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NATIONAL COMMISSION ON TERRORIST ATTACKS UPON THE UNITED STATES

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First public hearing of the National Commission on Terrorist Attacks Upon the United States

Statement of William F. Baker to the National Commission on Terrorist Attacks Upon the United States April 1, 2003

I wish to extend my sincere appreciation for being asked to address the Commission on behalf of the ASCE/FEMA World Trade Center Building Performance Assessment Team.

My comments relate to my role on the ASCE/FEMA team as well as my experiences as a structural engineer assisting the fire fighters and contractors in the early days after the attack on the World Trade Center. In addition, I will offer key recommendations that may be valuable to New York and other urban areas in dealing with the aftermath of future terrorist attacks. These recommendations include:

- Immediate coordination of on-site

Current News

The Commission has released its final report. [\[more\]](#)

The Chair and Vice Chair have released a statement regarding the Commission's closing. [\[more\]](#)

The Commission closed August 21, 2004. [\[more\]](#)

Commission Members

Thomas H. Kean
Chair

Lee H. Hamilton
Vice Chair

- structural engineers;
- An archived depository for construction drawings of all citywide buildings and infrastructure; and
- Federal "good Samaritan" legislation

When I arrived at the WTC site, I was awestruck at the extent of the devastation. While the media focused on the destruction of the twin towers, the damage went far beyond anything that was conveyed to the general public. The damage included the total collapse of four major buildings, the partial collapse and burnout of three major buildings and extensive damage to seven additional major buildings. Many other buildings suffered minor damage. The district's infrastructure including utilities and the subway system area was extensively damaged and parts of it were destroyed.

The New York City Department of Design and Construction (DDC) performed a brilliant job in organizing the efforts of the engineering and construction industries to support the search and rescue and, later, clean up the site. DDC divided the district into four sectors. Each sector was assigned to a team of contractors. This was a very successful approach.

Because the contractors were top-notch and adept at managing very large private and public sector projects, they knew how to organize the teams, deal with heavy equipment and marshal resources. However, the contractors needed the professional assistance of structural engineers.

The Structural Engineers Association of New York (SEAoNY) stepped forward to organize the services of structural engineers from across the city, state and country. SEAoNY assembled teams of structural engineers to assist each of the (4) contractor teams. I urge the Commission to use this approach developed by the DDC and SEAoNY as a model for dealing with possible large urban disasters. In many ways, New York City was fortunate to have the DDC and major

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players from the engineering/construction industries available to assist at the WTC site.

In the first, critical hours and days following the attack, what was not available or well organized were the drawings of the buildings, plazas, subway tunnels, freight tunnels, etc. As engineers and contractors were investigating the extent and severity of damage, drawings of the original structure were sorely needed. When it was necessary to bring very large cranes and other equipment across tunnels, vaults and plazas, drawings were an absolute necessity. I strongly urge all major cities to develop archive depositories for construction drawings and other critical information to be available to the authorities on short notice. A duplicate copy should be housed in a redundant location.

The structural engineers who assisted at the WTC site were often in uncharted territory with respect to professional liability. There should be appropriate national "Good Samaritan" legislation to promote the assistance of structural engineers in such situations. While such legislation exists in high seismic states such as California, all states are vulnerable to terrorist attacks and natural disasters and should have appropriate legislation. Federal "good Samaritan" legislation may be appropriate.

At this point, I would like to focus my comments on the efforts of the ASCE/FEMA Building Assessment. The Structural Engineering Institute (SEI), a division of the American Society of Civil Engineers (ASCE), was responsible for organizing this effort and bringing together the relevant professional societies with support from FEMA, for an assessment of the WTC site. Under the leadership of ASCE, a team of structural engineering and fire engineering experts from around the country were brought together. Because of my expertise in tall buildings, I was asked to join the effort and be on the five-

member core group that directed the assessment.

This type of effort is important because advancement in the construction of buildings has often come from the analysis of failures. These tragic events of 9-11 provided an opportunity to see how building emergency systems and structural systems behave in extraordinary events. Although the media has focused on the twin towers, there is more to be learned from the behavior of the more "ordinary" buildings that were damaged by the events. We saw and documented the performance of structures that resisted extraordinary forces and maintained their overall integrity. We also saw and documented collapses that, based on previous experiences, were unexpected. It is through the study of these behaviors that the art of building design is advanced.

Unfortunately, the ASCE/FEMA team faced many obstacles while studying the WTC. The team was not able to assemble on the site until October 6th. We could only request and cajole to get drawings and other information. And, in fact, we did not receive access to the twin tower drawings until January. Nonetheless, the team was able to perform an invaluable service in our initial, overall evaluation of the buildings in order to focus and prioritize future investigations and research.

Fortunately, the National Construction Safety Act that was signed into law on October 1, 2002 addresses the difficulties faced by the ASCE/FEMA team at the WTC site. This act authorizes the National Institute of Standards and Technology to investigate building failures. This is similar to the National Transportation Safety Board investigations of airline and other transportation accidents.

This act allows NIST teams to access building failure sites; provides the power to subpoena

evidence; provides access drawings, records and other documents; and allows for the removal and storage of evidence.

This legislation is a significant step forward in creating a vehicle by which the design and construction industry can learn from failures. This will help to advance building technology and improve the safety and reliability of future construction.

As a structural engineer, the WTC collapses represent the largest structural failure in the history of mankind. From this tragedy, I am confident that we can learn how to approach catastrophic building failures in the future and through the National Construction Safety Act we will continue to learn how to improve building construction.

Thank you for your attention.

Mr. Baker is the partner in charge of Structural and Civil Engineering for Skidmore, Owings & Merrill LLP (SOM). Mr. Baker has been involved in a variety of innovations in building systems, including low-rise and high-rise buildings, long span roofs and special structures. Current projects include Tower Palace III, a 69-story, 2-million sf residential tower for the Samsung Group, which is nearing completion in Seoul, Korea, as well as Trump Tower Chicago, a 2.6 million sf tower that will be completed in Chicago, Illinois in 2005.

In the weeks just after the WTC disaster, Mr. Baker provided structural engineering assistance to search and rescue teams in addition to evaluating damaged buildings and advising contractors on debris removal. He has recently been appointed as one of five members of the Core Group of the ASCE/SEI Building Assessment Team that is evaluating the WTC disaster.

Mr. Baker was educated at the University of Illinois, where he received a Master of Science in Civil Engineering in 1980. He received his Bachelor of Science in Civil Engineering at the University of Missouri, in 1975.

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The Commission closed on August 21, 2004. This site is archived.