WTC Public Safety Studies

*NIST World Trade Center Investigation*

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Building and Fire Research Laboratory

*This Federal Investigation is conducted under the authority of the National Construction Safety Team Act (PL 107-231)*
Objectives of the NIST Investigation

1. Why and how WTC 1, 2, and 7 collapsed following the initial impacts of the aircraft in WTC 1 and 2;

2. Explain fatalities by location, including all technical aspects of fire protection, occupant behavior, evacuation, and emergency response;

3. Determine procedures and practices used in the design, construction, operation, and maintenance of WTC 1, 2, and 7; and

4. Identify areas for improvement to building and fire practices, codes, and standards.
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## Desired Outcomes

- Make buildings safer
- Enhance safety of fire and emergency responders
- Better protect occupants and property in the future
- Better emergency response capabilities and procedures
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Occupant Behavior, Egress, and Emergency Communications

To determine the behavior and fate of occupants and responders by collecting and analyzing information on:

- occupant behavior
- human factors
- egress
- emergency communications
- evacuation system
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Fire Service Technology and Guidelines

To build upon work already done by the Fire Department of New York (FDNY) and McKinsey & Company and:

• document what happened during the response by the fire services, up to the time of collapse of WTC 7

• identify issues in fire service practice, standards, and codes

• identify alternative practices/technologies

• identify R&D needs that advance fire service safety
## Methodology for First Person Accounts

- **Face-to-Face Interviews (~750)**
  - Designed to maximize accuracy, recall, and detail

- **Telephone Interviews (~800)**
  - Designed for statistical representativeness

- **Focus Groups (~15)**
  - Designed for in-depth study of specific issues
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Face-to-face Interviews

• 3 Step Process
  • Uninterrupted description of the event
  • Structured discussion to elicit sequence of actions
  • Follow-up questions

• Participants Include Occupants, First Responders, and Families
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Telephone Interviews

- Standardized Set of Questions
- Statistically representative population of occupants from WTC 1 and WTC 2
- Stratification Variables:
  - Initial Floor Population Density
  - Single/Multi-Tenant Floor
  - Floor Location
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Focus Groups

• Detailed Recall of Specific Group Experiences
  – 5 Groups of ~10 Occupants of WTC 1, 2, or 7
  – 10 groups of ~5 first responders
    ( a company or other similar group )
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## Timeline

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 2002</td>
<td>External experts on-board</td>
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<tr>
<td>Feb 2003</td>
<td>Survey methodology developed</td>
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<tr>
<td>April 2003</td>
<td>Survey contractor on-board</td>
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<tr>
<td>May 2003</td>
<td>Survey instruments developed and approved</td>
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<tr>
<td>June 2003</td>
<td>Survey field work initiated</td>
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<tr>
<td>Nov 2003</td>
<td>Survey field work completed</td>
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<tr>
<td>Jan 2004</td>
<td>Analysis of data collections complete</td>
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<tr>
<td>August 2004</td>
<td>NIST completes Investigation</td>
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For More Information

• Web Site:  http://wtc.nist.gov

• Email:  wtc@nist.gov

• Regular Mail:  WTC Technical Information Repository
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   Gaithersburg, MD 20899-8610