch list developed and the items on the list should be corrected or completed by the Contractor within a reasonable and stipulated number of days after issuance.

9. When the Contract Documents are satisfied and the punch list is completed, the Architect will promptly issue a final Certificate for Payment representing his acceptance of the work.

History of Recommendation:
Revised October, 2009
Revised October, 2008
Revised April, 1987
Reviewed January, 1987
Approved April, 1976

Section D-3

Liquidated Damages

The Joint Committee recommends that Liquidated Damage Clauses be used sparingly and with discretion because these clauses can create adversarial relationships amongst the project team and add additional costs to a bid. Furthermore the Joint Committee recommends use of Liquidated Damage Clauses only in cases to provide monetary relief for specific and identifiable damages resulting from the project not being completed on schedule for reasons attributable to a contractor's non-performance. It is important to understand the full impact of the time of completion, especially if exceptional efforts will be needed to meet the schedule. If the owner is considering liquidated damages, a bonus for early completion is recommended. Additionally, the owner should not consider liquidated damage clauses as a mechanism to achieve an unrealistic completion date.

Where such clauses are necessary, the contract should be based on a reasonable completion time, the amount of damages should be factual and calculable, and adequate provisions should be made for extension of time for delays not caused by the Contractor.

This dollar amount of said Liquidated Damages shall be identified as part of the bidding process prior to the time of bidding.

History of Recommendation:
Revised May, 2009
Revised April, 1987
Reviewed February, 1983
Reviewed September, 1976
Revised November, 1971
Approved January, 1967

Section D-4

Order of Precedence Between Drawings and Specifications

The Joint Committee, realizing that there are options to the contrary, recommends that specifications and plans be considered as complimentary. Where a Contractor finds a discrepancy between them, he should immediately call it to the attention of the Architect or Engineer and request that a written clarification be issued. Where the Architect or Engineer finds a discrepancy, he should immediately call it to the attention of the Contractor, clarifying the discrepancy, and issue a written clarification of the requirement.

In cases of conflict, case law generally supports written specifications as ruling over graphic information.

History of Recommendation:
Revised July, 2010
Reviewed April, 1987
Reviewed February, 1983
Revised December, 1976
Revised November, 1971
Revised January, 1967
Approved September, 1958

Section D-5

Retained Percentage

Retention of payment (retainage or retention) is the practice of withholding a portion of the payment due to a contractor. Retention can be an effective tool for Owners to obtain contract compliance. For contractors and subcontractors, retention can be a burden on cash flow and profitability. The objectives of the Owner and the impact on the contractor should be properly balanced to achieve the project objectives.

The amount of retention and any special circumstances that affect the amount of retention should be clearly defined in the contract documents. Typically, retention is calculated as a percentage of the payment due, but specific amounts at certain defined events may also be used. Common practice is ten percent (10%) of each approved payment due from the Owner to the contractor where there has been proper performance of the contract. Common practice also includes a stipulation that at 50% of project completion, the retention amount should be reduced to 5% until substantial completion. Upon substantial completion, the retention should be reduced to 1 1/2 times the value of the uncompleted work (150%).

In order not to unduly burden subcontractors that perform work early in the project, retention can be reduced at certain project milestones.

Retention should not be confused with denial of payment for work that does not comply with the contract documents, breaches of contract or for reasons to protect the Owner from claims from third parties.

Users are directed to AIA-MBA Joint Committee Best Practices Guide D-2 Final Acceptance of Contract Work.

History of Recommendation:
Revised May, 2009
Reviewed April, 1987
Revised February, 1983
Revised November, 1976
Revised January, 1976

Section D-6

Unit Prices

The Joint Committee recommends that Unit Prices be used only when necessary and when the scope of work can be accurately described. Unit Prices should include the Contractor's overhead and profit. There should be a differential allowed between "add" and "deduct" unit prices.

In a lump sum bid situation, unit prices should not be used in determining the successful bidder. If the scope of work has changes equaling an addition or subtraction over 10% of the originally scheduled amount, the Owner should renegotiate the unit prices with the Contractor or consider completing the work on a lump sum basis.

History of Recommendation:
Revised May, 2009
Reviewed April, 1987
Revised July, 1985

Section D-7

Allowances

Allowances should be converted to include a defined scope of work as quickly as possible. When allowances are called for in the specifications, all items included therein should be clearly stated.

Unless otherwise provided in the Contract Documents:

1. Allowances shall cover the cost to the Contractor, of the materials, labor and equipment required to be delivered, furnished and installed at the site.
2. Allowances should clearly state whether the costs of freight, installation, unloading and handling, and tax are included.
3. The contract should define whether Contractor's overhead and profit are to be applied to adjustments in the contract price.
4. Whenever the cost is more than, or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order.
5. Where any trade discounts shall be applied to materials, said discount shall be granted to the Owner.
6. The contract documents should fully describe the materials and associated costs in the allowances.

History of Recommendation:
Revised May, 2009
Revised January, 1992
Reviewed May, 1990
Reviewed April, 1987
Revised June, 1985

Section D-8

Securing of Building Permit Procedure

A building permit is typically required for new construction, additions, and major renovations to pre-existing structures. Failure to obtain a permit can result in significant fines and penalties, and even the removal of unauthorized construction if it cannot be made to meet code. The permitting process is complicated by the complexities of construction technology, guidelines for accessibility, overall safety and welfare of the intended occupants, and ecological concerns. Some of these items are administered locally, and some by other layers of governing agencies.

The schematic design phase should include a determination of the Authorities Having Jurisdiction (AHJ) over the project, and a review of their permitting process(es). The Design Professional should review preliminary plans with the proper boards, commissions, and agencies that have jurisdiction over the project. For example, in addition to a building permit, the project may also require review and approval by the local zoning board, the contextual design review board for the community, etc. It is never too early for the Design Professional to establish a dialogue with the AHJ in order to avoid potential issues at the time of permit filing.

The obligation for securing approval of plans and specifications rests wholly upon the Owner or the Architect, whose plans must conform to the requirements of the building codes and the building department. The permitting process should be initiated by the Owner or the Architect, at the time when Contact Documents are completed, or not later than at the time the documents are issued for bidding. This provides the opportunity to resolve any building code issues that may arise during plan review, which often require redesign and modification of the working drawings and specifications. Certain work, such as pre-engineered buildings, requires approval by the specialty contractor.

The Contract Documents should clearly identify who will apply for and obtain permits, as well as whose responsibility it is to pay for them. Whoever files the applications should be someone with a good working knowledge of the permitting process. Typically, the Contractor is responsible for obtaining the building permits. The cost of the permit fee is usually based either on the building area or the project construction cost. It is best to obtain all necessary permits as early as possible, to minimize delays in beginning construction on a project.

The project delivery method, such as early packages for fast track delivery, may require alterations to the permitting process. Some municipalities may issue partial permits such as for grading, foundation, or demolition. Generally, the new construction must be inspected during construction and after completion to ensure compliance with national, regional, and local building codes. If a municipality, county, or state for which you are applying for a permit has third party inspections, the cost of the inspections should be included in the overall cost of the permit.

History of Recommendation:
Revised April, 2010
Revised October, 2009
Revised March, 1986

Section E-1

Temporary Services - General

Provisions for anticipated Temporary Services should be incorporated in the General Requirements of the specifications, but not in each product specification section. The responsibilities of each of the mechanical and electrical Contractors (or subcontractors) should be specifically defined where there are separate mechanical and electrical contractors, but not where work is under a single Prime Contractor.

When appropriate, the following Temporary Services should be addressed:

1. Heat - as recommended in Section E-2
2. Light & Power - as recommended in Section E-3
3. Water supply - as recommended in Section E-4
4. Barricades, Fending, Sidewalk protection
5. Stairs, Netting and Planking for multi-story buildings
6. Offices for field Superintendent/Inspector/etc.
7. Sheds for Carpenters/Brick Layers/Laborers/Storage/etc.
8. Toilets/Sewage
9. Enclosures
10. Telephone
11. Roads
12. Hoisting/Crane
13. Scaffolding
14. Winter protection (when applicable)
15. Travel/Room and Board
16. Fire Suppression equipment
17. Fire Watches
18. Signage
19. Daily clean-up/Final clean-up
20. Traffic Control
21. Pedestrian protection/Walkways/Egress

This list should be considered an overview. There may be other temporary Services that should be addressed for a particular project, and should be incorporated into that project.

History of Recommendation:
Reviewed March, 2010
Revised April, 1988
Revised April, 1987
Revised November, 1977
Revised November, 1971

Section E-2

Temporary Heat and Its Related Power (Including Fuel, Labor, Filters, Warranties, Etc.)

Prior to enclosure of the building, buildings or portions thereof, and when weather conditions indicate the necessity for temporary heat, the Contractor shall provide, maintain, operate and pay costs, including fuel for the sufficient number of approved portable heaters so that progress of the work is not impeded.

After the building, buildings or portions thereof are enclosed, and temporary heat is required for construction, temporary heat shall be provided by the HVAC Contractor. Fuel is to be supplied by the Contractor for new/unoccupied buildings; fuel is to be supplied by the Owner for occupied buildings undergoing additions or renovations.

1. In lieu of the permanent heating system, the Heating Contractor may provide, install, and maintain a temporary heating system of a type approved by the Architect, provided it is properly vented.

