Editorial | Is a Storm Brewing and What Should We Do About It?

By Andrew Rauch, P.E., S.E., CASE Chair

Having completed the first year of my term as CASE chair, it has been a privilege to be introduced to, and get to know, so many committed engineering professionals who are working very hard for the betterment of the profession. As part of my duties, I attended both the ASCE/SEI Structures Congress and ACEC Spring Convention in April. I was able to hear very interesting keynote speakers and take in several great sessions at both conferences

The speakers at the CASE Convocation breakfast at the Structures Congress caught my attention, and together with several other articles, the topic has remained in my mind for the past few weeks. Mr. Stephen Long of the Nature Conservatory and Mr. Frank Lowenstein of the New England Forestry Foundation spoke about the need for changes in engineering approaches to risks due to climate and disasters. They presented recently released information showing measured, not projected, changes in weather severity due to climate change. This data showed that the intensity of storms has increased in the recent past. The telling graphic for me was the superposition of a previous plot of storm intensity vs. frequency. The previous bell curve has not only shifted towards greater intensity, but has flattened as well. This combination has greatly increased the frequency of events that exceed what previously would have been considered a rarely occurring event

Whether by coincidence or heightened awareness, several other similar articles have caught my eye in the past few weeks. A coalition of design and building associations, including ACEC, ASCE, AIA, AGC and ASHRAE has issued a joint statement on resilience recognizing that "natural and manmade hazards pose an increasing threat to the safety of the public and the vitality of our nation". This statement calls for, among other things, research, education and advocacy to improve the resiliency of our nation's buildings, communities, and infrastructure. Recognizing the economic cost of responding to and rebuilding from these hazards and disasters increased resiliency will improve the economic competitiveness of our country.

The recently released NIST report on the Joplin tornado contained several recommendations of relevance to the structural engineering community. This report recommend the development of performance-based standards for resistance to tornadic events. These standards are proposed to be similar to those for seismic events with different performance levels such as operational, repairable occupancy, life safety, and collapse prevention. These objectives would vary depending on the building occupancy type and the severity of a tornado. For example, a building in risk category III per ASCE 7-10 would be expected to meet the repairable occupancy standard for EF-1 through EF-3, the life safety standard for EF-4, and the collapse prevention standard for EF-5. This report also recommends the installation of storm shelters in new and existing schools, office buildings, residential buildings, and other structures.

The last article reported that an insurance company was suing several communities in the Chicago area for not adequately foreseeing the effects of climate change and taking steps necessary to increase infrastructure capacity to accommodate heavier rainfall. This suit should serve as a warning to us in the design profession. While these government entities are likely to win this suit based on sovereign immunity, how long will it be before they turn to the engineering community saying that the project designers should have had similar foresight?

Should disaster resiliency become part of national design standards? Should tornado resistant design have the same level of importance as seismic design?

As this information has tumbled around in my head, it has led me to ask a few questions. Should disaster resiliency become part of national design standards? Design for tornadoes has long been considered excessive because tornadoes affect such a small area at any given time. Earthquakes have the potential for widespread damage but occur relatively infrequently. Conversely, tornadoes occur rather frequently but the damage is not as widespread. If the number of people killed or injured by tornadoes were compared to the number killed or injured by an earthquake, would that show that tornado resistant design should have the same level of importance as seismic design? In the interim, are we fulfilling our obligation to protect the public health, safety, and welfare by designing to the status quo or should we be encouraging our clients to include resistance to tornadic events in the design of their structures?

Finally, on a completely unrelated note, I would like to extend congratulations to Dave Oxley and the rest of the ACEC/MN staff along with the numerous volunteers who spent countless hours securing the passage of an indemnification bill for the State of Minnesota. This legislation makes clauses that require design professionals to indemnify others, for anything other than their own negligence, unenforceable in the State of Minnesota. It also requires that Minnesota be the venue for contracts for the improvement of real property in the state to prevent skirting the indemnity provisions by changing the venue for the project to another state. This is a great example of what the advocacy of ACEC and its state member organizations can do for firms of all sizes and all disciplines.▪

Andrew Rauch, P.E., S.E., is a principal with BKBM Engineers in Minneapolis, MN. He is the current chair of the CASE Executive Committee. He can be reached at ***arauch@bkbm.com****.*