

**National Construction Safety Team Advisory Committee
2003 Report to Congress**

**2003 REPORT TO CONGRESS
OF THE
NATIONAL CONSTRUCTION SAFETY
TEAM ADVISORY COMMITTEE**

DECEMBER 2003

National Institute of Standards and Technology

National Construction Safety Team Advisory Committee

2003 Report to Congress

2003 Annual Report to Congress of the

National Construction Safety Team Advisory Committee

1.0 Executive Summary

Pursuant to Public Law 107-231Section 11(b)-Annual Report, the National Construction Safety Team Advisory Committee (the Committee) presents its 2003 Report on the implementation of the National Construction Safety Team Act (the Act) by the National Institute of Standards and Technology (NIST).

The Committee was established and met three times during 2003, during which it reviewed progress on the two on-going investigations involving the 2001 World Trade Center building collapses following a terrorist attack and the Station nightclub fire in February in which 100 persons were killed. In addition, the Committee received and took under advisement, recommendations and comments from the public.

The Committee made many comments and suggestions on the investigations and concluded that both investigations were valuable with realistic and achievable goals. That said, the Committee is concerned that several key issues have to be addressed if the long-term implementation of the Act is to be successful. Recommendations addressing these key issues are:

- Creation of a National Construction Safety Team Office within the Building and Fire Research Laboratory of NIST with permanent staff and initial funding of \$2,000,000.
- Establishment of a Safety Team Investigation reserve fund of \$2,000,000 to be used at the discretion of the Director of NIST to fund investigations when warranted.
- Establishment of a program to familiarize local and State investigating authorities of the Act.
- A research program investigating the factors affecting human decision making and evacuation behavior during emergencies in buildings.

The Committee made other specific recommendations to NIST on the investigations. Most of these recommendations were accepted or resolved. Other items intended to further achieve the goals of the Act were identified for future consideration.

The National Construction Safety Team Advisory Committee 2003 Report to Congress

2.0 Background

2.1 Committee Responsibilities and Membership

On October 1, 2002, the National Construction Team Safety Act (Public Law 107-203) became effective. This Act charged the National Institute of Standards and Technology (NIST), a part of the Department of Commerce (DOC), to form investigative teams (herein after called 'Safety Teams') "*...after events causing a failure of a building or buildings that has resulted in substantial loss of life or that posed a significant potential for substantial loss of life*".

The legislation also required NIST to establish an advisory committee "*...to advise the Director in carrying out this Act and to review the procedures developed under section 2(c)(1) and the reports issued under section 8.*" On November 5, 2002, DOC approved the Charter for the formation and operation of the 'National Construction Safety Team Advisory Committee' (NCSTAC) (Attachment I). In consultation with other Federal Agencies and private sector interests, NIST selected members for service on the NCSTAC. Attachment II lists the Committee members and their professional affiliations and backgrounds.

The Act also required the NCSTAC to report through the Director to Congress; specifically to the Committee on Science of the House of Representatives and to the Committee on Commerce, Science and Transportation of the Senate. The Committee's charge is to evaluate and assess Safety Team activities and the implementation of Safety Team recommendations and to recommend other actions that will improve the operation and effectiveness of Safety Teams in carrying out their responsibilities. This report has been prepared to fulfill this requirement.

2.2 Summary of Committee Meetings

2.2.1 The NCSTAC met three times during the year, on April 29-30, August 26-27 and December 2-3, 2003 at NIST facilities in Gaithersburg, MD. The Committee received and took under advisement public comments at all three meetings. Detailed minutes of the three meetings and the public comments are posted on the NIST Web Site. Recommendations made by NCSTAC members concerned current Safety Team investigations, the various projects supporting these investigations and the proposed Final Interim Rule outlining the procedures governing implementation of the Act. The NCSTAC's recommendations to NIST and NIST's responses are summarized in Attachment III.

The National Construction Safety Team Advisory Committee

2003 Report to Congress

2.2.2 Brief Summaries of the Three Meetings

2.2.2.1 April 2003 Meeting

2.2.2.1.1 Briefings: NIST staff prepared and presented a detailed review of the investigation and research and development plans for both the World Trade Center and Station Nightclub Safety Team on-going investigations. NIST staff also covered the procedures Federal advisory committees must follow. Finally, the Committee reviewed interactions between NIST and other Federal government investigative bodies (e.g., Bureau of Alcohol, Tobacco and Firearms (ATF), the Occupational Safety and Health Administration (OSHA), the National Transportation Safety Board (NTSB), etc.). NIST staff also reported on investigator training received and the status of agreements outlining procedures and accountabilities where two or more Federal agencies might be investigating the same incident.

2.2.2.1.2 Other Agenda Items: The NCSTAC expressed concerns about the various administrative requirements NIST must follow in any investigation that could impede or significantly slow down a Safety Team investigation. The Committee made several recommendations (discussed in Section 4.1 below and Attachment III) for NIST's evaluation directed at obtaining relief from many of these requirements, thereby minimizing administrative delays and allowing investigations to move ahead in as timely and effective manner as possible.

2.2.2.1.3 Public Comments Received: The NCSTAC received comments from Ms. Monica Gabrielle on behalf of the Skyscraper Safety Campaign, Mr. Robert Polk on behalf of the National Association of State Fire Marshals (NASFM) and Ms. Colleen Delaney, who has residences in both New York and Rhode Island.

Commenters expressed their personal or organizational support for the Act and NIST's role in implementing it. They also expressed concern over current building codes and the issue of code enforcement in the United States.