2. **Labor -** Labor for the operation and maintenance of temporary heat systems shall be provide by the Mechanical Contractor, except that labor for the operation and/or maintenance of electrical control and power systems shall be borne by the Electrical Contractor.

3. **Filters and filter Labor -** If permanent system is used for temporary heat, appropriate filters are to be used until Substantial Completion and shall be furnished by the Mechanical Contractor. These shall be replaced (including labor for replacement) by the Mechanical Contractor with new filters of the specified type.

4. **Extension of Warranties -** The warranty period of individual pieces of equipment used during, and for, the temporary heat period, shall be extended so that the starting date for the warranties shall be the date of Substantial Completion.

5. **Cleaning -** The General Contractor shall remove from exposed surfaces deposits which are a result of the use of any temporary heating equipment, including from the use of the permanent heating system for temporary heat purposes. He shall not do any finish work until such surfaces are properly cleaned. Prior to final acceptance, all permanent heating equipment used to supply temporary heat shall be completely cleaned and reconditioned by the Heating Contractor.

Any Contractor who fails to carry out his responsibility in supplying temporary heat as set forth in this Contract, shall be held responsible for such failure. The Owner shall have the right to take such action as he deems proper for the protection and conduct of the work, and shall deduct the cost involved from the amount due the Contractor at fault.

History of Recommendation:
Reviewed March, 2010
Revised April, 1987

Section E-3

Temporary Light and Power

The Electrical Contractor shall furnish all labor and material necessary for a complete temporary lighting and power system throughout the project except as hereinafter modified. The Owner shall provide necessary tap-ins. The Electrical Contractor shall be responsible for the cost of temporary power in new/unoccupied buildings; the Owner shall be responsible for the cost of temporary power in occupied buildings undergoing addition or renovation.

The Electrical Contractor shall provide these temporary systems within fifteen (15) days after written request by any Contractor requiring the system, with copies going to interested parties.

The temporary lighting and power systems shall include the following:

1. Service to the building.
2. Metering, main fused disconnect switch, current limiting fuses, grounding panel boards and feeder circuits.
3. Distribution throughout the building as required by local, state, and national codes.
4. Lighting system to satisfy (minimum) local, state, and national codes.
5. Power system, including branch wiring (separate from lighting) with ground wire and grounding type 120 volt 20 ampere ground type duplex convenience outlets, located as follows:
   a. for corridors - outlets on 50 foot centers;
   b. for other spaces - outlets shall be located so that the addition of a 50 foot extension cord will extend power to any area within the space.
   c. Maximum of four outlets per 20 ampere circuit.
6. Power to construction trailers and offices for lighting and air conditioning.
7. Labor for operation and maintenance of temporary heat systems shall be provided by the Mechanical Contractor except that labor for the operation and/or maintenance of electrical control and power systems shall be borne by the Electrical Contractor.
8. Testing and reporting per the latest OSHA Standards.

The following are suggested capacities for temporary light and power:

Gross Square Feet Capacity

Up to 50,000 100KVA
50,000 to 100,000 150 KVA
100,000 to 250,000 300 KVA
250,000 to 500,000 500 KVA
500,000 to 800,000 750 KVA

Each Prime Contractor shall:

1. Bear the cost for providing power and service to their equipment which cannot be served from the systems provided herein.

2. Provide their own extension cords.

3. Bear the cost for any additional lighting they may require for night work and reimburse the Electrical Contractor for any standby personnel per the current labor Contract.

4. Maintain their equipment.

5. Repair and refinish their own work which may have been damaged by removal of temporary system facilities.

When permanent service becomes available, The Electrical Contractor may connect the temporary system to the permanent service with the owner's approval.

The Electrical Contractor shall maintain the temporary system in working order throughout the period of construction. He shall replace burned-out and missing lamps.

The location of main temporary service and distribution equipment shall be coordinated with affected Prime Contractors on the project.

The temporary systems installed shall be in accordance with requirements of the Local Building codes and local regulations.

The Electrical Contractor shall make the necessary adjustments to the temporary systems to eliminate interruptions which occur as construction progresses.

At the completion of the construction and test period, the Electrical Contractor shall remove all temporary system facilities from the site and replace lamps, ballasts, etc., which are connected to the permanent system, as required.

Any contractor who fails to carry out his responsibility in supplying temporary light and power as set forth in this contract, shall be held responsible for such failure. The Owner shall have the right to take such action as he deems proper for the protection and conduct of the work, and shall deduct the cost involved from the amount due the Contractor at fault.

History of Recommendation:
Reviewed March, 2010
Revised April, 1987

Section E-4

Temporary Water Supply

The Plumbing Contractor shall construct the permanent water supply line to an appropriate location as required and shall maintain this line, protecting it from damage.

The determination of available water service is the responsibility of the Owner. The Owner shall advise the Contractors of the water supply availability in advance of the bids.

The Plumbing Contractor shall provide, protect, and maintain an adequate water supply for the use of Contractors on the project during the period of construction, either by means of the permanent water supply line or by the installation of a temporary water supply line. This water supply line shall be made available within fifteen (15) days after written request has been made to the Plumbing Contractor by any Contractor requiring this service, with copies to interested parties.

If the water is currently metered, the Owner will bear the charges. If the water is not currently metered, the General Contractor will bear the charges. Service connection fees and usage fees should be the responsibility of the Owner.

When temporary water lines are no longer required, they shall be removed by the Contractor responsible for their installation and any part, or parts, of the grounds or buildings disturbed or damaged shall be restored to their original condition.

Any Contractor who fails to carry out his responsibility in supplying temporary water as set forth in this contract, shall be held responsible for such failure. The Owner shall have the right to take such as action as he deems proper for the protection and conduct of the work, and shall deduct the cost involved from the amount due the Contractor at fault.

History of Recommendation:
Reviewed March, 2010
Revised April, 1987

Section F-1

Bid Guarantee

When a Bid Guarantee is required, the Joint Committee recommends the following:

1. The Bid Guarantee should be in the form of a Bid Bond, certified check, or bank cashier's check. A specific amount should be noted for the bid guarantee rather than a percentage of the bid amount, and this guarantee should not exceed ten percent (10%) of the estimated amount of the base bid.

2. All bid guarantees not forfeited under the terms of the bidding, except for the two lowest responsible bidders, should be returned on or before the sixth day subsequent to the bid opening. If the contract is not awarded, the bid guarantees of the two lowest responsible bidders should be returned within forty-five (45) days subsequent to the bid opening, unless an extension is granted by those bidders.

3. It is recommended that bid bonds be provided as bid guarantees, but the bidder shall have the option of furnishing a check as noted above. If checks are mandatory as bid guarantees, and the contract bond is not executed within ten (10) days subsequent to the bid opening, the retained checks shall be exchanged for bid bonds at the option of the bidders.

4. If a bid bond is furnished, it should include a statement to the effect that if the Contractor is awarded the contract, the Surety Company will also provide the Contract Bonds required under the contract.

5. The name of the a specific Surety Company should not be specified in the requirements, nor should the Owner be permitted to require that only one Surety Company be allowed to supply the bonds.

6. Standard AIA contract documents should be used wherever possible.

History of Recommendation:
Reviewed March, 2011
Reviewed July, 2010
Revised May, 1987
Reviewed April, 1986
Reviewed June, 1977
Revised November, 1971
Approved March, 1968

Section F-2

Hold Harmless Clauses

The Joint Committee recommends "Hold Harmless" clauses should never be used.

Since the Owner, Architect, Engineer and/or Contractor each has certain legal responsibilities in the design of structures and participation in the construction process, each must assume their own responsibilities.

The specifications should require the Contractor to carry comprehensive general liability insurance, stating the insurance requirements applicable to the project at hand.

If, in an individual situation, the Contractor is required to protect (hold harmless) the Owner, Architect and/or Engineer, the specifications must define specifically the risks, liabilities, legal costs, etc., involved in protecting the Owner, Architect or Engineer. Such protection should only be against claims arising out of negligence in performance of the contract by the Contractor, their employees or Subcontractors, and should limit such negligent acts to those occurring in the performance of the terms of the contract, and not as a result of the project in general. This will enable the Contractor to have included in his liability policy the protection covering provisions set forth in the specifications.

In all cases where "hold harmless" clauses are required by the Owner, or an authorized agency, an attorney should be consulted.

History of Recommendation:
Reviewed July, 2010
Revised May, 1990
Revised May, 1987
Revised July, 1986
Reviewed September, 1977
Revised November, 1971
Approved April 23, 1964

Section F-3

Roofing Warranties

The Joint Committee has opted to remove this outdated recommendation from the website until a drastically revised recommendation can be agreed upon.

History of Recommendation:
Removed While In the Editing Process July, 2010
Revised May, 1988
Revised May, 1987
Revised October, 1977
Revised November, 1971
Approved July, 1968

Section F-4

Insurance

The Joint Committee recommends that the Architect utilize the latest edition of the AIA Document A-201 'General Conditions of the Contract for Construction' concerning "Insurance and Bonds." This document should be modified with information furnished by the Owner by the Supplementary General Conditions to include the particular requirements for each project.

If there are any deductibles that are responsibility of the Contractor, these deductibles should be stated in the Supplementary General Conditions.

