Considerations for Mechanical, Electrical and Plumbing (MEP) Engineers Pursuing Design-Build Projects

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CAMEE White Paper: Considerations for Mechanical, Electrical and Plumbing (MEP) Engineers Pursuing Design-Build Projects

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Introduction

Providing mechanical, electrical, plumbing (MEP) engineering services under a design-build procurement scenario differs significantly from the traditional design-bid-build project delivery method. Design-build is when the owner contracts with one entity to deliver the entire project. These projects are typically lead by construction contractors; however, engineering and architectural firms can hold the prime contract and hire construction contractors to build the project. Typically, a MEP firm can either be hired directly by the construction contractor or be hired by an architectural firm, who in turn, may be contracted with the prime construction contractor. The percentage of projects using design-build delivery methods continues to increase, prompting the American Council of Engineering Companies’ (ACEC) Council of American Mechanical & Electrical Engineers (CAMEE) to provide this discussion on specific details a MEP engineering firm should consider when pursuing design-build projects.

Project and Teaming Considerations

Design-build projects typically establish the total project scope and cost very early in the project delivery cycle before detailed design has been performed. For this reason, it is important to carefully select the type of project you are pursuing, along with the teaming partner with whom you will be working.

Selecting the right type of project is important for success, especially if you are new to the design-build delivery method. Important factors include:

1. The owner’s experience with design-build projects
2. The complexity of the project
3. The clarity and completeness of the project’s Request for Proposal (RFP) scope documents
4. The company’s experience with the MEP requirements for the type of facility being constructed

Design-build projects can be very demanding due to the need to balance costs, schedules and overall quality. These are important considerations when selecting a contractor and/or architectural firm to partner with. The relationship with the teaming partners needs to be one of mutual respect to achieve shared success. It is important to understand that as the engineer, you are accountable to the prime contractor not the owner for cost, schedule and quality. Therefore, a strong working relationship with the architect and contractor is essential. Open communication and frequent collaboration with the architect and contractor is needed during the proposal stage and during construction. Your teaming partner should be willing to enter into a teaming agreement as a commitment to mutual success. Since you will likely be investing significant resources during the proposal stage, you need to assess the teaming partner’s motivation and chances to win the project. Consider your teaming partner’s previous experience with the owner, type of construction and design-build projects completed, depth of relationships and motivation to drive down costs to win the project. These are crucial factors used to assess the chances of success.
Proposal Phase

During the proposal phase, you must establish your role on the team, understand the effort you will need to prepare the proposal, negotiate compensation for the proposal phase services, provide engineering services, and determine your total compensation for the project.

Early in the proposal process it is critical to clearly define your role on the team and document it in a teaming agreement. At a minimum, a teaming agreement should address:

1. The company’s and team members’ roles during the proposal stage
2. The company’s level of design effort during the proposal stage.
3. The company’s position in the chain of authority
4. The compensation framework for proposal stage engineering services
5. The company’s and team members’ roles once the project is won
6. Indemnity from errors and omissions claims resulting from reliance on incomplete design documents.

It is important that the teaming agreement defines your role once the project is won since you may be investing resources into the proposal. Many MEP contractors have in-house design capabilities and will be competing against you or the prime contractor may elect to shop around for final design services and wind up using another firm. If the teaming agreement does not stipulate that you will be the engineer of record providing all MEP design services after the project is won, your role could be diminished or eliminated. In addition, the termination clause should stipulate compensation for all proposal phase services in the event the prime elects to engage another MEP engineering firm for post award engineering.

Indemnity for errors and omissions in your proposal work documents should be discussed. MEP systems are highly customized throughout the project unlike architectural and structural systems, where in many cases, typical details and designs can be extrapolated across the entire square footage of the project. If the contractor wants to prepare more detailed take-offs than square foot estimates for MEP systems, some detailed engineering is needed. In many cases, it is not possible to provide extensive design for the MEP systems due to time constraints, lack of information, and the risk of not being compensated. This can lead to inadequate assumptions or omissions that may not be accounted for in the contractor’s bid costs. When not providing 100% design, the MEP engineer should protect themselves from claims through adequate language in the teaming agreement and by insistence of design contingencies in the contractor’s costs.

