



InFocus

Just What Is It That Structural Engineers Are Supposed To Accomplish?

By Richard Hess

One of the two quotations I have framed over my desk is: “Managers do things right, Leaders do the right things.” That quotation is from a book on management by Dr. Warren Bennis of USC. I wonder if it would be appropriate to paraphrase it to say: “Technicians do things right. Professionals do the right things.” That is to say, they understand and take responsibility for the consequences of their actions.

Is the end product of a professional structural engineer the completed structural analysis? Is it a stamped set of CAD drawings that reflects the model of the structure we analyzed? Or should we accept some responsibility for how the project gets constructed by thinking beyond producing calculations and drawings that may show the correct member sizes and location of frames or shear walls, but are so lacking in critical sections showing the relationship between elements, continuity and well-identified, constructible details that the fabricator and contractor constantly encounter conflicts that have to be resolved or jury-rigged in the field?

A requirement for structural observation helps the process; however, it cannot go beyond the quality of the drawings and specifications that the contractor has to work from.

Recently, on one of my frequent visits to a construction site, the general superintendent and a sub-contractor got into a heated discussion of difficulties and subsequent costs and delays that resulted from the omissions, mistakes, inconsistent detailing, and lack of coordination found in the construction documents.

When I chimed in with how difficult it was to hire young engineers who had ever spent any time at a construction site working during school vacations or in their early careers, the two contractors nodded and said that you could certainly tell that from the type of drawings that they receive, and the response (or lack thereof) to their questions relating to undefined or conflicting details.

The project in question was not small, at around \$85 million, and the owner had no intention of skimping on the facility’s design. But there were many problems in its execution. The structural design of the large gymnasium building seemed to be correct insofar as the sizing and connection of structural elements were concerned. However, the orientation of members, the placement of nonstructural elements and utilities, as well as some architectural and landscaping features, could not be constructed as shown without making field modifications for which no one wanted to take responsibility.

The structural engineer is not responsible for the methods and means of construction. However, if the structure cannot be built from the engineer’s drawings without making numerous and substantial changes, is that not the engineer’s responsibility? Going

to the courts is not an efficient or a pleasant way of resolving these issues. Therefore the question: Is the structural engineer responsible for the preparation of construction documents that can be built from by a reasonably competent contractor?

Put another way: Is the structural engineer a critical member of the construction industry or just the producer of a product that has to be interpreted and modified by someone else? The structural engineer who is knowledgeable about construction and understands that he or she is a part of the entire construction process is a professional. Can anyone who lacks this knowledge of construction be more than a technician?

STRUCTURE® is presenting a series of articles on “What is wrong with engineering drawings” that will address this issue. Your comments and questions are welcome.■

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