History of Recommendation:
Revised July, 2010
Revised April, 1987
Revised September, 1986
Reviewed September, 1977
Revised November, 1971
Approved November, 1969

Section F-5

Warranties*

The Joint Committee recommends a clear understanding of the establishment and documentation of warranties so that applicable parties can minimize issues with defective material and/or workmanship incorporated into a project. The Owner needs to understand that notification is critical in the warranty process. Notification delays interfere with and impede the resolution of warranty issues.

It is recognized that varying and indefinite requirements pertaining to warranties exist in the construction industry. It should be clearly known for each type of warranty when it commences, which is typically when the Certificate of Substantial Completion is issued unless otherwise agreed to. Furthermore, the contract documents should state which party is responsible for providing the warranty and its term length.

Standard warranties by the supplier and/or manufacturer for equipment and material used in the project are for various lengths of time, depending upon the quality and manufacturer. Where there is a choice, the selection should be made a part of the specifications. Where none are listed, the longest time should be used as if written and specified. Where possible, supplier contracts should be negotiated to effect the start of warranty coincident with the Contractor's warranty. Manufacturer warranties for required items should be delivered to the Owner at the commencement of the warranty period.

In the event that the Owner or Owner's agent utilizes a system prior to completion, then it is recommended that aCertificate of Substantial Completion be issued on that portion of the work so that all relevant warranties become effective and that the building systems or equipment is turned over to the Owner for operation so that warranty periods for that system or equipment may typically begin at date of transfer of ownership from Contractor to Owner.

If at the time of full occupancy of the building, there are systems or equipment not yet complete, the warranty period for those systems or equipment should begin only after they have been completed by the Contractor.

The Contractor should submit a written Certificate of Substantial Completion, listing said system and equipment to the Design Professional for signature of the Owner for record keeping. If the Contractor wants to use permanent systems or equipment during construction, the Owner should provide written permission to stipulate the conditions of acceptances for such use and also establish the beginning of the warranty period.

The warranty requirements should be objective and determinable.

* The term "warranty" replaces the term "guarantee" throughout A-201. There is currently no legal or common usage determination between the terms, and "warranty", with the added impetus of recent Federal legislation, is becoming the universally used term.

REFERENCES:
ConsensusDOCS 200: Owner/General Contractor Agreement and General Conditions

AIA Document A201 'General Conditions

Temporary Facilities and Controls Construction Guidelines

History of Recommendation:
Revised July, 2010
Revised October, 1998
Revised May, 1987
Approved December, 1976

Section F-6

Stored Construction Materials - Payment

When project materials are purchased in advance of their use, Contractors can assure a specified material is available for use in accordance with the construction schedule. In considering an equitable method of payment and transfer of title for stored construction materials, a basic distinction must be made between:

On-Site Materials: The Joint Committee recommends that payment should follow the provisions of the contract documents when materials are stored on site, provided that they are stored in a location that does not create obstacles to the progress of the project. Builder's Risk Insurance should cover this material once proper documentation has shown that the material has arrived on site. The Owner or Owner's Representative should have access to inspect the materials. The materials should be insured to protect the Owner's interests.

Off-Site Materials: The Joint Committee recommends that payment should be made to the Contractor for construction materials stored off site upon a showing, by the Contractor, that these materials have been identified, fabricated, and properly protected for use on the project and are merely awaiting convenient delivery for utilization. The Owner or Owner's Representative should have access to inspect the material. The materials should be insured to protect the Owner's interests.

In any case of discrepancy, the definition of On-Site and Off-Site materials contained herein is subject to the condition of the Contract and /or insurance provisions. Upon payment, title should be transferred to the Owner.

History of Recommendation:
Reviewed March, 2011
Revised July, 2010
Revised February, 1998
Revised May, 1987
Reviewed November, 1986
Approved November, 1977

Section G-1

Housekeeping

The Joint Committee recommends that each Contractor will be responsible for the clean-up of their debris and scrap material and will properly dispose of it off-site. If a Contractor fails to clean up, the Owner may, after 48 hours notice to the Contractor, do so and charge the direct cost to the Contractor.

History of Recommendation:
Reviewed July, 2010
Revised February, 1998
Reviewed May, 1987
Revised December, 1986
Approved November, 1977

Section G-2

Hand Rails - Perimeter Protection

The General Contractor should be responsible for perimeter protection, including any openings. Any removal and/or replacing of hand rails would be the responsibility of the Contractor performing the work requiring the removal of the hand rail.*

* In all cases, where safety issues are involved, care must be taken to follow the prevailing governmental regulations of any agency having jurisdiction of the matter.

History of Recommendation:
Reviewed July, 2010
Revised May, 1990
Reviewed May, 1987
Revised December, 1986
Approved October, 1977

Section G-3

Holes or Openings in Floor or Roof

Any Contractor creating any hole or opening shall be responsible for covering, securing or installing the covers or barricades for the hole or opening. Covers or barricades will be left in place until installation of the final equipment or material. The Contractor installing the final equipment or material would be responsible for the complete removal and disposal of the covers or barricades.*

* In all cases, where safety issues are involved, care must be taken to follow the prevailing governmental regulations of any agency having jurisdiction of the matter.

History of Recommendation:
Reviewed July, 2010
Revised May, 1990
Reviewed May, 1987
Revised December, 1986
Approved November, 1977

Section G-4

Temporary Fire Protection

The Joint Committee recommends that temporary fire protection be furnished by the General Contractor. Any Contractor performing work which requires additional fire protection will be responsible for providing this fire protection.*

* In all cases, where safety issues are involved, care must be taken to follow the prevailing governmental regulations of any agency having jurisdiction of the matter.

History of Recommendation:
Reviewed July, 2010
Revised May, 1990
Reviewed May, 1987
Revised December, 1986
Approved November, 1977

Section G-5

Hazardous Materials

If there is a possibility that hazardous materials may be, or are encountered on a project, the Joint Committee recommends that the Owner should retain the services of a qualified consultant to determine the extent and severity of the problem. The consultant will be responsible for recommending appropriate containment and/or removal methods. Additionally, the consultant will administer the containment and/or removal work which should be performed by a specialized abatement company contracted directly to the owner.

To the greatest extent possible, abatement work should be completed prior to the start of all other construction activities.

History of Recommendation:
Reviewed July, 2010
Reviewed May, 1991
Approved May, 1990

Section H-1

Pennsylvania Construction Lien Law

The Joint Committee recommends that companies involved in a construction project have a thorough understanding of the lien laws in states in which they perform work.

In Pennsylvania, the State Legislature made significant changes to its construction lien law known as the Mechanic's Lien Law; 49 Purdon's Pennsylvania Consolidated Statutes Annotated Section 1101 et seq. These changes went into effect January 2007. Prior to the changes, construction owners were able to obtain a single blanket waiver of mechanics lien, file it with the Prothonotary's Office on the first floor of the City-County Building before construction began and thereby create a bar to any mechanics liens being filed against a project. Under the changes to the Mechanics Lien Law, this type of "No Lien" agreement is prohibited as against public policy unless a payment bond is in place assuring payment. Without a payment bond being in place, only partial lien waivers can be obtained and only to the extent that the cost of the work covered by the waiver has been paid. Note that this is on private projects only. Public projects cannot be liened.

Some of the other significant changes to the Mechanic's Lien Law effecting commercial construction include:

- expanding lien rights beyond the prime contractor and first-tier subcontractors to include second-tier subcontractors;
- extending a claimant's time to file a lien from four-months to six-months after completion of work, and;
- removing the "Preliminary Notice" requirement to file a lien prior to completion of work.

The changes to the Mechanic's Lien Law went into effect January 2007 and have varying levels of impact to businesses involved in the construction process. The different stakeholders within the construction industry are poised to improve the lien law for their membership. The Joint Committee will continue to track this issue and update this recommendation to coincide with any law changes from a governing body. The Joint Committee further recommends that construction companies consult legal counsel concerning lien law issues.

REFERENCES:
Local & State Laws

History of Recommendation:
Approved March, 2009

Section I-1

Project Delivery Systems

There are a wide range of delivery systems available to Owners embarking on a design or construction project. Some are more appropriate to a particular project type and some are more appropriate to a particular Owner. Some are not, in the opinion of the Joint Committee, appropriate for any project.

Every project has a series of stages through which it passes. Different project delivery systems allow for different levels of participation by the Owner in these various phases. Following this introductory section are detailed descriptions of numerous project delivery systems where recommendations are made for the selection of the design professional, the constructor and for the structure of the design team, based on the attributes of the project and desired level of participation in or control of the process by the Owner.

The following are some of the issues which need to be evaluated by the Owner when determining which delivery system should be selected. They will be addressed in detail within the sections on each delivery system.