2.2.2.2 August 2003 Meeting

2.2.2.2.1 Briefings: The NCSTAC received detailed technical briefings on the progress of the on-going investigations. A considerable number of comments and recommendations were made concerning the two investigations regarding additional testing, interview criteria and underlying assumptions concerning modeling of building performance and fire dynamics.

2.2.2.2.2 Other Agenda Items: The NCSTAC further reviewed the various procedures that a Federal advisory committee must follow. The NCSTAC also reviewed the procurement practices NIST followed in selecting individual outside experts and other laboratories for both investigations. The Committee had no recommendations regarding the selection criteria or the competencies of the

The National Construction Safety Team Advisory Committee 2003 Report to Congress

selected contractors. The NCSTAC reviewed two specific recommendations made during the Public Comment period from Ms. Monica Gabriel of the Skyscraper Safety Campaign. One recommendation was that the NCSTAC hold its December 2003 meeting in the New York City area. The other was that NCSTAC record all future meetings (see below). The NCSTAC initially adopted both recommendations. After further review of the costs and logistics involved, NCSTAC meetings will continue to be held at NIST headquarters. Beginning with the December 2003 meeting, NCSTAC meetings will be recorded.

2.2.2.2.3 Public Comments Received: The NCSTAC received five public comments during the meeting and subsequently received an e-mail, which the NCSTAC has included in the public record. The commenters were Dr. Robyn Gershon of the Mailman School of Public Health at Columbia University and the Principal Investigator of the World Trade Center Evacuation Study; Ms. Gabrielle of the Skyscraper Safety Committee; Mr. John Biechman, Vice President of Government Affairs for the National Fire Protection Association (NFPA); Mr. Jake Pauls, a building safety consultant and; Mr. Frank Lombardi, Chief Engineer of the Port Authority of New York and New Jersey.

Comments were informative and supportive of the Act and NIST's investigations, but two commenters expressed concern over the delay in obtaining information and NIST not taking advantage of using existing information from various sources both within and outside the United States.

Mr. Sherman Rattner's post-meeting e-mail to the NCSTAC shared his belief that the unique and innovative design of the World Trade Center Towers were critical to the building's ability to withstand the impact of the aircraft and the subsequent fires allowing thousands of individuals to egress the building and survive.

2.2.2.3 December 2003 Meeting

2.2.2.3.1 Briefings: The NCSTAC received detailed technical briefings on the results of various projects from both investigations. The NCSTAC noted that the various project status were generally in line with the original project plans. NIST staff reported that they had now obtained all essential information needed to complete the World Trade Center investigation. The original completion date of September 30, 2004 for issuing a draft investigation report was reasonable. While several individual suggestions were offered on specific aspects of an investigation or individual experiments or tests, no major recommendations regarding the direction or content of the various programs were made.

2.2.2.3.2 Other Agenda Items: The NCSTAC reviewed the Interim Final Rule detailing procedures for implementation of the Act as published in the November 28, 2003 Federal Register and commented as a Committee suggesting several revisions. NIST staff described plans to improve NIST's interaction at the State and local level involving incidents with criminal

The National Construction Safety Team Advisory Committee 2003 Report to Congress

investigations. Several comments were made regarding the need to address incidents with civil litigation, as well.

The NCSTAC was briefed on the results of a press conference held in Providence, RI a few days before the NCSTAC meeting on the Station nightclub fire. NIST staff asked the public to contact them with any information they might have on the incident and reported several contacts had been made following the press conference. Finally, the NCSTAC reviewed the problem of ‘community-scale fires’, a relatively new phenomenon where close spacing of houses and other structures can cause fires to rapidly spread from building to building similar to historic city conflagrations or Wildland-Urban Interface (WUI) fires. The NCSTAC concluded that community-scale fires were possible candidates for Safety Team investigations.

2.2.2.3 Public Comments Received: Retired New York Battalion Chief Arthur Sheuerman and L. Ray Scott, Battalion Chief of Prince William County in Virginia addressed the Committee during the meeting. The NCSTAC also accepted written comments from Mr. Donald Bliss, Executive Director of the National Infrastructure Institute’s Center for Infrastructure Expertise. Comments included a recommendation NIST review the findings of a British investigative study of the World Trade Center tower collapses, the growing hazards associated with closely spaced housing and other structures and the need for NIST to work closely with organizations having similar objectives to NIST’s charge under the Act.

2.3 NCSTAC Comments On Implementation of the Act and Investigations

Following signing of the legislation, NIST moved quickly to form the advisory committee as required within the Act. Candidate NCSTAC members were promptly appointed. The NCSTAC’s membership technical expertise is multi-disciplined, coming from the structural, fire and behavioral sciences. Members also have a variety of business, engineering and academic backgrounds. The NCSTAC had full access to all staff members as it began its review of on-going projects. Communications between the NCSTAC and NIST management and staff have been open and candid.

By the time of NCSTAC’s formation, NIST had already initiated two major investigations – the World Trade Center investigation and the Station Nightclub fire in West Warwick, RI. Two other multi-death incidents also occurred during 2003. Over 20 persons died in a crowd crush incident in Chicago, IL while exiting a second story nightclub. After careful consideration, NIST elected not to form a Safety Team for this incident.

The other incident also occurred in Chicago in October and involved a fire in an unsprinklered, multi-story county office building in which six county employees died. NIST staff conducted an on-site reconnaissance of this incident. Subsequently, NIST decided not to launch a Safety Team investigation of the incident. As discussed in paragraph 2.4, both decisions were influenced by the limited availability of personnel

The National Construction Safety Team Advisory Committee 2003 Report to Congress

who could be released from current Safety Team investigations, especially the investigation of the World Trade Center collapses.

