

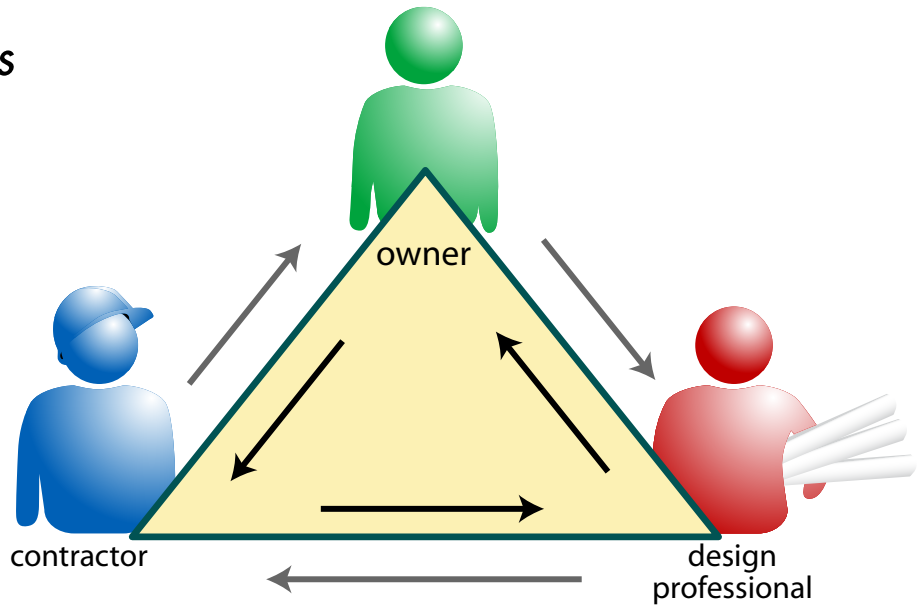
Roles and Responsibilities

By David J. Hatem and David H. Corkum

In the lexicon of construction industry participants, the words “roles and responsibilities” have come to be inextricably linked. When used together, these words serve to encompass the collection of tasks, duties, obligations, level of service performance and quality that the various participants undertake to complete a project. Unfortunately, misunderstanding of each participant’s respective role or responsibility often results in failures or commercial disasters. Structural engineers embarking on a new engagement would be well served by taking the time to contemplate exactly what role they were retained to fulfill, and in a similar but separate exercise, to assess their potential risks and responsibilities arising from the engagement.

The roles and responsibilities generally delegated to the main actors in a construction project assume that the designer designs, the constructor constructs, and the owner decides and pays. In this simplification, one could easily depict the relationships of the actors by a triangle, with direct and unambiguous lines of communication and responsibility. In this basic model, the owner’s role is to initiate the project, communicate his or her views and expectations, secure project financing and select a design professional to translate the abstract vision of the project into a set of contract documents, making design and other important decisions along the way. The design professional considers the owner’s desires, intended functionality of the project, site constraints, etc., and applies his or her skills and understanding of the science of materials and mechanics to create graphical and narrative descriptions of precisely what the finished project should look like. The constructor, relying on the design professional’s plans and specifications, determines the means and methods required to execute the work; procures the materials and equipment; organizes, coordinates and supervises the trades; and applies the craftsmanship necessary to achieve the owner’s vision as described therein.

In the not-so-distant past, the design professional and constructor were the same entity – often the same person. The so-called “master builders” did it all for the owner, creating bridges, cathedrals and other inspiring structures relying on the precedents of failure and successes of prior projects – without always understanding the reasons for said outcomes. The absolute responsibility of the person or entity



fulfilling the role of master builder was quite clear under that scenario. Today’s constructed projects are the result of a much more complex organizational structure, with contractual “compartments” and division of responsibilities among the actors. Indeed, the number of actors within each of the broad corners of our aforementioned triangle has expanded significantly as the demand for efficiency has driven the industry to rely on specialists. In addition, complexities in the design and construction process have resulted in delegation of permanent work design responsibilities to multiple parties.

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The structural engineer is very much a specialist. While design solutions to problems are often quite elegant, aesthetic considerations are secondary to the structural engineer’s role of designing the means for supporting gravity loads and resisting lateral loads. This broad statement of duties plays itself out quite differently depending on which corner of the triangle the structure engineer occupies. The structural engineer may be retained directly by the owner, or be a sub-consultant to the lead architect or civil engineer yet with overall design responsibility for the project. Alternatively, the structural engineer may be a sub-contractor to the constructor, responsible for designing means and methods of building the project. His or her basic duties will, of course, depend upon the scope of services that he or she has been engaged to perform.

While it is comforting to simplify our understanding of responsibility for a certain design element by pointing to the Structural Engineer of Record – i.e., that individual and entity that stamped and signed the particular element in question – our experience is that liability is generally much broader. Many of the claims against structural engineers have their origin in communication failures. Sometimes the delegation of design responsibility was not clear. In other situations, prohibited means and methods of construction were not clear, or the review and acceptance of shop drawings were performed under a misunderstanding of construction sequence.

The reality of a modern, complex project is that a particular element’s design likely gets passed back and forth among several structural engineers, each one adding their contribution to the final design before it becomes a tangible component incorporated into the construction. Miscommunications and mistaken assumptions accompanying the handoff of the design are the single greatest opportunity for a problem to occur.