Project type:

- Size
- Complexity
- Schedule
- Budget
- Repetitive / prototypical
- One time construction project or part of an overall master plan
- Part of a campus or a stand-alone structure
- Site conditions
- Budget-driven
- Signature building

Owner:

- Public or private
- Familiarity with construction
- Staff available for input during design
- Staff available for input / oversight during construction

Design professional:

- Familiarity with Owner / facility
- Familiarity with project type
- Staff available
- Compatibility with Owner's and Constructor's team
- One-time project or long-term commitment

Constructor:

- Familiarity with Owner / facility
- Familiarity with project type
- Staff available
- Compatibility with Owner's and Design professional's team
- One-time project or long-term commitment

History of Recommendation:
Reviewed March, 2011
Approved July, 2010

Section I-2

Qualifications Based Selection System for Design Professionals

The first step of any delivery system is that of building the design team. Qualifications Based Selection (QBS) is a method where a design professional's qualifications, not fee, is the determining factor in selecting a firm. It places fee negotiation at the end of the selection process. While price may have its place within the selection process, it alone should not be the determining selection factor. The fee is also negotiated allowing for a give-and-take between the Owner and design professional to clearly delineate the scope of services and arrive at a mutually agreeable sum.

Professional organizations, such as the American Institute of Architects (AIA), the American Council of Engineering Companies (ACEC), the American Society of Civil Engineers (ASCE), the American Bar Association (ABA), and client organizations, such as the American Public Works Association, strongly support or require the use of QBS for procuring professional design services. Additionally, QBS is required for federal projects as described by the Brooks Architect/Engineer Act (Public Law 92-582, 40 U.S.C. 541 et seq.) which states that "the Congress hereby declares it to be the policy of the Federal Government to publicly announce all requirements for architectural and engineering services and to negotiate contracts for architectural and engineering services on the basis of demonstrated competence and qualifications."

QBS provides owners with a selection process that is not only straightforward and easy to implement, but is objective and fair. It recognizes that design professionals play a critical role in the building process. The reason for this is clear: Projects that are contracted solely on price do not take into account the myriad additional factors that go into building design. Building design and space planning are evolving processes and much goes into them, even after the drawings are signed, sealed and delivered. In fact, one of the design professional's principal duties is to ensure that the construction process goes smoothly.

It is a design professional's experience, expertise, and ability to resolve unforeseen problems creatively that will keep a construction project moving forward. These intangibles are common throughout the process. As a result, owners who rely only on a submitted bid as the project cost may be placed in a difficult position if the final cost is significantly higher.

QBS helps resolve the projected vs. final cost dilemma by negotiating the project's cost with the most qualified firm among the applicants. QBS also fosters a collaborative environment, so the roles of all stakeholders are known, documented and understood. Finally, because the selection process is well-documented, decisions the owner makes are more likely to stand up to public scrutiny.

The QBS process for recruiting design professionals follows a well-established sequence.

- The Owner issues a request for qualifications (RFQ);
- Professional entities or individuals respond to the RFQ;
- The Owner reviews the qualifications based upon past performance, technical competence, capacity to accomplish the work and related factors;
- The Owner ranks the firms, with the best-qualified firm ranked first, the second most qualified second, and so on;

- The Owner commences negotiations with the top-ranked firm to reach a mutual understanding of scope;
- And the parties negotiate a fair and reasonable price for the services required.

If the Owner and top-ranked firm cannot reach an agreement on scope, contract terms or price, the Owner would then negotiate with the second-ranked firm, and so on. Caps on allowable costs and non-statutory based limitations on compensation are violations of the intent of the QBS process.

Owners frequently employ alternative project delivery methods. To help ensure that such projects receive the benefit of high-quality professional design services the following practices should be followed:

- The Owner should retain, or have on staff, a design professional selected on the basis of qualifications and not associated with the alternative delivery system prime contractor. This design professional should assist the owner in developing initial project scope, selecting the most appropriate project delivery system and assisting the owner throughout the project delivery process.
- Regardless of delivery method selected, the competence, experience, independent judgment and creativity of the design professional are major factors in a projects success. Thus, the qualifications and role of the project's design professional (A/E of Record) should be major selection criteria for awarding an alternative delivery contract.

When alternative project delivery methods are employed, the use of procurement methodologies for the prime contractor (who may be an A/E, contractor, developer or joint venture) should also emphasize qualifications. These purchasing mechanisms include QBS (qualifications only) or best value source selection (the latter includes qualifications plus technical response and costs). A qualifications-based selection system is recommended for all design professional services (e.g., for a design services subcontract) procured under an alternative delivery prime contract.

History of Recommendation:
Approved July, 2010

Section I-3

Best Value Contracting for Public Construction

When Best Value Contracting (BVC) is selected to award a construction contract, the Joint Committee recommends a transparent competition among responsible contractors to choose the constructor that offers the best combination of performance qualifications and price. The integrity of the construction industry and the future use of BVC is dependent upon qualified firms having an equal opportunity to fairly compete for a public construction project.

When to use Best Value Contracting

While there are many factors to consider to select the use of BVC for a project, a few criteria that may guide your decision include, but are not limited to, the following items: a project of unusual complexity, requiring expertise not commonly available among contractors; a time-sensitive completion and/or aggressive schedule; a project involving the use of a specialized construction technique that is not generally known throughout the industry; a project that involves complex and potentially unforeseen environmental issues; a design-build project (Section I-7); or if the entire scope of project is unknown at time of bidding and there is a high probability of major design changes during construction. There are certainly additional factors that could be considered; however, addressing these items may get your decision to use BVC closer. Additionally, the Joint Committee recommends consulting a practiced professional or public agency with a successful track record of using BVC to ensure this procurement method is advantageous and legally permitted.

The Selection Criteria in BVC

There are several industry accepted concepts that a BVC owner may use in order to select the firm which provides the best value to a project. The two concepts briefly discussed in this recommendation are the one-step and two-step selection process. The steps are defined by the number of formal submittals. In a two-step selection process, the technical criteria (and other non-price items requested by the owner) are submitted first, allowing the evaluation committee to assess which firms can perform the best value on a project (possible criteria listed below). After reviewing the technical submission, the evaluation committee may create a short-list of bidders acceptable to the owner based on a scoring system established, then competitively bid to the short-list firms in the second step of this process. The evaluation committee may make a final decision based solely on the competitive price; or depending on the submitted documents, an interview to discuss scope review, value engineering, constructability issues, sustainability ideas, etc., a decision may be determined that a firm can provide the best value for a successful delivery of a project.

In a one-step selection process, the owner requests a combination of the technical and price submittals to be simultaneously submitted so that both factors are evaluated, in accordance with a weighting of criteria items that is fully-disclosed in the request for proposals.

In either the one- or two-step process, it is recommended that the owner develop a list of non-price criteria, ranking each item in accordance with their importance to the specific project. These criteria requirements should be spelled out to clearly state what the evaluation committee is looking for. The following are examples of possible non-price/ technical criteria:

- Experience with project team

- Safety performance
- Bonding program (single project / aggregate)
- Past performance
- Schedule commitment and ideas to project
- Firm's experience relating to project (delivery method, agency, funding source, etc.)
- Depth of resources
- Responsiveness of submittal
- Default history, if any
- Project approach

BVC Evaluations
It is recommended that the owner assemble an evaluation committee to select the contractor that offers the best value to a specific project in a fair and transparent manner. In an effort to lower the probability of a protested bid, the owner should incorporate a committee comprised of various viewpoints, expertise, and background. A chairperson, preferably with BVC experience, should run the committee. Prior to reviewing any submissions, the evaluation committee should be educated on the project, the owner's requirements and the established selection criteria with weight of items.

When reviewing submittals, the committee should focus on content and how it addresses the criteria. When evaluating references, the committee should take a consistent approach, asking the same questions about each proposal, to effectively and accurately compare proposals. During deliberations, the committee should work towards a consensus, agreeing on a single score for each bidder and selecting the responsible contractor whose proposal is determined to represent the best value for the owner on its project. The committee should take all responsible steps to avoid any appearance of impropriety in the proposal review process, and it should afford the contractors who are not selected an opportunity for a debriefing to learn the reasons why its proposals was not selected.

Legal disclaimer: due to the legal environment associated with BVC, the Joint Committee recommends legal counsel be sought to assure actions conducted associated with bidding a BVC project are in accordance with the law.

History of Recommendation:
Approved July, 2011

Section I-4

Design-Bid-Build Delivery System

Design-Bid-Build has been the most common and popular form of delivery system for construction projects for many years. This is a sequential approach with three main phases:

- The design phase
- The bidding phase
- The construction phase

During the design phase, the Owner engages an Architect to work with the Owner to identify the Owner's needs and then to produce a conceptual or schematic design. This early design is then developed, and the Architect will usually bring in other professionals including mechanical, electrical, plumbing, fire protection, structural, civil engineers and a landscape architect to complete drawings and specifications which are called the Contract Documents (CD's). As an additional service, the Owner may have the Architect develop a written program documenting those needs.

Once completed, the CD's are presented to General Contractors (GC), who prepare bids for portions of the work and put them out to multiple subcontractors for bids on sub-components of the project. Sub-components include items such as the concrete work, structural steel frame, mechanical systems, electrical systems, and landscaping. Questions may arise during the tender period, and the architect will typically issue clarifications or addenda. From these elements, the contractor compiles a complete "tender price" for submission by the closing date and time. In public work, the contractor submitting the lowest responsible bid is selected to perform the construction. For private work, the Owner selects one of the GCs based on the evaluation of the bid, the proposed Subcontractors, proposed schedule, the GCs current workload, and other factors. The successful bidder may or may not be the one submitting the lowest bid. In the event that all of the bids are in excess of the goals of the Owner, the Owner may elect to reject all bids. The following options become available:

- Abandon the project;
- The Architect may revise the design, making the project smaller or more efficient, or reduce features or elements of the project to bring the cost down. The revised documents can then be re-bid;
- The Owner may elect to select the lowest qualified bid's General Contractor to join the architectural team to assist with cost reduction. This process is often referred to as Value Engineering.