2.4 Criteria for Establishing Safety Team Investigations, Prioritization and Allocation of Resources to Specific Investigations

A recurring issue in establishing Safety Teams is the availability of sufficient technical staff to conduct an on-site investigation and perform any subsequent research or testing needed to understand performance of a building or structure during an incident. The scale and complexity of the current World Trade Center disaster has strained NIST's existing resources. Limited resources may continue to affect NIST's ability to fully implement the Act even when the World Trade Center investigation is completed. For example, the NCSTAC notes that in both 2002 and 2003, there were no major natural catastrophes such as an earthquake or hurricane or any other national emergency such as a terrorist incident. Safety Team investigations of future building failures will provide valuable knowledge in building design, emergency egress and crisis response and minimize the consequences of such disasters. Adequate funding, that is stable from year-to-year, is needed to conduct Safety Team investigations and prevent overtaxing NIST resources and assuring successful implementation of the Act.

Recognizing scarcity of resources, the NCSTAC worked with NIST staff to establish methodology to help decide whether to form a Safety Team to investigate a specific event. This methodology should help NIST properly allocate resources for future events.

2.5 Dissemination and Technical Assistance Program

An important aspect of NIST's implementation of the Act is the Dissemination and Technical Assistance Program (DTAP). DTAP's objectives are to provide input to the development of Codes and Standards as well as to the field of building and safety sciences. The NCSTAC has reviewed the implementation of DTAP for the World Trade Center investigation. NIST conducted four major press briefings since the beginning of the investigation (including one held prior to the passage of the Safety Team legislation in which the proposed investigation process was presented to the public for comment). Subsequently, NIST engaged the National Institute of Building Sciences (NIBS) to assist in transferring information to the Codes and Standards bodies as well as to the architectural and engineering communities. At the present time, the NCSTAC has no specific comments or recommendations regarding DTAP.

2.6 Comments on Improving the Implementation and Objectives of the Act

During these first nine months of working as a committee, start-up operational issues associated with members becoming familiar with both the ongoing investigations and individual NIST staff were resolved. The current investigations appear to be on target.

The National Construction Safety Team Advisory Committee 2003 Report to Congress

NIST investigation teams have been very responsive to NCSTAC suggestions and recommendations. This experience, although limited, has provided a base for planning future NCST investigations. Additional issues that were identified and discussed with NIST staff were:

2.6.1 Identification and Selection of Future Investigations. – NIST published the Interim Final Rule addressing criteria for launching an investigation in the Federal Register on November 28, 2003. This Rule incorporated many NCSTAC recommendations for initiating a Safety Team investigation. The NCSTAC also recommended that NIST develop a roster of non-NIST staff that would be available on very short notice to assist in reconnoitering a building failure site and determining if a full Safety Team investigation should follow.

2.6.2 Cooperation with First Responders and State and Local Authorities Investigating a Building Failure Site. – Cooperation between NIST, first responders, and State and local authorities is critical to a successful investigation. NIST is working with various Federal Agencies to establish ongoing working relationships. When State and Local investigators are involved, clarification of responsibilities is more complex. If there is no criminal investigation, Safety Team investigations have priority over other investigations. Where there are criminal investigations, they take priority over an NCST investigation. The NCSTAC believes State and local investigating authorities will require much greater familiarization with the Act if future potential conflicts are to be avoided.

2.6.3 Human and Financial Resources to Perform Investigations as Provided in the Act. – The World Trade Center investigation was funded prior to the passage of the Act. These funds are being used as directed by the Act. The Rhode Island fire investigation is relatively small by comparison so its funding has been provided by NIST. Other investigation opportunities have not been undertaken because of the lack of sufficient resources. The NCSTAC believes that for either more numerous investigations or investigations larger than the Rhode Island fire, NIST will not have sufficient human or financial resources to start a Safety Team investigation. Section 4.4 provides a recommendation to help resolve this problem.

2.6.4 Acquiring Information When Individual Rights Conflict With the Authority Provided in the Act. – The Act defers investigation priority where the Attorney General has determined there is the possibility of criminal activity, provides guidance on the authority and responsibilities among Federal agencies and stresses the need for cooperation among other investigation authorities. It is silent with respect to individuals and their attorneys who are engaged in collecting evidence for use in civil litigation. The NCSTAC is currently reviewing this issue with the NIST staff to determine if a recommendation for modification of the Act is appropriate.

The National Construction Safety Team Advisory Committee 2003 Report to Congress

3.0 Current Safety Team Investigations

3.1 World Trade Center Investigation

3.1.1 World Trade Center Investigation Objectives: The World Trade Center investigation objectives are to investigate the building construction, the materials used and the conditions that contributed to the World Trade Center disaster. The four major objectives are to:

- Determine why and how World Trade Center 1 and World Trade Center 2 collapsed following the initial impacts of the aircraft and why and how World Trade Center 7 collapsed;
- Determine why the injuries and fatalities were so high or low depending on location, including all technical aspects of fire protection, occupancy behavior, evacuation, and emergency response;
- Determine what procedures and practices were used in the design, construction, operation, and maintenance of World Trade Center 1, 2, and 7; and
- Identify, as specifically as possible, areas in current building and fire codes, standards, and practices that warrant revision.

The investigation is one element of the overall World Trade Center response plan that includes the investigation, an associated research & development program and a dissemination and technical assistance program (DTAP). The overall NIST response and the investigation plan started before the legislation was passed and the NCSTAC was established.

