NIST Response to the World Trade Center Disaster

Federal Building and Fire Safety Investigation of the World Trade Center Disaster

WTC Investigation Overview
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Implementation of Recommendations and New Frequently Asked Questions

- NIST's WTC Recommendations have spurred changes to the International Building Code and actions to develop new provisions/guidelines within other standards, codes, and industry organizations, such as:
  - National Fire Protection Association
  - American Society of Mechanical Engineers
  - ASTM International
  - American Society of Civil Engineers
  - Council on Tall Buildings and Urban Habitat
- NIST just released a supplemental set of answers to frequently asked questions that were posted in August 2006 regarding the collapse of the WTC towers and the findings of the investigation. The FAQs are posted on the NIST WTC website: http://wtc.nist.gov.

WTC 7 Working Collapse Hypothesis

- The current NIST working collapse hypothesis for WTC 7 is restated here:
  - An initial local failure occurred at the lower floors (below floor 13) of the building due to fire and/or debris-induced structural damage of a critical column (the initiating event) which supported a large-span floor bay with an area of about 2,000 square feet;
  - Vertical progression of the initial local failure occurred up to the east penthouse, and as the large floor bays became unable to redistribute the loads, it brought down the interior structure below the east penthouse; and
  - Triggered by damage due to the vertical failure, horizontal progression of the failure across the lower floors (in the region of floors 5 and 7 that were much thicker and more heavily reinforced than the rest of the floors) resulted in a disproportionate collapse of the entire structure.
- The working hypothesis for the initiating event sequence that characterizes the initial local failure is based on fire-induced failures initiating in the tenant floors:
  - Floor beams, slabs, and connections heat more quickly and to higher temperatures than the columns.
  - Elevated temperatures in the floor elements lead to thermal expansion, sagging, and weakening that result in failure of floor connections and/or buckling of floor beams.
  - Sufficient floor component failures (connections and/or beams) result in at least one long unsupported column at the lower floors, which leads to the initiation of global collapse.
- While NIST has found no evidence of a blast or controlled demolition event, it is evaluating the magnitude of hypothetical blast scenarios that could have led to the structural failure of one or more critical elements.
- The working hypothesis is based on an initial local failure caused by normal building fires, not fires from leaking pressurized fuel lines or fuel from day tanks.
- This hypothesis may be supported or modified, or new hypotheses may be developed, through the course of the continuing investigation.

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Projected Schedule

1/08	Complete analysis of initiating event.
3/08	Complete analysis of global building response to initiating event.
4/08	Identify leading collapse hypothesis.
5/08	Complete draft reports for NIST Team review.
6/08	Revised draft reports transmitted for NIST level and NCST Advisory Committee Review.
7/08	Release draft reports for public comment.
8/08	Release final reports on WTC 7 Investigation.