

The Loads Just Didn't Add Up

By Nils V. (Val) Ericson, P.E.

TDEG Risk Management Commitment Statement;

Realizing the consequences of the risks associated with our profession, our firm is committed to implementing a program for managing professional liability risks.

As a result of the Risk Management Program, our company will enjoy benefits that will include lower insurance rates, greater profits, a higher rate of client satisfaction, increased staff pride and job satisfaction, and less stress.

We believe that the successful implementation of the Risk Management Program is integral to our firm's ability to uphold our ideals of engineering ethics and practice. Specifically, this program will help us to "advance the integrity, honor, and dignity of the engineering profession" (ASCE Code of Ethics), and to safeguard the "safety, health, and welfare of the public.

...by the TDEG staff, September 11, 2006

We formalized our commitment to implementing a risk management program with our entire staff two years ago. This was done as part of our first Foundation of Risk Management; to instill and foster a culture of risk awareness, education and mitigation. Before then, the Principals of our company were vigilant to our risks, addressing them and sharing the lessons learned with our staff. We still are, but now, with the help of the entire staff, we are more proactive in identifying issues earlier and "nipping them in the bud" whenever possible.

Everyone in our office now better understands their role in providing our clients the best engineering products and services that we can produce. They also are more aware of the threats to successful projects; relationships that sour, poor performance by designers, builders and owners, unrealized expectations and unrealistic expectations. Frequently, we will discuss "situations of concern" with proj-

ects that are identified by our staff during our Monday Morning Meetings. We do this as much to keep everyone informed about these issues and situations as to be a consciousness raising education.

Our company, now celebrating its 35th anniversary, has done many, many projects and learned many lessons through those years. We have also been learning how to identify and address the risks that we perceive with specific projects and clients. And, we are improving, even learning how to turn down projects that would be more trouble than they were worth! However, every once in awhile, despite the best laid plans, something goes wrong.

We generally observe the divide between buildings and transportation structures. The transportation engineers deal with the highways and bridges and we design the buildings; the horizontal structures v. the vertical structures division of SE projects. But when the client, whose building we are working



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on, comes up with the project for an access bridge to the site to complete his project, you want to try to accommodate him. Not just your private driveway bridge like the few we have done for the residential projects, this is the main entrance to a large office complex and it elevates over not only a roadway, but a railway too!

So we take on this bridge design, after all a structure is just a structure, helping out our client. We get the bridge codes, the bridge specs, the bridge details, the bridge design software and the bridge design learning curve. Somewhere along the way we realized why our bridge design fee should have been greater.

We complete the design, the construction documents and the reviews – in-house, the city's building department, public works department, the state DOT, the railway people and the developer. The comments are addressed and the bridge project is bid, contractors are selected and construction begins. All went well until that phone call about the girders deflecting too much during the slab pour.

That was when our uncommon project became a "situation of concern" and we kicked into high gear, or mitigation mode. First we confirmed that the deflection was excessive by immediately visiting the site, reviewing the construction and listening to the contractor's concerns. Then we re-checked our design. We discovered that our new bridge design software worked perfectly and did exactly what we asked it to do through our incorrect load input; it understated the girder loading! So now we faced a partially completed bridge with undersized girders installed, and a developer anxious to open the new bridge to his building so that his tenants could move in. The risk level is now elevated to a "situation of greater concern."

Case 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.

As we evaluated beam strengthening schemes, the construction continued and the cast-in-place concrete railing along the edges was poured. The top of the railing followed the deflected girder shape and gave away the excessive deflection, along with an unsettling appearance. The bridge was closed to even construction traffic and everyone looked to us for the solution. This was not our proudest moment, but what happened next gave me great pride in the commitment and resourcefulness of our company.

On re-examination the beams should have been stiffer to limit deflection, but they proved to have adequate strength to safely support the loading. But we needed confirmation so we retained an expert bridge engi-


neer, which was a great move and helped us all sleep better. His experience and separate analysis relieved much angst, and improved the outlook and prospects for the bridge. This favorable report of the situation was generally accepted by all and the focus was now on the excessive construction load deflection.

Things were looking up. Fortunately, we maintained credibility with the team due to our response to the emergency and management of the resolution process. They still looked to us to resolve the drooping concrete railing and we felt better about being involved and contributing to the solution. The solution here was a fabricated metal cap that we designed to fit over the top of the concrete railing, positioned to level the top across

the span. When the developer accepted the prototype of the solution, we arranged for its fabrication and installation.

Overall, due to the cooperation of everyone involved and the willingness to work together toward a solution, we averted a less desirable outcome. Today the building is occupied, the bridge is open and functional and the bridge construction delay was reduced to just a blip in the overall schedule. ■

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