

# SCHULTE & ASSOCIATES

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## LOOKING BACK: OCTOBER 2001

By Richard C. Schulte

The collapse of the World Trade Center (WTC) towers on September 11<sup>th</sup> was an event that was bound to have an impact on the design and construction of tall buildings. Given that, the Council on Tall Buildings and Urban Habitat (CTBUH) convened a meeting of representative of various building design and construction interests to discuss this subject in Chicago on October 15, 2001. The transcript of the comments made at this meeting can be found in a document titled “**Task Force on Tall Buildings: “The Future”**” on the CTBUH website ([www.ctbuh.org/](http://www.ctbuh.org/)).

Comments made by a structural engineer, Jon Magnusson, representing the structural/civil engineering firm of Skilling Ward Magnusson Barkshire, provided an interesting perspective on the events of September 11<sup>th</sup>, particularly given that the comments were made just a little over a month after the collapse of the towers. The following are excerpts from Magnusson’s comments:

*“I think that we need to be sure that we keep clear the event that we’re discussing is an airplane attack against a building. The ramifications of this attack versus other kinds of terrorist threats against buildings is important to keep in context.”*

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*“The 767-300 that hit each of the towers it had a wing span of 156 feet. It had 24,000 gallons of fuel. The approximate weight was about 300,000 pounds.”*

*"A couple of other facts: The fuel in the 767, 24,000 gallons; 747, 54,000 gallons; A380, 82,000 gallons. We're talking almost four times as much fuel in the A380. And then the weight of the plane that you saw was 300,000 pounds. A 747 400 is about 800,000 pounds, and the A380 will be 1.235 million pounds. So, with those facts you have to be drawn to the conclusion, it's not about concrete, it's not about steel to stop the plane that you saw flying. To stop the plane in five feet, which is something that you might consider if you're going to protect a building from an airplane, it takes 400 million pounds of force applied in under a tenth of a second to arrest the aircraft."*

*"The good news is, if we understand this, buildings should not and cannot be designed for airplane attack. It's a problem, really, about airplane security."*

*"As we look at where we should spend dollars and shape public policy, it needs to be on airplane security and not on changing things in buildings. Frankly, it doesn't matter what sprinkler system you have, or how many stairwells you have, or how wide they are, or what the response time is if the building has been cut in half by an airplane."*

*"So, the really good news is we can solve the airplane problem. That's the specific event that triggered this discussion. There certainly are other terrorist threats that we should be thinking about and address. In terms of the specific hazard of airplanes and buildings, we've just got to keep those two things apart."*

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With only a few simple words just over a month after September 11<sup>th</sup>, Jon Magnusson was able to put the collapse of two of the world's tallest buildings into perspective with the statement that "99 percent of all buildings would collapse immediately if hit by a 767." In other words, the World Trade Center towers performed magnificently on September 11<sup>th</sup> and the lives of thousands of people were saved because the towers did not collapse immediately.

There are two ways to look at the collapse of the WTC towers on 9/11—one way is to look at the “glass as half empty” and the other way is to look at the “glass as half full”. The National Institute of Standards and Technology (NIST) investigation report on the collapse of the WTC towers never compared the performance of the towers to the expected performance of other buildings if subjected to a similar high-speed impact of a large commercial airliner, but rather chose the “glass as half empty” approach to the terrorist attack. Rather than praise the performance of the WTC towers, NIST chose to look for defects in the design and construction of the towers and to make recommendations to enhance the performance of tall buildings.

Some say that the collapse of the World Trade Center towers is “old news” and it’s time to move along, but, in my view, the performance of the towers on 9/11 is worth another look. Although the NIST report on the investigation into the collapse of the towers took a little over 3 years to develop, it is my opinion that there was still a rush to judgment on the collapse. The first Congressional Science Committee hearing on the events of 9/11 (which eventually resulted in the authorization and funding for NIST’s investigations) was held on March 6, 2002, just a little less than 6 months after 9/11. It is clear from the transcript of that first hearing that the Congressional Science Committee’s (and NIST’s) opinions regarding the collapse of the WTC towers had already been formed and that the recommendations included in the report simply reflected those opinions expressed at the Science Committee’s hearings.

Perhaps, now, with 9/11 more than 8 years in the past, we can have a more reasoned, less emotional, response to the collapse of WTC towers. Jon Magnusson’s comments at the CTBUH meeting on October 15, 2001 are still relevant today.

**Note:** The internet address of the document titled “*Task Force on Tall Buildings: “The Future”*” is as follows:

[http://www.ctbuh.org/Portals/0/books/2001\\_CTBUH\\_TaskReport.pdf](http://www.ctbuh.org/Portals/0/books/2001_CTBUH_TaskReport.pdf)

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