

The CTBUH special issue reflecting on the progress and challenges in the ten years since the World Trade Center (WTC) attacks is a significant and timely contribution to the field. The National Institute of Standards and Technology (NIST) has been thrust into the vigorous debate surrounding tall buildings and safety as a result of our technical investigation of the collapses of WTC 1, 2, and 7. We had both a unique perspective and a mandate (via the National Construction Safety Team Act) to advocate for changes to codes, standards, and practices derived from our technical findings. In 2005, NIST issued 30 recommendations (and one new recommendation in 2008 following the WTC 7 study) for improvements to tall building codes, standards, and practices. The recommendations, discussed in this issue by several authors including Drengenburg and Corley, covered a variety of safety measures for tall buildings including increased structural integrity, enhanced fire endurance of structures, new methods for fire resistant design of structures, improved active fire protection, improved emergency response, improved procedures and practices, and education and training. The premise behind these recommendations is that consequences of failure or collapse of tall buildings are tremendous when compared to those for the same hazard or set of hazards in more typical structures.

We commend the industry for its efforts to mitigate the risks associated with tall buildings in the post-9/11 world. The article by Lewis and Holt presents some of the safety measures that were implemented in the design of the new WTC 1 and WTC 7 and may affect the new norm for the safety of high-rise construction. Measures for WTC 7 included enhanced fireproofing for the structural steel, a concrete enclosed core surrounding larger stairwells, and a redundant fire protection (sprinkler) system. In WTC 1, additional safety measures include a massive, redundant steel moment frame at the building perimeter, a massive high-strength concrete core shear wall, a protected tenant-collection point on each floor, a separate stairwell for first

responders, and blast-resistant facade. Bill Baker captured the post-9/11 industry practices: “The industry has shifted, particularly regarding egress and the way we tie the building together. Cores of new towers often exhibit hardened stairs and exit paths that are more generously sized to accommodate rescuers going up as well as inhabitants going down. It is probable that most engineers today pay greater attention to robustness and redundancy in their designs.” Finally, we were pleased to see that Torero (and later Lay) discussed the need for holistic engineering approaches. Performance-based design methods for both structural integrity and egress efficiency during a hazardous event provide a cost-effective and design-enabling alternative to the traditional prescriptive requirements, and should be high priority for the high-rise community moving forward. All these changes are consistent with the NIST recommendations following the WTC disaster.

In sum, this special issue beautifully captures both the progress that the tall building industry has achieved in the first ten years since the collapse of the WTC towers, but also the engineering, architectural, and social challenges that remain before us.