It is essential to estimate the amount of effort that will be expended to prepare the proposal. This is based on the difference between the amount of information and level of design provided in the RFP scope documents versus the amount of information and level of design the contractor and subcontractors need to prepare their bids. There is no standard for the level of design of the RFP scope documents (or bridging documents) provided by the owner. The depth of scope communicated in the RFP documents can range from performance criteria with basic system descriptions, to a 50% or more complete design showing the configuration of the systems, size/capacities of the major pieces of equipment, and detailed specifications. The engineering
effort is also influenced by the level of engagement of the contracting team during bid preparation. The amount of effort the MEP engineer will need to put forth for the proposal will be determined by the amount of additional design required by the contractor and their subcontractors, the push to optimize the design through innovation, value engineering and alternatives, and the types of documents that need to be submitted with the proposal. Close coordination with the contractors is essential so you can understand their preferences on systems and configurations as well as cost impacts of the design. The level of design classification system below can be used to assist in negotiating the amount of engineering effort needed during the proposal stage:

**LOD-0:** No engineering effort needed, owner’s bridging documents are adequate.

**LOD-1:** Pricing support – meetings with the contractors, minor optimization of owner’s bridging documents, limited number of sketches to clarify design.

**LOD-2:** Alternative design concepts for major elements of work. Narratives, equipment selections, limited number of drawings, schematic level.

**LOD-3:** Advancing the owner provided schematic design to design development level. Optimization of the owner-furnished design.

**LOD-4:** Little or no engineering design/performance criteria provided by the owner. Engineering design needed. Develop system concepts, equipment sizing, prepare design development level drawings and specifications.

Depending on the amount of effort needed to provide engineering services and to prepare the proposal, you may be able to negotiate compensation from the prime contractor. There are several structures of compensation for proposal phase services including:

1. A percentage of a stipend provided by the owner, if any
2. Success fee paid by the prime contractor, if the project is won
3. Time and materials for proposal stage effort at a full or partial multiplier
4. A specified amount of uncompensated services followed by time and materials at a full or partial multiplier
5. No compensation

Ultimately, a proposal for your company’s post award engineering services needs to be prepared. This will specify your scope of services, roles and responsibilities, terms and conditions, and compensation. If the RFP documents do not stipulate the design deliverables submissions, level of completeness of the final documents, and owner design document acceptance criteria, define these items in your proposal. Several owner’s RFPs stipulate the design deliverables such as 60%, 90% and 100% signed and sealed documents. In many cases, the owner must sign off on the 100% documents before construction can begin while other RFPs provide more flexibility in the delivery of the design and construction. In addition to the typical delivery of engineering services, the level of engagement and collaboration with the contractors during design and construction needs to be established so the effort can be properly defined and estimated. The level of involvement during the construction phase can range from minimal to full time on-site representation. Scope details to clarify include shop drawing review responsibilities, frequency of site visits, revisions
to design documents due to contractor changes, compensation for value engineering, record
drawing preparation, and system commissioning involvement. In addition to the standard terms
and conditions, stipulate a percentage or dollar amount of construction contingency the
contactor should carry to cover design errors and omissions since their cost is based on a less
than 100% completed design. This provides a buffer for claims that may arise. If liquidated
damages are in the prime agreement, stipulate that liquidated damages do not apply to the
engineering services, as the MEP engineer has little or no control over schedule performance.
You should develop the full agreement you intend to execute with your teaming partner as part
of the proposal. Refer to EJCDC D-505 Standard Form of Subagreement Between Design/Builder
and Engineer for Professional Services and DBIA Contract Document #540 Standard Form of
Agreement between Design-Builder and Design Consultant for examples of a standard form of
agreement.

When developing your compensation include the recovery of uncompensated proposal
development costs, the estimated cost to provide the post award engineering services, and
opportunity costs. Proposal and post award engineering services are related to the specific
pursuit while opportunity cost is the uncompensated effort expended on unsuccessful proposals
for other pursuits. This is a method to recoup uncompensated proposal preparation costs for lost
design-build pursuits and will enable you to cover your losses in your wins. The opportunity cost
of traditional design-bid-build engineering services is relatively low and typically includes only
qualifications, scope of work and compensation proposals, and is built into traditional overhead
rates and multipliers. Your proposal should include a payment schedule of values reflecting the
fact that much of the engineering services occur in the early stages of the project. Payment can
be based on delivery of documents or other milestones, and should not coincide with the
percentage completed of the overall project. Retainage should be discouraged, but if it is
required by the owner, negotiate a retainage payment schedule to release up to 80% of monies
withheld at the acceptance of the design documents.

Design-build projects for MEP engineering companies present good opportunities but come with
different risks. The contractor-engineer relationship is different from the owner-engineer
relationship in that cost weighs heavily in decisions and can overrule long term performance and
reliability decisions. These decisions can be contrary to owner wishes and can strain your
relationship with the owner. Design-build procurement is an important project delivery method
and by choosing the right teaming partner with mutual respect can lead to successful projects
and long-lasting business relationships.