

U.S. agency wants safer high-rises

Code changes urged in response to Sept. 11

By Stevenson Swanson

Tribune national correspondent

Published June 24, 2005

NEW YORK -- Wrapping up a three-year investigation into the collapse of the World Trade Center towers, a federal agency called Thursday for building codes nationwide to incorporate tougher standards for fireproofing skyscrapers and for speeding up the evacuation of office workers in an emergency.

Among the 30 recommendations by the National Institute of Standards and Technology, the report urged that emergency stairwells in new buildings be placed farther apart to increase the chance that at least one of them would remain intact following a catastrophic event, such as the impact of a passenger jet.

Only one of the six stairwells in the two towers remained passable after two hijacked aircraft crashed into them on Sept. 11, 2001. The three stairwells in each tower were clustered near the core of the buildings.

And, in a switch from current thinking, the institute called for buildings to be designed so that the entire structure could be evacuated quickly, instead of just a few floors.

The twin towers were only one-third occupied on the morning of Sept. 11, but if they had been full, a complete evacuation would have taken four hours, the institute calculated. Both towers collapsed less than two hours after they were struck. As many as 14,000 people might have been killed in that case, according to the agency, instead of the actual death toll of 2,749.

To achieve speedier evacuations, new skyscrapers should have wider stairwells with better fireproofing and "hardened" elevators. Those elevators, which would continue to operate during a fire, would bring emergency personnel up to the blaze and then evacuate office workers unable to walk down many flights of stairs.

"We strongly urge that the building and fire-safety communities give immediate and serious considerations to these recommendations," said lead investigator Shyam Sunder. "We believe the recommendations are reasonable and achievable."

No enforcement

The institute, part of the Commerce Department, is not a regulatory agency and cannot order states and municipalities to change their building codes. But Sunder said his agency would press the trade groups and professional organizations that set many of the standards incorporated in local building codes to adopt its suggestions.

"Our work just begins," Sunder said during a news briefing a block from the trade center site in lower Manhattan. "It doesn't end with this investigation."

Since 2002, 200 scientists, engineers and technical experts have conducted what institute spokesman Michael Newman called the most thorough investigation ever of a building collapse. More than 1,100 survivors were interviewed, and computer simulations based on more than 7,000 photographs and more than 150 hours of videotape helped engineers recreate the sequence of events leading up to the collapse of the towers.

In April, the institute released its findings on the cause of the collapses, concluding that the towers' innovative, lightweight structures were not at fault.

Instead, it said, the impact of the jets dislodged the sprayed-on fireproofing that was intended to keep the

towers' steel columns and trusses from softening. Exposed to the fires ignited by the explosions of the fuel-laden jets, the steel buckled, triggering the pancaking collapse of the 110-story skyscrapers.

The new report calls for the development of new fireproof coatings or other methods to beef up the durability of structures and "to provide protection following major events."

Aimed at typical events

But the institute's recommendations are designed mainly to make buildings safer during typical fires, not to prevent a collapse from the impact of a passenger jet. To do so would be prohibitively expensive and turn American cities into fortresses, Sunder said.

"We believe it's far more cost effective to keep terrorists away from airplanes and airplanes away from buildings," he said.

Among recommendations aimed at how fire departments respond to emergencies, the report urged local officials to change how they coordinate their rescue efforts. On Sept. 11, the New York City Fire Department located its command centers in the buildings' lobbies. That led to many deaths when the first tower collapsed.

The institute did not calculate how much its recommendations would add to the cost of building a high-rise, but some industry experts have estimated the safety improvements would increase costs by 2 percent to 5 percent.

Cost of changes questioned Gene Corley, a Chicago engineer who led an earlier study into the twin towers collapse, said some of the recommendations could prove far more expensive than that. No one knows what the design standards are for a "hardened" elevator, he said.

"You can say you should have a hardened elevator, but you have to define what a hardened elevator is," said Corley, who noted that the American Society of Civil Engineers has included some of the institute's recommendations in a new set of building code standards that were developed in consultation with the institute.

The mother of a firefighter who died at the trade center criticized the report for not taking the Port Authority of New York and New Jersey to task. The port authority, which owned the trade center, was exempt from New York City building codes

"I'm very disappointed that they didn't have the courage to say that no building in this city should be above the law," said Sally Regenhard, chairwoman of the Skyscraper Safety Campaign, a Sept. 11 family group that advocates tougher building codes and better emergency procedures to prevent unnecessary loss of life in skyscraper catastrophes.

The port authority has said that it met or exceeded the city building code when it constructed the World Trade Center in the late 1960s and early 1970s.

Sunder said the investigation found some problems with the port authority's construction oversight, but nothing that would have changed the outcome of Sept. 11. However, the report called for independent certification of the standards used in constructing buildings that are exempt from local building codes "to gain broad public confidence in the safety of such buildings."

But Rep. Anthony Weiner (D-N.Y.) said he would introduce a bill that would make every building subject to the building code of the city or state in which it is located.

Although the recommendations are intended for new construction, Sunder urged managers of existing high-rises to consider whether improvements or new procedures would make their buildings safer.

The report and list of recommendations is available on the Internet at <http://wtc.nist.gov>.

soswanson@tribune.com