

# STRUCTURAL FORUM

## The 1981 Hyatt Regency Walkway Collapse *A Disaster, But Not a Tragedy*

*By Thomas F. Heausler, P.E., S.E.*

While certainly the 114 who died, those injured, their families and the community experienced a tragedy when the Hyatt Regency walkway collapsed, the structural engineering community, and the public for which it serves, has experienced valuable benefits over the last 22 years. The benefits have been manifested in the improved performance of structural engineers and safety in their designs.

The Hyatt Regency walkway collapse was unique in many respects. Dramatic failures are usually caused by acts of god such as wind or earthquakes, acts of vandals, inferior material, shoddy construction work or some combination therein. That was not the case at the Hyatt. The investigation found blame limited to the professional structural engineer designers only. Furthermore, it was not a case of poor design, where an error was made in a calculation, or poor judgment used in designing a connection; instead it was a case of "no design". The connections that were constructed were never designed by a structural engineer. No connection design drawing existed prior to the collapse. It slipped through the cracks. The structural engineers were negligent not for what they did, but rather what they did not do, but nonetheless were still responsible for. Some have labeled the cause of the Hyatt failure a "failure in communication," but the reality is you can't communicate that which does not exist.

### *Why did this occur?*

In addition to the normal pressures of speed and low cost, the Hyatt was constructed under what is known as the "fast-track" method, i.e. portions were being constructed before all of the information and design was complete for the remaining portions. Although not unusual, the process nonetheless adds to the complexity of the structural engineers involvement. If a structural engineer works too fast, or uses inexperienced and less expensive staff, there is a potential for poor quality designs. (An adage has developed among engineers: "Fast, cheap or good - pick two!"). Poor quality structural engineering can lead to failure - the Hyatt Regency walkway collapse was an extremely dramatic example.

Structural engineers are under huge pressure from clients, contractors and owners to perform quickly and cheaply, potentially at the risk of quality and safety. The lasting memory of the Hyatt disaster provides beneficial guidance to structural engineers who are frequently faced with the decision of where to draw the line between speed and cost versus quality and safety. Over the last 22 years, the benefits gained have significantly outweighed the negative aspects of the collapse by preventing hundreds of similar disasters, albeit likely smaller and less dramatic, but nonetheless summing up to what would have been a far greater tragedy. The world has ended up a better place in the wake of the Hyatt collapse disaster.

### *Can Structural Engineers be More Proactive?*

Is it necessary for structural engineers to periodically experience a disaster in order to be reminded of the appropriate quality standards? Not necessarily. Rather than being reactive, structural engineers are becoming increasingly more proactive in their continuing education and communication with peers. Organizations such as the Structural Engineers Association of Kansas and Missouri (SEAKM), NCSEA and other similar organizations nationwide provide an excellent venue for education and communication, and thus the means with which to gauge the appropriate standard of care necessary and appropriate for assurance of safety.

SEAKM was founded 1½ years ago by several structural engineers who wanted to make a difference, and make the profession better. SEAKM now has approximately 200 members, with over 100 in the Kansas City Area. Since September, in Kansas City, SEAKM has had 8 monthly meetings consisting of structural engineers networking, socializing, and receiving professional training. Attendance often numbers over 50 structural engineers.

### *Conclusions*

The structural engineer serves the public by assuring the public's safety in buildings and structures. A doctor or a policeman may come to mind when one thinks of serving the public. However, a structural engineer, over a long career, will be responsible for the care and safety of many more people than a doctor will treat in his or her lifetime. And, in fact, be responsible for the structural safety of the very building where the doctor goes to work each day! The public often takes this for granted. The structural engineer receives glory through anonymity... for as long as the building remains structurally safe, the structural engineer will stay out of the news headlines and have the intrinsic satisfaction of a job well done.

Structural failures are relatively rare – as well they should be. Automobile accidents took the lives of approximately 42,000 people the US last year. That is a disaster. The same number will likely die next year. That is a tragedy. The Hyatt collapse was a structural disaster, but not a tragedy. Structural engineers have used the experience wisely. Today, structural engineers do not need to rely on failures to reassess their quality standards. Instead, professional organizations such as SEAKM are maintaining and improving the structural engineering profession. Structural engineers should be commended and admired for their involvement in these professional organizations, and for maintaining the excellence and integrity required of a professional structural engineer.

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## **Structural Failures**

### **Are We Really Designing Safer Buildings Today?**

*By Jim DeStefano*

We, as a profession, learn from our failures. Unfortunately, we don't always learn the correct lessons, and our memory is often too short.

The collapse of the Kansas City Hyatt Regency walkways was caused by the failure of one critical connection. The connection detail, as drawn on the structural drawings, could not be built. The contractor modified the detail on the shop drawings so that it could be built, and the modifications affected the connection capacity. Do most structural engineering firms perform a constructability review of the structural details prior to issuing drawings? Probably not.

Many of you probably don't remember the 1987 collapse of L'Ambiance Plaza in Connecticut. Some of you may recall that it was a lift slab building that collapsed during construction. Following the collapse, restrictions were placed on lift slab structures that resulted in the extinction of that structural system. I suspect that very few of you know that it was a design-build project, and that the contractor had trivialized the role of the structural engineer of record. In addition, the SER had very little oversight of construction operations. Required temporary bracing was not installed by the contractor, resulting in an unstable structure. When we submit a proposal for a design-build project, are we confident that the contractor shares our concern for public safety?

The collapse of the World Trade Towers is still fresh in everyone's memory. The structural system performed heroically. The performance of the fire protection systems was disappointing. How many of us have made the effort to learn more about passive fire protection of building structures and to make sure that the fire protection is properly specified and inspected on our projects?

#### *Additional Lessons*

In 1982, a Congressional Subcommittee held investigative hearings to examine the causes of structural failures. They concluded that many failures could have been avoided if the structural engineer had been on site during the construction of the building frame. How many structural engineers today take an active role in the Special Inspection of their projects?

After a structural failure, forensic structural engineers are engaged to investigate. These investigators represent some of the finest minds in our profession. Unfortunately, they are often more interested in exonerating their client than finding the true cause of the failure. Settlement of litigation following a failure is often based more on insurance coverage

than culpability, and often the parties of the litigation are required to not publicly divulge the facts of the case.

In the aftermath of a major structural failure, there are often changes to the Building Code. There is no disputing that the Building Code has gotten thicker over the years. But have the additional pages in the code book resulted in safer buildings, or in more confusion and greater chance of misinterpreting code provisions?

The public pays a high cost when our structures fail. It is our duty as a profession to learn from these failures and make certain that we do not repeat the mistakes of the past.

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