The selected GC is then responsible for constructing the facility in accordance with the CDs, including all related work to deliver a complete project. The GC is responsible to provide items included in the CDs but not included in the Subcontractor bids at no additional cost to the owner.

During the Construction Phase, the Design Professionals typically maintain limited oversight of the work, respond to questions, and interpret the intent of the CDs on behalf of the Owner. The Design Professionals may also assist the Owner in administering the construction contract, including determination of project progress for interim payments made to the contractor.

Benefits of this system
This contracting system offers the advantage of being widely applicable, well understood, and well-established /clearly defined roles for the parties involved. Furthermore, it offers the Owner a significant amount of control over the end product, particularly since the facility's features are fully determined and specified prior to selection of the contractor.

Among the chief advantages of the Design-Bid-Build system are:

- The design team is impartial and looks out for the interests of the Owner.
- The design team prepares documents on which all General Contractors place bids. Incomplete, incorrect or missed items are usually discovered and addressed during the bid process when brought to the attention of the Design Professional by the bidders.
- Ensures fairness to potential bidders and improves decision making by the Owner by providing a range of potential options. It also identifies new potential contractors.
- Assists the Owner in establishing reasonable prices for the project.
- Uses competition to improve the efficiency and quality for Owners.

Disadvantages of this system
In Pennsylvania, public owners are not permitted to utilize this approach in a single prime delivery method because of the Separations Act, which requires a Multiple Prime Contractor delivery system (refer to section I-8).

Even though this delivery system has historically been the most dominant, many Owners have experienced a variety of frustrations using this system, leading to the development of other methods.

Among the chief disadvantages of the design-bid-build system are:

- The process is time-consuming since all design work must be completed prior to solicitation of the construction contract.
- The designer may have limited ability to assess scheduling constraints.
- Failure of the design team to be current with construction costs and any potential cost increases during the design phase could cause project delays if the construction documents must be redone to reduce costs or result in a more costly final product.
- The Owner generally faces exposure to Contractor claims over design and constructability issues since the Owner accepts liability for design in its Contract with the contractor.
- The approach tends to promote more adversarial relationships rather than cooperation or coordination among the Contractor, the designer and the Owner.
- The Contractor may pursue a least-cost approach to completing the project, requiring increased oversight and quality review by the Owner.
- The absence of a Contractor's input into the project design may limit the effectiveness and constructability of the design. Important design decisions affecting both the types of materials specified and the means of construction may be made without full consideration of a construction perspective.
- There is the potential for the development of a "cheaper is better" mentality amongst the General Contractors bidding the project resulting in the tendency to seek out the lowest cost Subcontractors in a given market. In strong markets, General Contractors will be able to be selective about which projects to bid, but in lean times, the desire for work usually forces the

low bidder of each trade to be selected. This usually results in increased risk (for the General Contractor) but can also compromise the quality of construction. In the extreme, it can lead to serious disputes involving quality of the final product, or bankruptcy of a sub-contractor who was on the brink of insolvency desperate for work.

- As the General Contractor is brought to the team post design, there is little opportunity for input on effectivealternates being presented.
- Pressures may be exerted on the design and construction teams, which may lead to disputes between the Architect and the General Contractor.

Hybrid Design-Bid-Build Systems

While the most common approach to bidding a project in building construction is for General Contractors to submit a sealed lump sum bid, many variations in Contractor procurement exist in the traditional system.

Other methods include unit-price contracting, which is generally limited to projects that can be easily divided into small work units and quantified prior to construction. This is commonly found in heavy construction projects. At the other end of the spectrum is cost-plus contracting, generally used in circumstances where there is such high risk or variability in the work that preparing a responsible bid is impossible.

Many Owners make some effort to pre-qualify Contractors, either through invitation, or through an objective set of criteria considering construction experience and financial capability. Doing so helps assure the Owner that the Contractor is capable of providing a high-quality product. Once the field of bidders is established, an Owner bidding a lump sum project may choose to require sealed bids, wherein the lowest responsible bidder will earn the right to perform the work.

However, many private Owners prefer to negotiate bids with pre-selected GC's (see section I-9: Negotiated Bid). This can be an especially powerful technique if the Owner considers qualifications, history of claims and experience in related work along with price in its evaluation. What the Owner should really be seeking is the best value for its money, not necessarily the lowest initial cost. Through a careful negotiation or contractor evaluation, the Owner can maintain the maximum amount of control over the resulting construction portion of the project.

History of Recommendation:

Revised September, 2011
Approved July, 2010

Section I-5

Construction Management – CM as Constructor

The Construction Manager as Constructor (CMc) Project Delivery System allows an Owner to engage the Constructor early in the project to provide cost, schedule, and constructability advice to the Owner and Design Team. This is the same method often referred to as CM at Risk. Use of the term Construction Manager as Constructor is recommended to more clearly identify the CM's role in this delivery system, and to be consistent with the language in prevailing contract forms. With this system, the CMc can assume responsibility and risk for budget and schedule management.

The CMc delivery system differs from the Design-Bid-Build system, in that it offers a more collaborative way for an Owner to engage a project team. When utilized early in the project, this system allows the CMc to provide preconstruction services in the form of assistance to the Owner prior to construction, offering schedule, budget, and constructability advice during the project planning and design phases, which can help facilitate more informed decisions relative to the project budget and scope. Thus, instead of a traditional General Contractor, the Owner works with a hybrid Construction Manager/General Contractor, whose services can better compliment the services of the Design Team. This approach can be especially valuable in complicated projects.

After the design phase of the project, the role of the CMc may become similar to a GC's role in a traditional Design-Bid-Build project delivery system, in that the CMc assumes financial responsibility for the construction of the project. The CMc often self performs some of the work while subletting the remaining work to trade subcontractors and material suppliers. The CMc often guarantees completion of the project for a fixed negotiated price (usually referred to as a Guaranteed Maximum Price, or GMP) at an agreed-upon point during, or following, the design phase. It is, however, critical that the Owner understand the degree of certainty provided by this delivery system.

Selecting the CMc

The CM as Constructor plays a critical role in the success of a project. Since a commitment is made to the Constructor early in the process, a heavy emphasis should be placed on the proper selection of the CMc to provide the best value to the Owner. A Qualifications-Based Selection System (similar to that described for Design Professionals in BPG Section I-2) is frequently used to solicit proposals from a reasonable number of prequalified Constructors. Solicitations should identify the scope of preconstruction services, general conditions, and the CM fee structure. It may be appropriate for the Architect to assist the Owner in this process, if they already are on board. Conversely, if the CMc is established first, it would be appropriate for them to assist with the selection of the Architect.

Commonly used contract forms in the industry for this project delivery system are:

- AIA Document A133-2007 *Standard Form of Agreement Between Owner and Construction Manager as Constructor* or the ConsensusDOCS

500 *Owner/Construction Manager & General Conditions (At-Risk)* - for these contract forms the basis of payment is the Cost of the Work Plus a Fee **with** a Guaranteed Maximum Price.

- AIA Document A134-2007 *Standard Form of Agreement Between Owner and Construction Manager as Constructor* or the ConsensusDOCS 510 *Owner/Construction Manager Agreement & General Conditions (cost of work, Preconstruction Option)* - for these contract forms the basis of payment is the Cost of the Work Plus a Fee **without** a Guaranteed Maximum Price.

Managing Roles / Responsibilities

Comprehensive management of every stage of the project, beginning with the original concept and project definition and continuing through the design, procurement, and construction phases, yields the greatest possible benefit to Owners from Construction Management. Construction Management provides for very consistent schedule and budget management. It is imperative that the Owner defines and maintains a clear understanding of the roles of the project team and fosters a collaborative working relationship.

Understanding Risk

Understanding risk, risk management, and the responsibility for risk is critical in all project delivery methods. Design and construction projects are risky. Unknown conditions, marketplace volatility, material supplies, permitting processes, and weather conditions are just a few examples of risk factors. Contractors, architects, engineers, and building owners who build frequently come to know these risks. However, the assumption of and responsibility for risks are often and easily misunderstood – especially by inexperienced parties. The best path to clear understanding is open communication. It is incumbent on each party to a contract to assure that the other parties have clear and consistent understanding of project risk. It is best to assign risk to the party best able to control and insure it. With mutual understanding these risks can be assigned and managed properly for project success.

Budget Management

In choosing a project delivery system, the Owner needs to take into account the size and complexity of the intended project. Use of CMc on a smaller project may not be cost effective. During the design of a project, a process that can involve many months of coordination between the Design Team and Owner, the CMc assists with estimating the cost of constructing a project based on a description from the Design Team and Owner that conveys the design concept and what is proposed to be built. If certain aspects of the preliminary design are identified as probable factors causing a cost estimate to exceed the Owner's budget goals, a group decision can be made to modify the design, saving time, effort, and design fees for re-designing and modifying completed construction documents. With this level of informed decision-making during the early design phases of a project, the Owner may also be able to procure or identify additional funding for the project rather than reduce the desired scope or quality.