The World Trade Center investigation was funded on September 9, 2002 through the transfer of \$16 million from FEMA under Public Law 107-206. An additional \$3.4 million was redirected internally by NIST in FY2002 for research and pre-planning of the World Trade Center investigation. In FY2003, \$3 million for research and DTAP support was appropriated by Congress in FY2003. For FY2004, \$4 million has been requested, again for research and DTAP support.

3.1.2 World Trade Center Projects: Eight major projects form the World Trade Center investigation effort. They are:

- Project #1: Analysis of Building and Fire Codes and Practices
- Project #2: Baseline Structural Performance and Aircraft Impact Damage Analysis
- Project #3: Mechanical and Metallurgical Analysis of Structural Steel
- Project #4: Investigation of Active Fire Protection Systems
- Project #5: Reconstruction of Thermal and Tenability Environment
- Project #6: Structural Fire Response and Collapse Analysis
- Project #7: Occupant Behavior, Egress, and Emergency Communications
- Project #8: Fire Service Technologies and Guidelines

The National Construction Safety Team Advisory Committee 2003 Report to Congress

The investigation program currently has a delivery date of a draft report in September 2004.

The status of each project was updated at the NCSTAC meetings of August 26-27 and December 2-3, 2003. Sixteen contracts were issued by November 1, 2003. The current status of each of the eight major project areas is detailed in the minutes and presentations from the December 2-3, 2003 NCSTAC meeting.

3.1.3 NCSTAC Comments on the World Trade Center Investigation and Associated Projects: The major challenges facing the investigation and comments and recommendations from the NCSTAC are summarized below:

3.1.3.1 Through most of 2003, significant gaps existed in the data collection related to almost all of the project areas. During this period, while NIST pursued missing data, they relied on other reliable sources to provide the data necessary to continue the investigation. The amount of voluntarily offered documentation and information was impressive. By November, NIST had received all of the data essential to completing the investigation of the World Trade Center disaster.

3.1.3.2 Timely receipt of information and physical evidence was important to this investigation and that will be true for any Safety Team investigation. For future investigations, NIST must plan to immediately deploy an authorized Safety Team to an incident site to directly gather information and physical evidence. This is particularly important with respect to obtaining eyewitness and emergency responder interview data.

3.1.3.3 Many of the calculations and predictions necessary for successful completion of the World Trade Center project are state-of-the-art methods using best-available technology. As with all leading edge technologies, there is substantial technical risk and no guarantee the investigation will succeed in all of its technical objectives. Of particular concern in the World Trade Center investigation is the detailed fire environment and related fire induced structural response predictions. The NCSTAC believes that NIST has mitigated this risk through a variety of innovative approaches throughout its investigative plan.

3.1.3.4 The scheduled delivery date of the draft report is September 2004. The NCSTAC believes this target date is reasonable and achievable. Several important contracts were issued in the last quarter of 2003, raising the possibility that unforeseen technical and data collection problems could delay completing the final report. The NCSTAC advised NIST that technical quality and completeness of an investigation and any associated projects is the highest priority outcome. While all efforts should be made to meet the September 2004 delivery date, there should be no compromise in quality should unforeseen technical problems arise.

The National Construction Safety Team Advisory Committee

2003 Report to Congress

3.1.3.5 In summary, given the unique and challenging nature of this investigation and the relative lack of infrastructure available at NIST for investigations of this scale, the NCSTAC believes that the World Trade Center investigation and associated programs are technically well founded and are currently on track to meet its stated objectives.

3.2 Station Nightclub Fire

3.2.1 Station Nightclub Fire Investigation and Objectives: The investigation was initiated after a site survey by a NIST reconnaissance team on February 22, 2003 with a report to the NIST Director on February 25, 2003. This report resulted in the establishment of a Safety Team investigation on February 27, 2003.

The Station fire resulted in 100 fatalities. The rapid spread of fire and smoke necessitated a Safety Team investigation to determine how this rapid fire development may have overwhelmed any fire safety features of the building and possibly affected occupant egress. Depending upon the investigation's findings, the potential exists to mitigate similar future building failures with changes in building practices, standards, codes and regulations.

3.2.2 Factors Affecting the Investigation: The NIST Safety Team investigation has been conducted independent of a criminal investigation being conducted by the Rhode Island Attorney General's Office. In accordance with the provisions of the Act, Safety Team investigations must relinquish investigating priority to the appropriate law enforcement authorities. Thus, much of the physical evidence needed to conclude the Safety Team investigation is in the custody of the State Attorney General. On December 9, 2003, the Rhode Island grand jury handed down 100 indictments of involuntary manslaughter with criminal negligence, to each of the building co-owners and to the manager of the band. The seriousness of the charges makes it likely that this evidence will not be available in the immediate future. In addition to the criminal proceedings, approximately 717 items are in an evidence repository storage building pending current civil litigation.

3.2.3 Station Nightclub Projects: The tasks and projects included in this investigation are:

- Establishment of Initial Conditions
- Materials and Contents Identification (*ceiling, wall, and foam soundproofing samples*)
- Cone Calorimeter, Panel Corner and Ignition Experiments
- Reconstruction of Thermal and Tenability Environment
- Determination of Occupant Behavior and Egress
- Building and Fire Codes Identification for Revision
- Impact of Sprinklers on Survivability

The National Construction Safety Team Advisory Committee 2003 Report to Congress

Future projects include comparative experiments with actual samples of materials from the evidence storage repository when legally available; documentation of emergency response (in cooperation with assistance from the United States Fire Administration and local and State agencies); and recommendations to Code organizations for improvements not only in fire codes but also preventing crowd crush incidents like the Station fire and the crush in the Chicago night club in February.

