

Temporary Structures Failures... Designers Beware!

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Design Loads on Structures During Construction Standard Committee

More structures fail during construction than in service after completion; and many if not most of them occur as the result of the failure of "temporary structures" that are used to provide support, protection or access during the construction. The tacit attitude sometimes prevails in the design-construction industry that "these things" are temporary only, hence generally less important, therefore greater risks may be acceptable than in permanent structures. But a dollar or a life lost at a construction site should be no less valuable or less tragic than its loss elsewhere.

Construction safety and, hence, temporary structures should be the concern of everyone in the building process: the owner, the designer, the contractor, the insurer, the authority having jurisdiction, as well as of the workers at the site and the general public. Yet, this important component of the construction process is not a "field" of practice but a neglected stepchild: at times claimed and at other times disclaimed by both designers and contractors, and almost totally neglected by researchers and educators.

The functions, types, materials, uses and abuses of temporary works are very wide ranging and different from those of permanent facilities. They present as many contractual and legal pitfalls as technical challenges. Who does the design? Who prepares the drawings? How detailed and tight should the specifications be? What are the allowable stresses and tolerances? Exactly who is responsible and liable for what? What are the various legal positions of the owner, designer, manufacturer, general contractor, subcontractor, construction manager, inspector? OSHA regulations notwithstanding, there are no universal industry standards covering these matters. The answers often depend on the particular temporary structure, the contracts among the involved parties, state and local laws and regulations, and sometimes on the specific circumstances of the construction project.

There is a distinction between the responsibilities of the designer of the temporary structure (DTS) who deals with the construction phase only, and the designer of the permanent structure, referred to as the Structural Engineer of Record (SER).

The DTS is, of course, responsible for the accuracy and adequacy of his/her plans but, strange as it may sound, generally has no inherent duty to supervise, inspect, or observe the performance of the work he/she designed, absent a duty which he/she as the design professional may have assumed by contract, by statute, or by having filed plans with a local building department. At the very least, the DTS will be responsible for making occasional visits to the site to verify technical compliance with his/her design. He/she should be wary of issuing so-called "routine sign-offs" of the contractor's work for payment. The sign-off may include a certification that the contractor



has complied with the plans and specifications and with applicable codes. Such a certification could impose on the designer liability equal to the contractor's in the event of a failure.

The responsibility of the SER is for the accuracy and adequacy of the contract documents for the completed permanent project. According to the *National Practice Guidelines for the Structural Engineer of Record, CASE Document 962*, "The SER is not responsible for, nor does the SER have control of construction means, methods, techniques, sequences and procedures, or for safety precautions and programs in connection with the construction work."

However, once some duty has been assumed in the construction phase, state courts are in disagreement as to the extent of responsibility and liability; some courts have found that design professionals have a non-delegable duty to regularly supervise the means and methods of construction. Unfortunately, most structural design engineers are ignorant of the intricacies of temporary works, hence are not well qualified and not much interested in the subject.

Even when qualified, SERs often distance themselves from the construction phase of the project for a variety of reasons that include the absence of an agreement and fee for construction services, restrictions in their professional liability insurance, etc. Nevertheless, the SERs should at least use their influence, as it may be, to press for strict inspections and unwavering enforcement of high standards during construction.

A Structural Engineer of Record should be particularly careful in requiring submission of and then "approving" the contractor's detailed plans for temporary structures. Exculpatory language is often placed in engineers' "approval" stamps to the effect that the engineer has assumed no responsibility by having reviewed the submission . . . Hmmm . . . In the event the design was not adequate and there was injury to person or damage to property, it is likely that the engineer's stamp would not be sufficient to exculpate him/her from liability to injured third parties.

The SER should, but often does not, have adequate familiarity with the materials, hardware and equipment, nor the experience with methods of installation/maintenance/removal of temporary structures. If the SER does not have the necessary expertise, or does not intend to carefully review each and every submission, the submissions should not be required at all. Don't ask for it, if you don't know what to do with it! ■

Too often, temporary structures in construction don't get no respect!

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