ON SECURE BUILDINGS

Baldridge

Steven M. Baldridge, SE, PE. President, Baldridge & Associates Structural Engineering, Inc. Chicago born and bred, he studied structural engineering, designed high-rises there and then moved to Hawaii during the late 80s construction downturn. Today, he balances living in paradise with running one of the leading engineering firms in terms of designing military facilities.

Reality I remember a conversation with a newscaster who asked post-9/11, "If a plane were to fly into a building in our area, what would be the result?" We have buildings that do not even have fire sprinklers in them or do not meet current seismic codes! These are more probable threats. Who is addressing that? Security has to be approached from a rational – not just an emotional – point of view. That's difficult to do after 9/11. Engineers, being conservative, want to build bunkers. In most cases, that's not necessary. We have to keep the reality of the situation in mind.

Misconceptions There is a belief in terms of bomb-blast loading: "use as much mass as you can, and you'll have a safer structure." But that's not necessarily true. When designing to prevent progressive collapse the indiscriminate use of mass can actually work against you. Another misconception is that if you designed for seismic, you've designed for blast. That's absolutely not true. Sometimes when you oversimplify, you end up further away from the answer. Every project is unique.

Security Just by talking about security measures incorporated into a construction project, you provide information that can actually place your building at risk. A lot can happen even at a local site where construction is taking place. There's the story about an American embassy being built in Moscow that was "bugged" by the local labor. There is potentially a security issue with the labor force of any building. The more of a building that can be fabricated in a secure environment, the better. Steel can be fabricated in the U.S. and then shipped anywhere in the world. Fabrication of steel under controlled conditions, well, it's a plus.

Mentoring Young structural engineers need to keep in mind that the client has a set budget, and that they need to be creative to find cost-effective approaches. Take the time to do that. Don't take the easiest approach to solving a problem. Engineers have a responsibility to look at ALL alternatives. For example, there is a difference between designing to a progressive collapse criteria than for a blast loading. The former can be very prescriptive, whereas designing for blast loading, you have to figure out what and where the blast could be. This requires a lot more detailed analysis – something we need to do – or find people to do it for us if it is not our expertise.

Inspiration One aspect of security is the huge sense of responsibility that develops around a project. On military work, like our work on the Department of Defense's new six-story, 320,000 sq. ft. Pacific Command Headquarters Building, it was knowing that the client had a set budget, and the mission needed to be achieved within that budget. What a terrific responsibility! As odd as it might sound, we have a sense of patriotism working on military projects. It is difficult to really explain what we felt.

Being Competitive That Command Center RFP called for concrete. We wanted to make sure we would provide the client "best value," and so we looked at structural steel as an alternative. In the end, the only way to find out what is a better value is to price out a couple of different systems. To stay competitive, you have to be able to run these "what if" scenarios, even though it goes well beyond what's expected. We avoided the temptation to bid the drawings "as is."

Codes Building codes, like RFPs many times, try to create a simplified "cookbook approach" to designing a building (like designing for seismic loads). But every design is a complex event and is never as easy as 1,2,3. Blast loading, for example, is a complicated, dynamic event. There are some simplified methods of computing the loads that can be created from it, but it is really a specialty. The practicing engineer needs to understand the basics, but more important, needs to know when to get expert help.

Steel Structural steel provides many advantages from a security point of view. Steel buildings are also easy to alter, so when an office space needs to be changed, it's easy and less costly to modify the structural steel. Steel can provide superior seismic performance due to its inherent ductility and lightness. It's completely recyclable, and it's easy to ground. I've never been one to push any one particular system. But knowing that, you have to be willing to look at all the alternatives, even when the RFP doesn't require you to do so. Looking at steel made the difference in the Pacific Command Center project. We saved the client several million dollars and delivered a superior, secure structure due to steel.