In a CMc contract with a GMP, the Owner still faces the potential of change orders for increased cost and schedule. The CMc's risk needs to be appropriately defined to exclude risks of cost and time caused by changes outside of the CMc's control; such as unforeseen changes in scope, delays caused by severe weather, and slow approval processes by jurisdictions having authority.

Advantages of the CMc Project Delivery System

In addition to having 'checks-and-balances' similar to the Design-Bid-Build approach, an Owner deciding to use the CMc approach can realize additional benefits. Primary among them is the opportunity to include a contractor's perspective and input as part of the planning and design decisions. The CMc delivery system is a contractual vehicle to implement lean construction principles and tools, like Target Value Design, which allows for better collaboration between the different project participants at early stages while the project design is still be developed.

Furthermore, the CMc may find basic performance specifications or abbreviated specifications to be adequate. Since the CMc's input can facilitate early decisions on materials, specifications, equipment types, and other project features, construction cost and time savings can result for the Owner.

In addition to providing the Owner with the benefit of preconstruction services, which may result in advantageous changes to the project, including cost savings, the CMc scenario offers the opportunity to begin construction prior to completion of the design. If portions of a design can be firmly established and documented earlier in the process, the CMc can bid and subcontract portions of the work earlier than in other processes, often while design of unrelated portions is still in progress. In this scenario, the CMc and Owner can negotiate a GMP based on a partially completed design, which includes the CMc's estimate of the cost along with allowances for the incomplete design aspects.

Owners should understand that competitive pricing is included at all levels of pricing in the CMc project delivery system. Initially, the CMc selection process may include an evaluation of CM fees, and preliminary opinions of probable cost (if a preliminary design is established), in addition to qualifications, capabilities, experience, and references. Whether a GMP is involved or not, the majority, if not all, of the work and materials will be provided by subcontractors and suppliers competitively procured by the CMc. The Owner should review all bids received, and subcontracts negotiated, with the CMc. Therefore, the Owner has more control and insight into the cost components of the project.

Disadvantages of this Delivery System

As with all project delivery systems, extensive communication and openness amongst all project team members is essential to ensure a successful project delivered by a CMc system. Without this effort, in the throes of financial responsibility and time management, disagreements and adversarial relationships may result. This paradigm can involve more time devotion and an adjustment to philosophies than required with other systems, to realize the advantages to all involved.

Not every Design Team, Construction Team, and Owner are naturally suited to work effectively within this collaborative environment. Some Owners may not be able to prepare the non-financial input required by a team approach, and some design and construction professionals may not be able to work well within a project team philosophy. Participants should be chosen carefully, and the system approached with some introspection.

Maintaining Positive Working Relationships among the Owner, Design Team, and Constructor

As with all successful projects, an atmosphere of cooperation and mutual respect needs to be maintained throughout the course of the project for this collaborative process to function properly. Each party (Owner, Architect, Engineers, and Constructor) needs to be allowed to offer input and expertise during all phases. This input also needs to be considered, rather than challenged, by the other members of the team. Input from the CMc about any assumptions made, or deviations from the preliminary design description taken in the course of their cost estimating, must also be conveyed to the Design Team to ensure the design is developed in concert with the project budget.

Through constant and open communications between all parties during all phases of the project, the CMc system maximizes awareness amongst the Owner, Design Team and CMc of each other's goals and expectations. This allows each party to perform their part of the project in the most efficient manner.

History of Recommendation:

Approved July, 2010
Amended March, 2014

Section I-6

Agency Construction Management

Agency Construction Management (CM) is similar in concept to the Construction Management-At-Risk (CM@R) - see Section I-5), with the very important difference that the CM does not have a financial risk for the final constructed cost of the project. The concept is that the role of the CM in the CM@R system is subdivided into two roles/ parties, the CM and the General Contractor. In the Agency CM system, the CM is involved during the construction phase instead of the CM@R system where the CM transitions to the role of GC once the GMP is established. The GC is also not involved during the design phase, requiring the Agency CM to have extensive knowledge of construction practices, costs, and trends for input during this period of the project.

Managing Roles / Responsibilities
Comprehensive management of every stage of the project, beginning with the original concept and project definition, yields the greatest possible benefit to Owners from Construction Management.

Advantages of this Delivery System
Agency CM is a fee-based service in which the CM is responsible exclusively to the Owner and acts in the Owner's interests at every stage of the project. The CM can offer advice, unaffected by any conflicting interest, on matters such as:

- Optimum use of available funds;
- Control of the scope of work;
- Project scheduling;
- Optimum use of design and construction firms' skills and talents;
- Avoidance of delays, changes and disputes;
- Enhancing project design and construction quality;
- Optimum flexibility in contracting and procurement;
- Cash flow management.

Disadvantages of this Delivery System
The primary disadvantage of the Agency CM system involves the contractual relationship among the Design Professionals, CM, GC, and Owner. As is the case during the construction phase of the CM@R system, tensions over construction quality, the completeness of the design, and impacts to schedule and budget can arise. Interests and stake holding can become similar to the traditional Design-Bid-Build system, and adversarial relationships may result. In addition:

- This system introduces a fourth party to the team which requires more team building;
- The General Contractor is not able to provide cost-saving suggestions during the design phase;
- The General Contractor is not able to provide schedule expediting suggestions during the design phase;
- Early construction packages are more difficult to issue.

History of Recommendation:
Approved July, 2010

Section I-7

Design-Build Delivery System

Design-Build is a method of project delivery in which one firm assumes the responsibility for both the design and the construction of a project. The one firm is known as the Design-Builder, Design-Build Contractor, Design-Build Entity or the Master Builder. This single entity delivery system is used to minimize the project risk for an Owner and to reduce the delivery schedule by overlapping the design phase and construction phase of a project. In this system, the design, permit, and construction schedules are all combined in order to streamline the process. The time it takes to complete the individual tasks of creating Construction Documents, acquiring building and other permits, or actually constructing the building are not reduced, but an environment is created where these tasks can be done concurrently rather than sequentially.

Typically, in a Design-Build project one entity takes the lead; if this entity is a Contractor, the process may be known as *"Contractor-led Design-Build."* If the entity is a design firm, the process may be known as *"Design-led Design-Build."* In either case, the organization employed by the Owner rarely handles both aspects of design and construction in-house. The Design-Build entity often subcontracts with construction personnel if design-led, or with Architects and Engineers if Contractor-led.

Potential Advantages of Design-Build

Among the chief advantages of the Design-Build delivery system are:

- Schedule compression allowing for earlier occupancy;
- Integrated solutions;
- Single point of contact;
- Focus on maximizing the value to the Owner.

It is important to note that the Design-Build method, while not focused on saving the Owner construction costs, can often save the Owner money on the overall project. An earlier occupancy date usually yields considerable overall profitability to the project and may make seemingly unfeasible projects into genuine opportunities. The schedule compression is an important aspect of the implementation of this system.

Rather than a distributed level of responsibility, as is customary of the classic Design-Bid-Build, Design-Build provides an integrated solution for the Owner. This moves projects away from the adversarial relationships between the Owner, Design Professional, and Contractor that are often commonplace in traditional delivery systems.

Instead of having several contractors and consultants, an Owner only has one entity to deal with. Design revisions, project feedback, budgeting, permitting, construction issues, change orders, and billing can all be routed through the Design-Build entity. This single point of contact allows a certain degree of flexibility for the Owner. Most Design-Builders will leverage that flexibility for the Owner's benefit by continually refining the construction schedule to maximize the Owner's value at the completion of the project.

Typically, in order for a Contractor to bid on a project, very specific details relating to the methods and materials must be given to avoid any ambiguity and to allow for an equitable comparison of bids. In a Design-Build context, the Owner, the Owner's other consultants, and the Design-Builder can work together to determine what methods and materials will maximize the Owner's value. In instances where marginally more expensive materials, designs, or construction methods might yield a higher return on investment for the Owner than those of lower cost, the Owner is free to adjust the project's program without having to re-bid the entire project.

Potential Disadvantages of Design-Build
Potential problems of the design-build process include:

- Premature cost estimating;
- Short-cut design process;
- Decreased accountability by the service provider;
- The need to correct completed work.

Cost estimating for a Design-Build project is sometimes difficult because design documents are often preliminary and may change over the course of the project. As a result, Design-Build contracts are often written to allow for unexpected situations, and the price of the completed project may vary greatly from the original estimate. The uncertainty of the early estimate requires the Owner to rely a great deal on the integrity, acumen, and competence of the Design-Builder. As the certainty of estimate decreases, the reputation of the Design-Build firm becomes more important. Estimates should be accurate, and reasonably verifiable in order to minimize risk.

The short-cut design process may restrict regulatory review efforts to a potentially cursory overview. Projects may be designed as they are built, thus providing those with the responsibility of oversight little to no time at all to review completed plans and specifications. Projects completed before they may be reviewed can be forced into costly change orders to bring the project into compliance with regulatory requirements. The short-cut design process may also create an ill-defined scope of the work. Since the purpose of the design documents is to describe the project's desired outcome, an abbreviated design process can result in leaving out some details of the quality, workmanship, and/or desired aesthetic attributes of the project, thus making it impossible to hold the builder accountable for the desired level of quality.

