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# Getting Through the Construction Phase

Who's In Charge Here?

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I'm often reminded of the many tenets of professional engineering practice that one encounters only during the construction phase. The following probably refers more to publicly-bid projects (which is my field), than to private or commercial, or design-build, types of projects, but the overall designer-owner-contractor relationship is always worth some thought regardless of the actual bidding process used.

During a design phase, the engineer attempts to meticulously outline the scope of the work on drawings and specifications. During bidding, addendums are issued to clarify contractor questions, and to button up the "loose ends" that are always uncovered after the design is finally bound together in one set of documents. During these phases, the engineer is in charge and at full liberty to revise previous instructions, or impose new or revised conditions on the subsequent construction phase.

Once the Owner receives bids and awards construction contracts, the project takes on a different tone. The contractor is now in direct control of the work. The engineer remains on the sideline as sort of a "coach" and overseer to serve the owner's interest as spelled out in the engineer-owner agreement for services during construction. When questions arise, such as the contractor requesting more detailed information or submitting a request for change order or time extension, the engineer provides information and recommendation for a final decision by the owner.

If an adversarial relationship develops, a common complaint one can hear from a contractor is, "We're not the engineer!" The engineer can equally respond, "We're not the contractor!" Such epithets don't resolve

anything, but they do indicate the need to understand the necessary role of each party during construction and the need for teamwork.

Regardless of the best approach to managing the engineer-contractor relationship, conflicts are difficult (if not impossible) to avoid. The engineer and contractor each have their respective contractual relationship with the owner, but no contract with each other (except under a "design-build" type of project). The contractor must take the lead under the design engineer's oversight in protecting the owner's interests.

Even so, some engineers might still prefer to tell the contractor to "follow the specs" with no exceptions. Others might start with this tack, then give a little if the owner can get money back after the contractor proposes a less costly method. In my view, the owner has a right to expect a teamwork approach, with conflicts resolved by the time-tested process of full disclosure, persuasion and negotiation. "Full disclosure" has to work both ways. Contractors must provide their "schedule of values" tabulating the costs allocated to each element of construction, and engineers must provide the project criteria and "basis of design" for elements that the contractor may propose executing in a different way than indicated by the design.

A teamwork approach keeps the contractor in the driver's seat with the freedom to submit alternatives to the design, with the understanding that the engineer will consider and recommend them to the owner as appropriate. The need for the owner to "get money back" is dealt with case-by-case, rather than as a pre-condition that may foster an adversarial atmosphere and prevent

contractors from submitting any "better-idea" options. I know from experience that good construction people can often find an easier way to accomplish a difficult task than can the design engineers with their multiple sketches.

Of course, most contractors are looking for alternatives that can reduce their cost (with minimal credit to the owner), and the engineer has a responsibility to protect the integrity of the design while remaining open to possible alternatives that could reduce the project time or cost. (Any alternative's cost reduction must include future operation, maintenance and replacement, as well as installation cost.) If a contractor's first transmittal for the project involves requests for construction changes, or substitution of equipment suppliers, their motives can rightly be questioned. This approach can cause a lack of trust that will balloon into eventual dissent and an adversarial relationship, until some milestone is reached that requires everyone working together for the overall goal.

Regardless of the project delivery or construction management approach used, design engineers should also remember the multiple purposes involved in communicating with contractors and reviewing construction submittals. One is to verify the quality of project execution in accordance with design specifications. A second purpose is to give the engineer a "final chance" to clarify or correct any design questions, before it's cast in concrete. (Only engineers with too much pride-of-authorship in their design would not recognize this as an opportunity.) A third purpose is to allow for considering new products or methods that were not available

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should consider both "natural" and "unnatural" solutions. Can a relocation at the end of your lease help avoid business disruption from flooding? What kind of pre-employment screening can you do to assure employees' integrity? What kind of periodic training would help remind employees of your standards? (By the way, are you walking the walk, or just talking the talk?) Should you change your pricing practices so that you have sufficient mobilization funds for the project to stand on its own, without significant operating capital? Do you know what is on the planning commission's agenda in your location? Will they be changing traffic patterns or road grades in a way that could affect you? When the utility is upgrading their equipment, are you providing forward-looking input, or just assessing your current needs? All this foresight is useless if you keep it to yourself, without follow-up and implementation.

As when you evaluated impacts, you are likely to discover that this analysis generates some further additions to your data list. That's not any more surprising here than it was in the last issue, since your analyses continue to move backward up the decision tree.

Now that you have identified your organization's critical assets (Step 1), established performance and operational goals, objectives, and criteria for your critical assets (Step 2), and assessed hazards (Step 3), evaluated the effect of the identified hazards upon your critical assets (Step 4), and designed solutions to deal with identified deficiencies (Step 5), you have a complete risk assessment. This time, I think that you should take the afternoon off. After all, your hard work has helped you prevent your business from being a Risky Business. ■

*The "Risky Business" column offers articles covering liability from both the legal and engineering perspective. Mrs. Bowman's articles share general information and should not be relied upon as professional legal advice of either a general or specific nature. Rebecca Bowman is a civil engineer-attorney in solo private practice in McMurray, Pennsylvania for more than 25 years. Her practice is a certified woman-owned business. Her B.S. in Civil Engineering is from the University of North Dakota.*

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or not yet on the marketplace during design, as well as allowing for contractor-proposed alternatives discussed above. A fourth purpose, often overlooked in a hasty review of contractor submittals, is to give the construction inspector, as well as the contractor's personnel, the most thorough set of instructions possible to do their jobs. The inspectors (or "resident engineers") are those with day-to-day responsibility for verifying design compliance and construction quality.

So the next time you review a contractor's submittal, put yourself in the shoes of the inspector or superintendent who reads your comments and is charged with seeing the design executed to best serve the owner's interests. Mark your comments so that he or she will understand the purpose of the submittal and what should be verified during field inspection. Even if the contractor is not a team player, any project's success requires that the owner's design and construction inspection staff work together as a team.

And that's the key – teamwork to execute the project. A teamwork approach is no doubt easier to use in a design-build type of project. But it can also work with traditional design-bid-build projects given mutual trust among all parties from the beginning. Senator Arlen Specter's autobiography, *Passion for Truth*, recalls Earl Warren's admonition to his legal team at the start of the investigation of the assassination of JFK: "Your client is the truth."

Similarly, I would say that during construction, "Your client is the success of the project." ■

## PSPE Calendar of Events

### 2006

- October 19-21 **NSPE Northeast Region Meeting**  
The Saratoga Hotel & Conference Center  
Saratoga Springs, NY
- October 20 **Nominations to PSPE Nominating Committee**  
for 2007-2008 PSPE State Officers

### 2007

- January 20 **PSPE Board of Directors Meeting**  
Harrisburg, PA
- March 23-24 **Pennsylvania MATHCOUNTS Competition**  
Harrisburg-Hershey Sheraton Hotel
- May 31 - June 2 **PSPE Annual Conference**  
The Inn at Reading  
Reading, PA