The National Construction Safety Team Advisory Committee 2003 Report to Congress

4.0 NCSTAC Recommendations

4.1 NIST Implementation of the NCST Act

The NCSTAC commends NIST on the speed with which it has undertaken the two active investigations as well as their efforts to keep the public advised of its progress and plans through press conferences and the NIST web site. Notwithstanding this admirable start, several issues have arisen during the implementation that the NCSTAC believes should be addressed.

4.1.1 Timeliness: Forensic investigations are extremely dependent on the timeliness of on-site, first-hand examination of the physical evidence and access to eyewitnesses. This response can be improved.

4.1.1.1 Develop procedures for deciding if a Safety Team Investigation is needed when an event occurs so investigators can leave immediately to reconnoiter the failure site and begin examination of physical evidence and eyewitnesses.

4.1.1.2 Review and seek relief from those Federal regulations and procedures (e.g., the Paperwork Reduction Act, etc.) that could impact the rapid deployment of Safety Teams to a site or impede access to information needed to complete a thorough and timely Safety Team investigation.

4.1.1.3 Develop 'first call' investigating teams who are prepared on a moments notice to visit the site of an incident within the 48 hours required by the Act, and following reconnoitering the site, report to the Director as soon as possible on the advisability of a Safety Team investigation. Consider retaining individuals as members of the reconnaissance team who know local authorities to improve immediate access to an investigation site.

4.1.1.4 Cooperation With Local Authorities: The Act is clear that when the Attorney General determines a criminal act may be involved in a building failure, the criminal investigation by the appropriate law enforcement agency takes priority over a Safety Team investigation. The Act is also clear that Safety Teams are expected to work cooperatively with local authorities, other Federal agencies and other research organizations in conducting an investigation. Some of these investigators may take possession of evidence needed to complete the Safety Team investigation. The NCSTAC believes improved access to information held by local authorities is critical to Safety Team investigations. In both the World Trade Center and the Station Nightclub fire, greater familiarization by local authorities with NIST's Safety Team responsibilities might have accelerated the release of information. Because the Act is new, many local authorities may not know of the Safety Team initiative and the assistance available to them from NIST.

4.1.1.4.1 Institute a program designed to educate local authorities on the Act and NIST's role in investigations so that these authorities will look to NIST for positive

The National Construction Safety Team Advisory Committee 2003 Report to Congress

assistance in conducting and investigation by working with and through them, rather than independently.

4.1.1.4.2 Where delays occur in gathering information, collecting physical evidence or gaining access to eyewitnesses, NIST should use the power provided by the Act to subpoena documents to hold public meetings to solicit testimony in order to facilitate and improve future investigations.

4.2 WTC Investigation and Research Programs

Recommendations and suggestions made by the NCSTAC during the year were adopted and implemented by NIST. Additional recommendations are not required at this time.

4.3 Station Nightclub Fire and Research Programs

4.3.1 The Station Nightclub fire investigation is being affected by the lack of access to certain key pieces of information. Although this was mitigated to some degree by the large amount of information available in the press and through media video tapes, the investigation would benefit from having access to both the physical evidence being held by law enforcement authorities and individual attorneys. Being able to interview survivors of the fire would aid the investigation. The Station Nightclub fire and the incident at a Chicago nightclub a few days earlier clearly indicates that the factors affecting crowd egress during emergencies are not well understood. Therefore, the NCSTAC recommends that:

4.3.1.1 NIST and the Department of Commerce study and advise how NCST investigators can carry out their work with State, Local and Federal agencies in the context of a criminal investigation to gain access to critical data.

4.3.1.2 A research project be initiated to study evacuation decision-making and human behavior during major building emergencies, including the phenomenon of crowd crush as seen in the Chicago nightclub and the Station Nightclub incidents.

4.4 Objectives of the Act and Program Funding

In order to achieve the objectives of this Act, the damaged building must be visited immediately after the damaging event. From these observations and in consultation with appropriate knowledgeable individuals, the Director of NIST will be able to make a decision on its selection for investigation under this Act. The initiation of the NCST Investigation must begin as soon as practical after its selection in order to obtain and protect the damage data.

The National Construction Safety Team Advisory Committee 2003 Report to Congress

4.4.1. Section 15 of the Act authorizes the use of NIST funds otherwise authorized by law to carry out this Act. This should provide sufficient funds for the immediate post-event observation, but will not provide sufficient funds to perform the Investigation to achieve the objectives of this Act. Nor is there sufficient time for the Director of NIST, through the Department of Commerce, to request a special appropriation for the selected Investigation. Annual funds should be made available to the Director of NIST to cover one year of investigations. This would provide time to request a supplemental appropriation to fund the Investigation. On that basis the following recommendation is made:

4.4.1.1 Establish a National Construction Safety Team Office within the Building and Fire Research Laboratory at NIST with annual funding in the amount of \$2,000,000 and an additional \$2,000,000 reserve fund appropriated for use by the Director of NIST to initiate major investigations of building failures in a timely manner as required by the Act. This investigation reserve fund should be maintained year-to-year so that investigations can begin promptly and not have to await final budget or appropriation approvals.

The National Construction Safety Team Advisory Committee 2003 Report to Congress

5.0 Individual NCSTAC Member Comments and Recommendations

One NCSTAC member requested that several comments be included in this report for information. The NCSTAC will address these comments and recommendations at a future meeting.

