

***The Rest of the Story ...***

I and my firm were the structural engineers on a distribution center and regional headquarters project for a national electronics and appliances retailer (the owner) in 1985. The \$5M facility is located in Dallas and consists of a 280,000 sf concrete tiltwall warehouse and an attached 40,000 sf two-story steel frame office.

In May 1989, the warehouse experienced a partial roof collapse during an intense thunderstorm. Upon learning of this event, I quickly assembled an engineering team and we rushed to the facility. We found that three perimeter roof bays had failed, pulling the adjacent tiltwall panels inward and crushing the rack area where the electronics were stored. The floor of the warehouse had several inches of standing water, causing many stacks of boxed appliances to topple. We were told that a ruptured fire sprinkler system was responsible for the inundation.

The air in Dallas is dusty, and the dust settles on rooftops. When rainwater accumulates, the dust floats and leaves behind high water marks on building parapets. Climbing up on the roof, we found clear evidence that there had been at least 12" of water on the roof at the parapets, more than three times the design live load. Beyond that, we observed that the roof drainage system was deficient. There were no primary roof drains, and the secondary drains (the scuppers) were narrow and widely spaced. Even worse, flow through the scuppers was mostly blocked by gravel guards that consisted of steel plates perforated with drilled holes.

We left the site and I returned to the office to verify the structural design. Then I opened my hydraulics textbook for the first time since college and checked the adequacy of a typical scupper. Eventually, I was satisfied that I understood the cause of the collapse and it had nothing to do with the structural design.

Sometime thereafter, I received a phone call from an attorney. He explained that the owner had filed a \$26M claim, including \$1M for building repairs and \$25M for damaged inventory. The insurance company paid the full claim and he was now subrogating on their behalf.

Three salvaged roof joists were being sent to UT-Austin for load testing. In addition, a mock-up of the roof drainage system was being tested elsewhere. The ongoing investigation was unusually extensive and costly. The attorney asked for various design and construction documents. I promised full cooperation. In return, he assured me that he was pursuing reimbursement with "a rifle, not a shotgun." Eventually, it became clear that neither I nor my firm were going to be named as a party in any litigation. Relieved, I shifted my focus elsewhere and didn't look back ... until very recently.

In August 2015, I attended a dinner with a small group of structural engineers in Chicago. Seated to my right was the leader of a large firm based in New England. Eventually, our conversation turned to structural engineering education. At one point, he randomly asked: "Have you ever actually used your education in hydraulics?" After thinking for a moment, I responded that I had, but only once. Then I proceeded to tell him the story that you have just read.

When finished, I asked: "What about you?" He responded that he had used his education in hydraulics to analyze the adequacy of a roof scupper as well. Comparing details, we soon discovered that it was the same scupper! He and his firm had worked as one of the forensic experts. He described the investigation and a subsequent video deposition where he presented his conclusions: the drainage system was substantially inadequate, but the structure was not an issue.

Then he asked: "Do you know how the case ended?" I responded that I did not. As Paul Harvey might proclaim, here is the rest of the story. There was one final witness to depose, just a few days before trial. The witness was a maintenance worker employed by the owner. Under oath, he testified that he had been ordered by his supervisor to use a fire hose and thoroughly soak the entire warehouse inventory. The supervisor told him that it was a unique opportunity to replace all of the aging electronics and appliances at full value.

Following that revelation, the case was quickly settled and never went to trial. The owner declared bankruptcy in 1992, and all of its stores were liquidated in 1993.