For example, consider the miscommunication when the Owner’s structural engineer provides a 30% conceptual design of a building’s framing, which is incorporated into a Design-Build RFP. The Design-Builder’s structural engineer assumes that the 30% framing has been developed in consideration of the latest seismic codes and prices the structure based on his assumption of the Owner’s engineer’s responsibility. Subsequent analysis during detailed design development shows that the 30% design was based on an outdated code. The Owner’s engineer performed his piece of the design

years earlier, and the Owner assumed that the Design-Builder's engineer would verify this because of its overall design responsibility.

A more complex question arises when the structural engineer questions the appropriateness of, or notices an issue with, the designed components that have been forwarded to him. Consider, for example, the responsibility of the structural engineer retained by a precast panel manufacturer to design the hoisting and connection details for those panels as prescribed by the contractor, the manufacturer's customer. During a preliminary review, the engineer detects a subtle flaw in an unrelated (clearly outside our hypothetical engineer's role) element of the original structural engineer's design. Calling attention to said flaw will impact the schedule and possibly jeopardize the panel manufacturer's contract. Where does our structural engineer go to determine whether he or she is responsible for calling this flaw to his client's attention? How about to the Contractor's attention? Or, to the attention of the original structural engineer?

This is not a novel situation, and it is well understood that our structural engineer is subject to responsibilities beyond those assigned to him by virtue of the contract with the panel manufacturer. As a licensed professional, the State has granted that structural engineer the right to practice the profession and earn a living from that profession in exchange for a commitment to comply with the State's requirements as embodied in its statutes, such as building codes. In addition to the duties imposed by virtue of such licensure, a structural engineer is subject to the canons of ethics imposed by peers by virtue of membership in a professional society. The first Canon of the ASCE Code of Ethics requires that: "Engineers shall hold paramount the safety, health, and welfare of the public in the performance of their professional duties."

Our competitive, capitalist society is such that your engagements will always entail some degree of pressure to perform that engagement as efficiently as possible using the minimum number of man-hours, relying on just enough information, just enough research, and just enough review, checking, and validation of your designs to prove their adequacy. That same competitive marketplace may tempt some to accept engagements that are only marginally within their skill, experience, and comfort level. In the wake of a failure, the jury will not be impressed by the Owner's refusal to pay for peer reviews that would have detected the flaw in a structural element with which your firm had little prior experience.

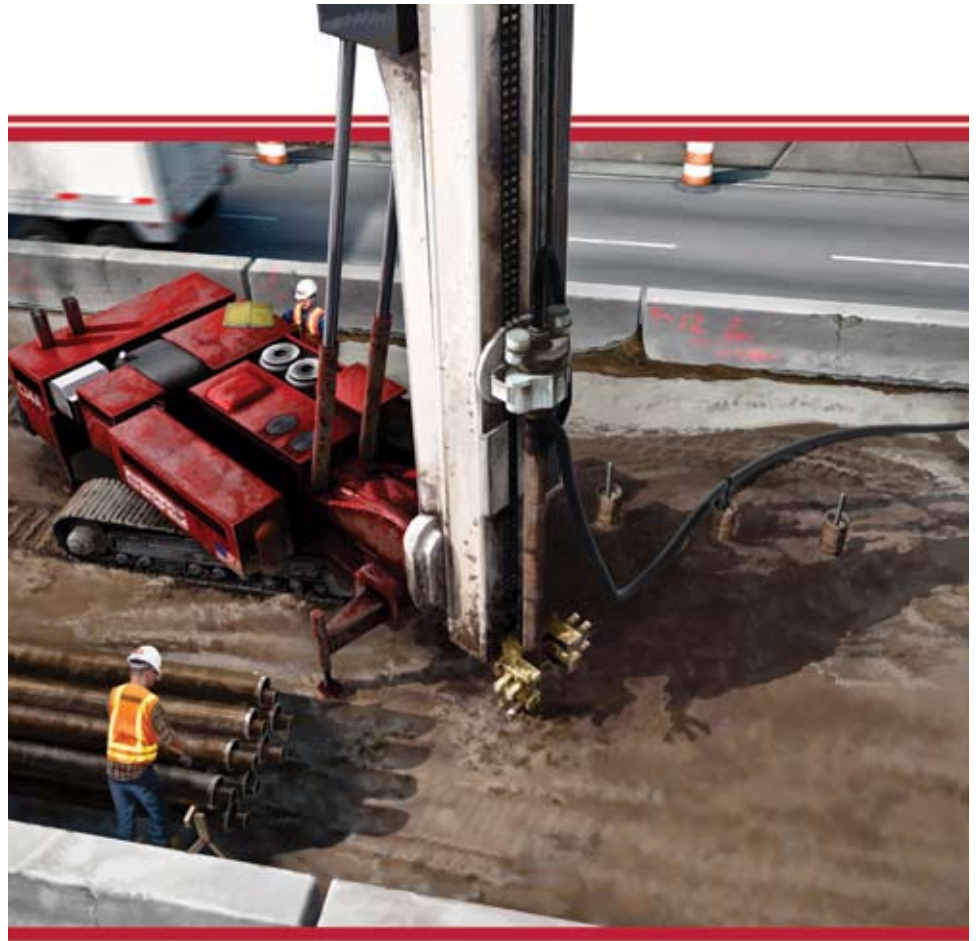
Especially in challenging economic times, such as the current situation and the foreseeable future, all of these role and responsibility

tensions are bound to increase and have the potential of leading to conflicts, disputes and claims involving the structural engineer. Now, perhaps more than ever, attention should be given to the management of risk. Subsequent

articles in this series will address the evolving trends of liability in structural engineering and provide recommendations for insulating your practice from risks that are beyond your ability to control. ■

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