5.1 Professor Corbett:

5.1.1. Since it is apparent that investigative priority was relinquished to the Rhode Island Attorney General's Office in the case of the Station nightclub fire, I think it is appropriate to include the documentation from the Attorney General that notified the Director to give investigative priority to Rhode Island authorities. This documentation will give Congress a more complete picture of this complex legal issue.

5.1.2 NIST needs to take an aggressive, *investigative* stance with regard to information acquisition. NIST investigators should not only solicit documents, but physically visit and interview individuals who possess information about the building in question. In addition, NIST should dispatch investigators to visit repositories of information such as court archives that could provide important data.

5.1.3 While the Interim Final Rule for the "Procedures for Implementation of the NCST Act" has been established, it is critical that NIST quickly develop a set of *detailed* protocols for conducting the investigation itself. While the Interim Final Rule speaks about investigations, it lacks detail. A comprehensive procedures manual is called for.

For example, the Final Interim Rule speaks of collecting and analyzing physical evidence but provides no specifics on how this is to be accomplished. A procedures manual would detail the specific test or analysis technique that should be used for a particular type of evidence.

Investigation procedure manuals of the National Transportation Safety Board and the U.S. Chemical Safety and Hazard Investigation Board would provide good guidance in the preparation of an NCST Procedures Manual. In addition, national guidelines such as the National Fire Protection Association's *Guide for Fire and Explosion Investigations* (NFPA 921) are also useful.

The National Construction Safety Team Advisory Committee 2003 Report to Congress

ATTACHMENT I

CHARTER OF THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY NATIONAL CONSTRUCTION SAFETY TEAM ADVISORY COMMITTEE

ESTABLISHMENT:

In accordance with the requirements of Section 11 of the National Construction Safety Team Act (P. L. 107-231), hereinafter referred to as the Act, the Secretary of Commerce hereby establishes the National Construction Safety Team Advisory Committee, hereinafter referred to as the Committee, pursuant to the Federal Advisory Committee Act, 5 USC App. 2.

OBJECTIVES AND DUTIES:

The Committee will act in the public interest to:

1. Advise the Director of the National Institute of Standards and Technology, hereinafter referred to as the NIST, on carrying out the Act by:
 - a. Providing advice on the functions of National Construction Safety Teams, hereinafter referred to as Teams, as described in section 2(b)(2) of the Act.
 - b. Providing advice on the composition of Teams under section 3 of the Act.
 - c. Providing advice on the exercise of authorities enumerated in sections 4 and 5 of the Act.
 - d. Providing such other advice as necessary to enable the Director to carry out the Act.
2. Review and provide advice on the procedures developed under section 2(c)(1) of the Act.
3. Review and provide advice on the reports issued under section 8 of the Act.
4. Function solely as an advisory body, in accordance with the provisions of the Federal Advisory Committee Act.

MEMBERS AND CHAIRPERSON:

1. The Director of NIST shall appoint the members of the Committee, and they will be selected on a clear, standardized basis, in accordance with applicable Department of Commerce guidance. Members shall be selected on the basis of established records of distinguished service in their professional community and their knowledge of issues affecting the National Construction Safety Teams. Members shall serve as

The National Construction Safety Team Advisory Committee 2003 Report to Congress

Special Government Employees. Members serve at the discretion of the NIST Director.

2. Members shall reflect the wide diversity of technical disciplines and competencies involved in the National Construction Safety Teams investigations. Members will be drawn from industry and other communities having an interest in the National Construction Safety Teams investigations, such as, but not limited to, universities, state and local government bodies, non-profit research institutions, and other Federal agencies and laboratories.
3. The Committee shall consist of not fewer than 5 nor more than 10 members. The term of office of each member of the Committee shall be three years, except that vacancy appointments shall be for the remainder of the unexpired term of the vacancy and that the initial members shall have staggered terms such that the committee will have approximately 1/3 new or reappointed members each year. Members who are not able to fulfill the duties and responsibilities of the Committee will have their membership terminated.
4. Any person who has completed two consecutive full terms of service on the Committee shall be ineligible for appointment for a third term during the one year period following the expiration of the second term.
5. The Director of NIST shall appoint the Chair from among the members of the Committee. The Chair's tenure shall be at the discretion of the Director of NIST.

ADMINISTRATIVE PROVISIONS:

1. The Committee shall report to the Director of NIST.
2. The Building and Fire Research Laboratory (BFRL) within NIST will provide staff support for the Committee.
3. The Committee shall meet at least once per year at the call of the Chair. Additional meetings may be called whenever one-third or more of the members so request it in writing or whenever the Chair or the NIST Director requests a meeting.
4. Members of the Committee shall not be compensated for their services, but will, upon request, be allowed travel and per diem expenses in accordance with 5 U.S.C. 5701 et seq., while attending meetings of the Committee or subcommittees thereof, or while otherwise performing duties at the request of the Chair, while away from their homes or regular places of business.
5. The Committee shall provide an annual report through the Director of BFRL and the Director of NIST, to the Secretary of Commerce for submission to the Committee on Science of the House of Representatives and to the Committee on Commerce,

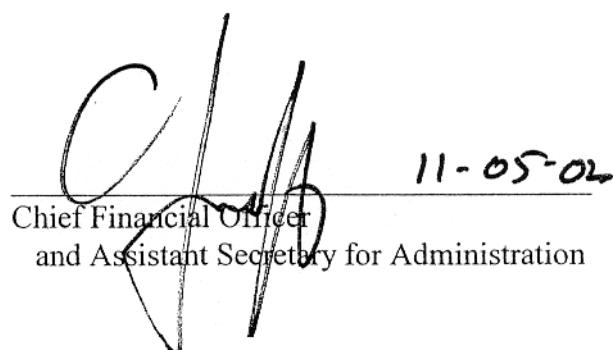
The National Construction Safety Team Advisory Committee 2003 Report to Congress