The Design-Builder is given a great deal of control over the entire process of both how the project is configured, and how it is completed. With no third-party observer such as an independent architect to administer the process, the unscrupulous Design-Builder may sacrifice the quality of materials and systems such as HVAC, lighting, plumbing, and even structural elements in order to pad his own profits at the expense of the Owner.

Since the Owner may not have the expertise to evaluate the quality of portions of the work, the Owner must trust the Design-Builder to properly design a facility that will meet its needs, and to execute the design properly, according to codes, and consistent with industry-standard specifications. Unless the Builder agrees with the Owner's assessment of the situation, the Owner may have no means to insist on correction of work done improperly but to go to some form of formal dispute resolution such as litigation, or arbitration. To avoid this issue, it may be beneficial for an Owner to consider utilizing a third party consultant to assure that the Owner's needs are met - this

point is especially important in instances when an Owner inexperienced in the Design-Build process is involved.

In exchange for the ability to save money, the Owner assumes the risk and responsibility to review contract documents, such as plans, specifications, and agreements for services, and to hold the Design-Builder accountable to design and deliver a quality product. By contrast, under the typical Design-Bid-Build or Negotiated Bid delivery systems, the Design Professional is in a better position to reject work not performed according to the Contract Documents.

Several organizations, such as the Design Build Institute of America, provide standardized form contracts for Design-Builders to use, but it is not unusual for the Design-Builder to provide its own contractual documents. The American Institute of Architects warns that when non-standard documents are used, great caution should be exercised because they may be untested, or may be written to favor one party or the other; Therefore, qualified legal council should be employed to review all contracts before signing.

History of Recommendation:
Amended November, 2011
Amended July, 2010
Approved March, 1995
Revised Oct. 25, 1995 I-1

Section I-8
Multiple Primes Delivery System

Another alternative project system is Multiple Prime Contracting, in which the Owner holds separate contracts with Contractors of various disciplines, such as general construction, mechanical, electrical and plumbing. In this system, the Owner, or its CM, manages the overall schedule and budget during the entire construction phase.

Although the Joint Committee ultimately does not recommend this delivery system, it is required for Commonwealth of Pennsylvania public projects by the Separations Act* and many Public Owners are required to use it. The system has also gained favor in part as another method to procure early "stand alone" packages to help accelerate the construction start or order long lead major equipment.

Potential Advantages of the Multiple Prime Contracts system

This system can theoretically result in a lower cost to the Owner because it avoids the compounded profit and overhead margins that are common to the single contract method. The multiple contract system may also permit the Owner to divide the work into smaller packages. This may permit more firms to bid for the work and this increased competition may result in lower prices.

Work in each construction discipline is bid separately, allowing the flexibility of awarding construction contracts on the first portions of the project as soon as the respective aspect of design is completed. Furthermore, the system may allow the Owner to have more control over the project procurement schedule, since the Owner sets the schedule for bidding individual portions of the work. For example, if an initial phase of construction (such as foundation construction) is delayed, the Owner may reduce liability for delays by postponing the bidding of follow-on work. Another advantage of this system is that the Owner can realize savings by directly procuring major material items, such as structural steel or major mechanical equipment, avoiding contractor mark-ups.

Disadvantages of the Multiple Prime Contracts system

The very nature of this system causes its primary disadvantages.

- The final cost of the project is not known until the final prime contract is procured.
- There have been numerous cases where this method did not work well due to the absence of overall authority and coordination once construction is underway. The problems primarily arise from lack of coordination and contractor delay issues. While the general trades prime contractor is often given contractual responsibility to coordinate the work among trades, including schedule, this contractor lacks the contractual authority to dictate the schedule of another contractor.

- With the Owner as the construction cost estimator, more time and expense may be required of it in receiving separate bids or negotiating separate contracts.
- Some party has to coordinate the work of the various contractors and form the construction team. This may be done by the Owner, the Design Professional, a Construction Manager or the Contractor who is constructing the building structure.
- As the construction cost estimator, the Owner must determine the cost that will be incurred in connection with the coordination work.
- The lines of responsibility and accountability under Multiple Prime Contracts are less clear than a single contract system utilizing a general contractor. A Contractor who performs his work late may assert that this delay was caused by another Contractor.
- When defective work is the issue, a Contractor may claim that his work was proper when he performed it, but that another Contractor's work caused the problem.
- The Owner or his Design Professional, whichever is responsible for the construction project management, must coordinate a solution to competing claims from Contractors under the Multiple Prime Contract system. Had there been only a single contract, the General Contractor would be responsible for construction management. He would be required to resolve the problems since the General Contractor is responsible for the work of his Subcontractors
- Various elements required for the proper installation of materials and equipment or performance of systems may not be included in any of the separate contracts. Even with detailed scope review of each separate prime contract, missing items of work may not be uncovered until late in the construction process causing additional cost, schedule delays, and potential removal of work already in place. This coordination is the responsibility of the Owner under a Multiple Prime Contract whereas it is the responsibility of the Contractor under a Single Prime Contract.
- Some General Contractors in the area will not participate in projects utilizing the multiple prime delivery system. Some General Contractors prefer to control the entire project thereby limiting risk and having to rely on the performance of another prime, especially not knowing what other major primes might be awarded contracts for the project.
- Decreased collaboration may occur because the multiple primes may act in a manner that benefits their own interests instead of the best interests of the project.
- Number of bidders may be limited by major trade contractors that are unable to provide performance and payment bonds for their package, but would be able to participate as a subcontractor under a General Contractor that does not require a subcontractor bond.
- The multiple prime delivery method challenges the process of constructing a high performance building by making it virtually impossible to integrate the design and construction processes. This is fundamental to constructing a Green Building at a competitive price. The key principle of sustainable design, treating the building as a total functioning system, requires pre-construction collaboration between the designer and contractor; which cannot be done using the multiple prime delivery method..
- The general trades contractor is often assigned responsibility for the coordination of the other prime contractors even though this entity does not have the authority to approve or disapprove the Owner's payment to the other prime contractors. Therefore, the most effective method to coordinate the work is lost under the multiple prime delivery system.

* PENNSYLVANIA STATUTES
TITLE 53. MUNICIPAL AND QUASI-MUNICIPAL CORPORATIONS
PART I. GENERAL MUNICIPAL LAW
CHAPTER 9. CONTRACTS
ARTICLE I. GENERAL PROVISIONS

53 P.S. § 1003 (2013)

§ 1003. Separate specifications for plumbing, heating, ventilating and electrical work; separate bids and contracts

Hereafter in the preparation of specifications for the erection, construction, and alteration of any public building, when the entire cost of such work shall exceed four thousand dollars, it shall be the duty of the architect, engineer, or other person preparing such specifications, to prepare separate specifications for the plumbing, heating, ventilating, and electrical work; and it shall be the duty of the person or persons authorized to enter into contracts for the erection, construction, or alteration of such public buildings to receive separate bids upon each of the said branches of work, and to award the contract for the same to the lowest responsible bidder for each of said branches.

History of Recommendation:
Approved November, 2013

Section I-9

Negotiated Bid Delivery System

This delivery method is similar to the Design/Bid/Build method in that design and construction are performed by different firms. Unlike the Design/Bid/Build approach, a General Contractor and an Architect are selected at the project's inception. These firms work together throughout the design phase.

When the Owner does not have preexisting relationships with companies that have a proven ability to perform, it will qualify a list of Architects and Contractors via a request for qualifications (RFQ) process; followed by a request for proposal (RFP) to those that best qualify. As the proposals are short-listed, a selected subset of candidates are typically interviewed by the Owner to determine which company understands the project, has the chemistry to collaborate with the team, is able to display competency throughout the proposed team, and offers the best solutions and strategy. The chosen Architect and Contractor will enter into a contract with the Owner based upon negotiated terms.

The General Contractor provides estimated construction costs throughout the design phase and may offer a Guaranteed Maximum Price before the design documents are complete. When design documents are complete, the final construction costs are negotiated by the General Contractor through bids from Subcontractors on various scopes of work.

Among the Chief Advantages of the Negotiated Bid Delivery System are:

- An Owner may expect some advantages from employing a particular Contractor whose policies and methods are known and who has in the past proved capable of fulfilling his obligations;
- With the General Contractor being pre-qualified and able to select his Subcontractors, better quality, early completion, and smooth administration can be anticipated;
- The GC is one in which the Owner and the Design Professional have confidence, and which is of known integrity and reliability. Moreover, the work to be carried out is within his special scope and experience.
- The GC has the opportunity to provide input to the design and suggest alternative materials, systems, or means and methods which the GC feels will improve the project or reduce costs;
- The GC provides preconstruction budgeting and scheduling in order to determine project feasibility, to establish economic parameters, and to gain preliminary "buy-in" from ancillary departments;
- 'Typical' details do not need to be provided in the drawings since the methods and details are being discussed and agreed upon between the Design Professional and GC;
- Not having to solicit competitive bids and possibly solicit revised bids to meet a budget saves time;
- The GC's bid can be compared to national and regional averages. If there is a large discrepancy these averages can be used to negotiate the price with the GC;
- Beneficial gain is realized through the team striving to achieve mutually accepted project goals in which all parties have contributed value input;

- Projects performed under these terms are often times more collaborative, resulting in greater overall satisfaction with the value and quality of the end product;
- This system typically reduces the overall project schedule from conceptual phase to occupancy, in large part by avoiding the re-design, value engineering, and re-bid phases common to the Design/Bid/Build delivery process;
- Change orders should be reduced or eliminated since the GC was party to the design.

