



Too Crucial to Fail

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The phrase “Too Big to Fail” entered our vernacular last fall during the financial crisis that involved several large banking and insurance firms. The concept is that these institutions cannot be allowed to fail because of the resulting wide-reaching, negative consequences.

Engineers are very familiar with this concept. The phrase “Too crucial to fail” exemplifies the responsibility we feel for the lives that are affected by our designs. We are reminded of this each time a failure of a part of our infrastructure causes a loss of life, loss of commerce, or a general loss of public well-being. Engineers need to take seriously our primary ethical canon of “protecting the health, safety, and welfare of the public.”

CASE (Council of American Structural Engineers), of which I am beginning my two-year term as chairman, is dedicated to improving the practice of structural engineering through improved business practices, decreased professional liability exposure and improved profitability. Our committees consist of volunteers from the ranks of member firms’ principals and senior managers.

One of CASE’s iconic elements is our **10 Foundations of Risk Management** that organizes our products, such as tools, guidelines, contracts and convocations. The 10 Foundations are Culture, Prevention and Proactivity, Planning, Communication, Education, Scope, Compensation, Contracts, Contract Documents, and Construction Phase. Rigid application of these foundations to your structural engineering practice and projects will help prevent the kind of errors that can lead to design failures and liability claims.

The most successful engineering firms have instilled a **Culture** of excellence within their staff, and in their strategic and operational planning. Firm principals should expect excellence in analysis and design, documentation and client service; and, they should demand personal accountability for performance from all employees. A culture of excellence promulgated throughout the firm, from the top down, will certainly mitigate the risk of a faulty design leading to a failure.

Being able to anticipate the long-range effects of present actions or situations arises from experience gained over a long career. This ability to **Proactively** react and **Prevent** problems from occurring is an important element in managing risk and avoiding errors. This wisdom can be acquired in two ways: making your own mistakes as you gain experience, or having a veteran engineer mentor you as you gain experience and point out the pitfalls along the way. Which way seems to you to carry the least risk?

Proper and upfront project **Planning** is necessary for its smooth execution. The plan must include what information is needed, when it is needed, who is responsible for gathering that information, and who needs to know the information. With proper planning and proper execution of the plan, mistakes due to improper or untimely information can be avoided.

Many failures can be attributed to a lack of **Communication**. The proper transmission of information is one of a project manager’s greatest challenges. Be sure that clear lines of communications are open between Owner, Prime Designer and all Sub-consultants, and your staff. Communicate early and often, and document all forms of communication.

Some engineers complain that present design codes are becoming too complex to easily understand and implement. It is imperative to **Educate** your staff on how to use the design codes and the analysis software used in your practice. Target your education efforts according to staff needs. Promote *lessons learned* sessions as a way to educate the entire staff at once.

Scope, Compensation, and Contracts are interrelated. A few failures have been caused by an unclear allocation of responsibility between parties. Proper documentation of everyone’s responsibilities, and which tasks are to be delegated downstream to others, is essential to ensuring important tasks are not left undone. For an engineer to properly address all of the assigned responsibilities, scope and a fair compensation must be negotiated for those services in a fair and equitable contract.

To be interpreted properly and built correctly, a structure’s **Contract Documents** must be clear, coordinated, and complete. The CASE *Guidelines for the Coordination and Completeness of Structural Construction Documents* is the perfect resource for your young engineers to gain the understanding they will need to put into practice. Senior engineers paying constant and close attention to document production will earn great dividends in producing quality documents. Institute a quality assurance plan that is rigorously enforced and that involves personal accountability, senior management oversight and a comment feedback loop.

The final stone of the 10 Foundations is the engineer’s service to the project during the **Construction Phase**. This is the final opportunity to make sure things are right before they are set in stone (or concrete, masonry, or steel). A job site visit provides an excellent forum for interacting with the contractor, observing the work as it progresses, and stopping errors in a timely fashion. However, your staff must be trained in proper job-site behavior so that the scope of services isn’t inadvertently enhanced and liability expanded.

CASE’s **10 Foundations for Risk Management** lay the groundwork for projects to be designed and built successfully. These tenets, plus our members’ professionalism and dedication to their craft, help us protect public safety against projects that fail. If you are not already a member of CASE, please join us and help our industry become even stronger. ■

Foundations for Risk Management

- 1) **Culture:** create a culture of managing risk and preventing claims.
- 2) **Prevention and Proactivity:** act with preventative techniques, don’t just react.
- 3) **Planning:** plan to be claims free.
- 4) **Communication:** communicate to match expectations with perceptions.
- 5) **Education:** educate all of the players.
- 6) **Scope:** develop and manage a clearly defined scope of services.
- 7) **Compensation:** prepare and negotiate fee that allow for quality and profit.
- 8) **Contracts:** negotiate clear and fair agreements.
- 9) **Contract Documents:** produce quality contract documents.
- 10) **Construction Phase:** provide services to complete the risk management process.