Science, and Transportation of the Senate, to be due at a date to be agreed upon by the Committee and the Director of NIST. Such report will provide an evaluation of National Construction Safety Team activities, along with recommendations to improve the operation and effectiveness of National Construction Safety Teams; and an assessment of the implementation of the recommendations of the National Construction Safety Teams and of the Committee. In addition, the Committee may provide reports at strategic stages of an investigation, at its discretion or at the request of the Director of NIST, through the Director of the BFRL and the Director of NIST, to the Secretary of Commerce, to be due on dates to be agreed upon by the Committee and the Director of NIST.

6. The Committee may establish subcommittees subject to the provisions of the Federal Advisory Committee Act and the Department of Commerce *Committee Management Handbook*. Subcommittee members shall be selected from the parent committee.
7. The annual cost of operating the Committee is estimated at \$ 250,000, which includes 0.5 work years of staff support.
8. The Committee shall not act in the absence of a quorum, which shall consist of a simple majority of the members of the Committee not having a conflict of interest in the matter being considered by the Committee, except that, if the number of members on the Committee is even, half will suffice.
9. NIST will report to the Committee actions taken in response to recommendations by the Committee.

DURATION:

While the duration of the Committee is continuing, the Charter shall be renewed every two years from the date of filing.



11-05-02

Chief Financial Officer
and Assistant Secretary for Administration

**The National Construction Safety Team Advisory Committee
2003 Report to Congress**

ATTACHMENT II

**National Construction Safety Team
Advisory Committee - 2003**

John M. Barsom
President, Barsom Consulting, Ltd.
Pittsburgh, PA.
Term Expires: March 31, 2005

John L. Bryan, Professor Emeritus and
Consultant, Fire Protection and Life Safety
University of Maryland,
Frederick, MD.
Term Expires: March 31, 2004

David S. Collins, President
The Preview Group, Inc.
Cincinnati, OH
Term Expires: March 31, 2004

Glenn P. Corbett, Professor
Public Management-Fire Science,
John Jay College of Criminal Justice
New York, NY.
Term Expires: March 31, 2006

Philip J. DiNenno, President
Hughes Associates, Inc.
Baltimore, MD.
Term Expires: March 31, 2005

Paul M. Fitzgerald, Chair
Executive Vice President (retired)
FM Global, Johnston, RI.
Term Expires: March 31, 2006

Robert D. Hanson, Professor Emeritus
University of Michigan
Walnut Creek, CA.
Term Expires: March 31, 2006

The National Construction Safety Team Advisory Committee 2003 Report to Congress

Charles Thornton, Chairman and Principal
Thornton-Tomasetti, Inc.
New York, NY
Term Expires: March 31, 2005

Kathleen J. Tierney, Professor
Department of Sociology and Criminal Justice, and
Director, Disaster Research Center
University of Delaware
Newark, DE.
Term Expires: March 31, 2004

Forman A. Williams, Professor
Department of Mechanical and Aerospace Engineering and
Director, Center for Energy Research
University of California at San Diego
San Diego, CA.
Term Expires: March 31, 2005

**The National Construction Safety Team Advisory Committee
2003 Report to Congress**

**ATTACHMENT III
Summary of NCST Advisory Committee Recommendations**

| Recommendation | NIST Response | Status | Responsible Party |
|---|----------------------|---|---------------------------|
| <i>Formal Recommendations</i> | | | |
| NCST Advisory Committee meetings should be recorded on audiotape and archived. | Accepted | Ongoing. Will be arranged for December and subsequent meetings. | S. Cauffman |
| The next Advisory Committee meeting should be an open meeting held in New York City on December 2 and 3, 2003 | Not Accepted | Complete. Discussions held with Chair of AC and decision was made to hold meeting at NIST due to additional cost of meeting in NYC | J. Hill |
| NIST and DOC should study and present to the Advisory Committee at the next meeting how the investigators can carry out their work with state, local, and federal agencies in the context of a criminal investigation to gain access to critical data. | Accepted | Complete. Added to agenda for December meeting. | M. Rubin/ C. Burkhardt |
| Urban-wildland interface (as a possible condition for deployment of a team) should be presented by NIST at the next meeting. | Accepted | Complete. Added to agenda for December meeting. | W. Grosshandler |
| The WTC project leaders should identify the necessary input that they need in order to accomplish their objectives, and if it comes from another project, make sure that the appropriate project leader is aware of the need and provides the necessary data. | Accepted | Ongoing. A series of meetings between the projects are being held that involve all affected projects to ensure that data needs are identified and filled. | S. Sunder |
| NIST should be onsite at the E119 test facilities during specimen preparations and testing. | Accepted | Ongoing. NIST is visiting both UL facilities to witness fabrication of assemblies and testing. | J. Gross |
| The closest representation of as-built conditions should be tested in the E119 tests, including primer paint, ensuring that the properties of the steel being tested match the steel that was in the buildings as closely as possible. | Accepted | Ongoing. NIST is attempting to use steel that most closely matches the steel in the buildings as well as primer paint and the like. | J. Gross |
| Consider whether an additional E119 test is needed using lower strength steel (A-36 or close substitute if unavailable) and different fireproofing thicknesses that could have been present in the buildings based on the specifications | Accepted | Completed. A fourth test is being added to NIST plans | J. Gross |
| Interviews done in support of Project 7 for the WTC investigation should be recorded on audiotape and transcribed. | Partially Accepted | Ongoing. Interviews will be taped if the interviewee agrees. Transcripts will not be made as part of the investigation. | J. Averill |
| For future investigations, there should be pre-approved instruments for use in initial interviews and fact-gathering at the scene. | Accepted | Ongoing. | J. Hill |