Among the Chief Disadvantages of the Negotiated Bid Delivery System are:

- It does not provide the Owner with comparative prices from several bidders;
- The cost of work may be higher in this method;
- The Owner may feel that he is in a weaker negotiating position when getting final pricing since there is a disadvantage to utilizing a GC other that the one retained throughout the design process (giving up advantages noted above);
- The GC may not submit the bid in the itemized format. In this case it may be difficult to decipher the bid and the GC may resist further breakdowns.

History of Recommendation:
Approved July, 2010

Section I-10

Integrated Project Delivery System

Integrated Project Delivery (IPD) is a project delivery system which teams the Owner, Design Professional and Constructor throughout the life of the project. It is similar to a number of other delivery systems previously described in this resource in which the Owner selects the Design Professional and Constructor at the inception of the project, based on qualifications.

IPD is a project delivery method that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to optimize project results, increase value to the Owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction.

There are eight main sequential phases to the Integrated Project Delivery method:

- Conceptualization phase [Expanded Programming]
- Criteria design phase [Expanded Schematic Design]
- Detailed Design phase [Expanded Design Development]
- Implementation Documents phase [Construction Documents]
- Agency Review phase
- Buyout phase
- Construction phase
- Closeout phase

IPD is similar to the Toyota Productions System, which was an outgrowth of the work of W. Edwards Deming and the writings of Henry Ford. Emphasis is placed on collaboration between all parties of the design team and approaches promoted by the Lean Construction Institute, such as the two-week look-ahead schedule and Last Planner System collaborative schedule / programming tool.

Today, design and construction teams are joining forces across the country to utilize the IPD system created and trademarked by the Orlando, FL-based Integrated Project Delivery Inc. As organizations, such as AIA, have endorsed the IPD system, projects of all sizes are seeing the benefits of Integrated Project Delivery Inc.'s foundation. IPD combines ideas from Integrated Practice and Lean Construction to solve several problems in contemporary construction such as low productivity and waste, time overruns, quality issues, and conflicts during construction among the key stakeholders of owner, architect and contractor. The growing use of Building Information Modeling in the construction industry is allowing far greater information collaboration between project participants using IPD and considered an important tool to increasing productivity throughout the construction process.

Advantages of the IDP System

- By the project team working as one unit, the Owner is better served and the project is completed faster, cheaper and without the typical stress of a construction project.
- IPD seeks to align interests, objectives and practices, even in a single business, through a team-based approach. The team primary Team Members would include the Architect, key technical consultants, the General Contractor, and key Subcontractors.

- The IPD system is a process where all disciplines in a construction project work as one firm, creating faster delivery times, lower costs, no litigation and a more enjoyable process for the entire team - including the Owner.

History of Recommendation:
Approved July, 2010

Section I-11

Building Information Modeling (BIM)

The National Institute of Building Sciences, author of the National BIM Standard, states that "BIM is a digital representation of the physical and functional characteristics of a project. As such it serves as a shared knowledge resource for information about a project forming a reliable basis for decisions during its lifecycle from inception onward." The "I" in BIM stands for digital information that includes both two and three dimensional data, as well as associated properties that describe the characteristics of components and assemblies that compose the virtual model of a project. This information can be used to promote better collaboration, visualization, analysis, coordination, project scheduling, phasing and sequencing, cost planning, fabrication and pre-fabrication, and lifecycle maintenance / management during the project lifecycle. When implemented thoughtfully and managed carefully by project stakeholders, BIM provides great value to projects by reducing costs, shortening project durations, eliminating field conflicts, minimizing duplication of effort, and increasing project team efficiency.

Process

BIM not only refers to technology and software tools, but also an integrated project process which requires an increase of collaboration and communication among the entire team.

The information developed and extracted from the model will be used for many purposes by multiple entities utilizing different software packages. To accomplish this level of collaboration, the information within the BIM must be structured to support the various intended uses, which requires a carefully planned and documented execution strategy. The project team should develop this plan early in the project, revise as additional participants are added; and update the plan as needed throughout the project lifecycle. Within this document, the project team will need to define the scope of BIM implementation; the level of collaboration between stakeholders; the information requirements and responsibilities for each team member; and the required technological infrastructure needed to support implementation.

Delivery methods which reward integration and collaboration, such as IPD and Design-Assist, will maximize the effectiveness of BIM. However, BIM also has value in the more traditional delivery methods of Design-Bid-Build,Design-Build, and Construction Management-At-Risk. Currently, project teams are experiencing a hybrid of traditional delivery contracts that include supplemental agreements which target the level of BIM to varying degrees. Even with these agreements, additional definition of goals, uses, delineation of responsibilities, and planning may be required to leverage BIM effectively.

Many project teams have found it helpful to consult a practiced professional or consulting firm with a successful track record of using BIM to ensure that the chosen delivery method and developed execution plan is advantageous, financially feasible, and acceptable to both industry and project stakeholders.

Factors for Use

As BIM implementation becomes more prevalent within the industry, some professionals and contractors are utilizing BIM for design, construction documentation, coordination, and analysis for

projects of any size or complexity. However, it is important for project teams to realize that BIM use may vary from project to project and, in some instances, certain applications may not be appropriate or cost-effective. The project team must instead define the specific areas for successful project implementation and should aim to use BIM at the level needed to maximize value, while minimizing project cost. Criteria that can assist the project team during the decision making process includes, but is not limited to:

- a project of unusual design or complexity
- a project using value-based engineering to make up-front decisions
- a time-sensitive design and/or construction schedule
- a project using specialized or complex construction techniques, including prefabrication or computer-aided fabrication
- a project with significant unknown scope at the time of bidding, resulting in a high probability of major design changes during construction
- a project requiring phased future expansion and/or facilities operations management

Benefits

Since there is no single best method for BIM implementation, the team must effectively design the execution strategy for each project by understanding the goals, capabilities, and constraints of the project team members. By utilizing the BIM process, the entire project team can achieve the following benefits:

During design and preconstruction:

- align project to planning, programming and budget requirements
- generate meaningful design studies
- adjust design for optimal performance through integrated analyses
- avoid costly redesign by creating more informed design decisions
- enhance project visualization and project marketing support
- improve project communication to expedite approval process
- produce tighter design coordination and integration of building systems
- improve document coordination, quality, and speed of revisions
- develop owner information requirements

During construction:

- use enhanced visualization for better project understanding
- efficiently extract data to support quantity take-off and cost estimating
- enhance construction coordination of trades and reduce costly field conflicts
- create schedule simulations of installation sequences that optimize manpower and supply chain inventory, storage and site logistics to minimize damage, re-work, safety hazards and waste
- utilize digital fabrication and equipment control processes to promote efficiency and accuracy during installation
- address owner information requirements

After project turnover:

- reduce costly and time consuming manual data entry at project turnover
- integrate models with equipment information (warranties, maintenance records, O&M manuals) into a facility management system to aid in the creation of maintenance schedules, budgets, and resolution of work orders
- integrate models and data into a BAS (building automation system) and EAS (energy automation system) to improve building performance and reduce unscheduled repairs by using real-time performance data
- support space utilization management and real-estate portfolio planning
- provide first responders visual and comprehensive facility information to assist in planning appropriate response to emergencies

Closing Summary

Addressing the project scope, goals, and limitations during the early stages of a project will create the necessary dialog between the different project stakeholders to use BIM effectively. In order to achieve the maximum benefit, the project team needs to establish a detailed implementation plan to utilize BIM throughout the design, construction, and operational lifecycle.

Note: This document is an executive summary of The Joint Committee BIM Reference Guide that will soon be published.

History of Recommendation:

Approved August, 2012

Section J-1

Value Engineering

The Joint Committee recommends the use of value engineering in the post-bid / preconstruction phase of a project to evaluate and analyze design and constructability of a project to provide the best value and functionality to the Owner, provided that a recommendation results in the building being fully functional and code-compliant.

When a General Contractor has been consulted during pre-construction, the Designer can utilize input from the Constructor to collaboratively value engineer details to minimize the impact to a project, lessen re-design, and shorten project schedule. The earlier a beneficial change can be identified, the higher its potential for value and positive impact on the project can be realized. However, the Owner should be aware that re-design work may result in an increase in design costs.

Value engineering should be a collaborative process that can begin as early as the design concept stage and continue throughout the duration of the project. Also, it is important to seek value engineering input from professionals involved in the project, like subcontractors, engineers, suppliers, etc. The construction team should evaluate alternatives for the Owner to consider; such as:

- *First Costs*
- *Operating Expenses*
- *Constructability Methods*
- *Time/Schedule Efficiencies*
- *Quality*
- *Aesthetics*
- *Impact on other work disciplines*
- *Energy Consumption*
- *LEED Certification*

Value Engineering is not to be used as a method to negotiate with a short list of firms (either Contractors or Designers) to bring a project into budget. Value Engineering is NOT a method to allow an Owner to pick and choose from a list of suggestions to incorporate into a project from firms that have not yet been awarded a contract for a project.

History of Recommendation:
Approved May, 2010