The National Construction Safety Team Advisory Committee

2003 Report to Congress

| Recommendation | NIST Response | Status | Responsible Party |
|--|----------------------|--|--------------------------|
| A research project should be initiated to study the phenomena of crowd crush, such as occurred at the Chicago and Rhode Island nightclubs. | Accepted | Ongoing. Contract awarded to Arup Fire to do literature search (in connection with RI investigation). Research plan awaiting Arup report in spring '04. | W. Grosshandler |
| Recommend Advisory Committee members be assigned as leaders for drafting sections of the Annual Report to Congress. | Accepted | Ongoing. Advisory committee members are working on specific sections of the report as assigned by the Chair of the Committee. | Paul Fitzgerald |
| <i>Informal Recommendations</i> | | | |
| The links to the NCST Advisory Committee web page and email address should be more easily found on the NIST home page and advertised more often to the public. | Accepted | Ongoing. The links have been made more prominent on the website and the email address is being provided to the media during press events | M. Heyman/ M. Newman |
| NIST should check with other agencies, such as the National Transportation Safety Board, who have experience with investigations running concurrently with criminal investigations. | Accepted | Ongoing. C. Burkhardt agreed to follow-up on recommendation. | C. Burkhardt |
| Suggestion was made to revise the trigger criteria for an NCST investigation by deleting the statement regarding terrorists. | Accepted | Completed. Wording changed. | J. Hill |
| WTC investigation data that is missing should be prioritized as to what is most important to the investigation. Be aware of information overload issues. | Accepted | Completed. | S. Sunder |
| A “plan B” should be developed for information that is essential to the WTC investigation and may not be made available. | Accepted | Completed. None of the missing information is considered essential. NIST believes that this information could be very important to the investigation and should be made available to it. | S. Sunder |
| Experimental risk should be considered in planning for the WTC investigation. The potential is there for surprise results from the experiments. | Accepted | Completed. The need to plan for such risks has been communicated to all Project Leaders. | S. Sunder |
| Analytic risks are complicated on the WTC investigation by the use of external and internal sources, which presents a significant communication issue. There should be frequent and strong interaction among the project team members. | Accepted | Ongoing. Communications between Project Leaders and external experts have been emphasized and are being supplemented by a number of multi-project meetings. | S. Sunder |
| WTC investigation requirements should be reviewed and streamlined as much as possible if the original timeframe is to be met. | Accepted | Ongoing. Requirements are being actively managed to maintain focus on the most important aspects of each project. | S. Sunder |

The National Construction Safety Team Advisory Committee 2003 Report to Congress

| Recommendation | NIST Response | Status | Responsible Party |
|---|----------------------|---|--------------------------|
| The Project 3 contractor is trying to characterize all of the pieces of steel from the WTC buildings. It may be advisable to concentrate on the pieces from the impact zones and combining this information with information from the photo enhancement work. | Accepted | Ongoing. WJE is focusing on the pieces from the impact zones. | F. Gayle |
| The behavior of the steel in the WTC buildings will depend greatly on its geometry. Triaxial stresses should be considered as a possible failure mode. | Accepted | Ongoing. NIST is now working with ARA to ensure that triaxial stresses are appropriately considered in the impact analysis, and will do so with the contractor in the collapse analysis. | F. Gayle |
| The weld metal should be characterized. | Accepted | Ongoing. Weld metal was already being characterized. | F. Gayle |
| Furnaces should be checked to ensure that they are in top condition prior to the E119 tests. | Accepted | Ongoing. NIST will be checking furnace conditions during visits to UL facilities to view test assembly fabrication. | J. Gross |
| There will be differences in the manufacturing and assembly of the 17-ft and 35-ft E119 test sections. The differences should be minimized, and the differences between the two should be known. | Accepted | Ongoing. NIST is working to minimize differences between the 17 ft and 35 ft. specimens and to understand the consequences where differences exist. | J. Gross |
| The Australian Steel Institute should be contacted for additional information on E119 like testing of steel. | Accepted | Ongoing. Will be following up with Australian Steel Institute to see if they have any information on steel testing that is relevant to the investigation. | J. Gross |
| Information from FDNY and the McKinsey & Company report is needed to validate the data being collected in the interview process. An alternate plan should be developed in case such information does not become available. | Accepted | Ongoing. The FDNY and McKinsey & Company data is considered very important and NIST believes that it should be made available to the investigation, but it is not considered essential information. | J.R. Lawson |
| The database of information from the interviews should be structured with keys for time and space to allow the analysts to attempt to resolve inconsistencies (e.g., who was where, when). | Accepted | Completed. The Project 7 team has included this activity in its plans. | J.R. Lawson/J. Averill |
| Information is starting to be generated by the Columbia University study. This information should be used to augment the information being collected by NIST. | Accepted | Ongoing. NIST has been cooperating with Columbia University in its study and will continue to do so. | J. Averill |
| The draft survey instrument should be provided to the Committee members. | Accepted | Completed. The draft survey instrument was sent to the members on October 10, 2003. | J. Averill |