National Institute of Standards and Technology (NIST)
National Construction Safety Team Advisory Committee (NCSTAC)

NIST NCSTAC 2025 Annual Report to Congress

December 20, 2025

The Honorable Brian Babin
Chairman
Committee on Science, Space, and Technology
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

We are pleased to submit the 2025 Annual Report of the National Construction Safety Team Advisory Committee (the Committee) of the National Institute of Standards and Technology (NIST). The Committee serves as NIST's advisor on implementation of the National Construction Safety Team (NCST) Act (P.L. 107-231; the 'Act'), and the opinions and recommendations expressed in this letter reflect our views as an independent body composed of technical experts in engineering, public health, and the social sciences. The Act was passed in response to 9/11 and empowers NIST to conduct rigorous investigations of significant disasters impacting the built environment. Following the collapse of the World Trade Center towers, NIST conducted a groundbreaking study of building performance and issued transformative, evidence-based recommendations for improvements in building codes and standards.

The Act directs the Committee to report to Congress annually on its findings and recommendations in two areas:

1. Evaluation of NCST activities, and
2. Assessment of the implementation of recommendations from the Committee to the NCST.

This year the Committee met on September 9 and 16, 2025. During these meetings, NIST staff briefed the Committee on activities performed under the Act and closely related activities performed by NIST under other authorities. In June, NCST published two public videos on the progress of Hurricane Maria[1] and Champlain Tower South Collapse[2] investigations. The Committee evaluated the materials from the September meeting and the June videos for this report. The Committee also asked NIST staff and research team members questions during the September meetings and via email, and the Committee provided feedback on their many ongoing activities.

We begin the report with a brief summary of NIST's responses to our prior recommendations. We follow that with our most recent observations and recommendations. Throughout this report, we use a **bold** typeface and indented text to highlight our recommendations.

NIST'S RESPONSE TO THE RECOMMENDATIONS IN THE COMMITTEE'S 2024 REPORT TO CONGRESS

[1] View at https://www.nist.gov/video/nist-hurricane-maria-program-technical-update-july-2025
[2] View at https://www.nist.gov/news-events/news/2025/06/nist-releases-extensive-video-update-champlain-towers-south-investigation.

GENERAL COMMENTS

In our 2024 Report to Congress, we provided seven recommendations to NIST and its NCST: one related to NIST's evaluation of new events for potential study (specifically the wildfires in Hawaii), one regarding training to address ways to offer psychological and social support to address the personal challenges experienced by NCST members while on field assignments, and five related to the ongoing NCST investigation of the partial collapse of Champlain Towers South (CTS) in Surfside, Florida.

We are pleased to report that NIST accepted all our recommendations and developed responsive implementation plans. Examples of NIST's initiatives are as follows:

- NIST has engaged with state and federal agencies that are investigating the fires in Hawaii.
- Investigative team members are actively monitored to limit overcommitment, and the Employee Assistance Program is available to address stress or other work-related issues.
- The CTS NCST continuously endeavors to maintain focus and efficiency, and to engage in public outreach as appropriate.

THE COMMITTEE'S 2025 RECOMMENDATIONS: CHAMPLAIN TOWERS SOUTH PARTIAL COLLAPSE NCST INVESTIGATION

NCST provided the Committee with an overview of its work during the past year, as data collection, testing, analyses, and assessments of this extensive investigation are ending. Presenters identified other government, academic, and consulting entities with which the CTS NCST collaborated to collect and analyze data, the timeline of the study, overall budget and expenditures for the work, and the status of the investigation and report preparation.

The CTS NCST presented detailed summaries focusing on the following topics: the relevant history of the building and a detailed timeline of its partial collapse, current thinking on the more likely collapse initiators and how the collapse likely progressed through the building, a timeline and overview of the work completed to date, and the anticipated schedule for completion of the investigation and issuance of the CTS NCST report.

Collapse Event Timeline - The CTS NCST and the Committee discussed salient design, construction, maintenance, and use features that potentially had a role in the partial collapse. The CTS NCST has analyzed and ranked numerous collapse scenarios; presenters explained several scenarios that have emerged as the most likely explanations for the initiation and progression of the collapse, as well as two representative unlikely scenarios. They provided justifications for ranking the scenarios that included specific design and construction details, insights from rigorous analysis of available collapse video, and pre- and post-collapse physical and photographic evidence.

Investigation Timeline and Ongoing Schedule - The CTS NCST presented graphics that illustrate the timeline of the extensive work conducted since the inception of its investigation and highlighted several of the investigation challenges. Of particular impact on the timeline have been complications related to collecting data and evidence during the COVID-19 pandemic; the

extensive destruction of the building during the collapse; coordination with Urban Search and Rescue operations and other local, state, and federal agencies in the immediate aftermath of the collapse; safety-related restrictions at the site during evidence collection; the sheer enormity of the challenges related to identifying, collecting, preserving, and evaluating the voluminous evidence; testing physical replicas of building components; and the highly sophisticated analyses necessary to assess structural performance.

Going forward, the CTS NCST will be completing its analysis, preparing its multi-faceted reports, and seeking comments and approval before report publication. The CTS NCST stated that it will engage stakeholders in its investigation and propose technical and policy recommendations that follow from its findings.

Summary of Investigation to Date – The CTS NCST has conducted a thorough and comprehensive building collapse investigation. They engaged several qualified and experienced experts to pursue multiple collapse causation possibilities. It is the view of the Committee that they exhausted all scenarios that had sufficient efficacy to warrant pursuit.

We anticipate that the final report will be authoritative, professional, and unimpeachable. This study is very likely to have positive and lasting impact on the safety of buildings, particularly where environmental conditions can accelerate deterioration. The findings may also provide impetus for increased attention to quality control in the design, construction, and inspection of new buildings. The Committee expects the CTS NCST reports on its investigative methodologies will improve the state of practice for investigation of less severe, but more common building failures.

The following are the Committee's recommendations, which focus largely on issues we suggest the CTS NCST cover in its report.

Champlain Towers South Recommendation 1. Readers of the CTS NCST report logically will wonder why the building stood for 40 years, and then collapsed one night, apparently without a particular triggering event. The CTS NCST should emphasize its explanation for this circumstance.

Champlain Towers South Recommendation 2. The CTS NCST has described its assessment of videos that captured the partial collapse, which appears to have progressed sequentially through three sections of the building, leaving one section standing. The CTS NCST needs to describe the building features and collapse mechanisms that led to this outcome. It should also offer guidance, or propose the development of guidance, on strategies to maintain effective isolation to limit horizontal progression of collapse.

Champlain Towers South Recommendation 3. To the extent that there may have been observable evidence of distress prior to the collapse, the CTS NCST should discuss why these indicators might have been overlooked or been left unaddressed. It should also offer guidance, or propose the development of guidance, to help professionals (e.g., building officials, facility managers, engineers, architects) and lay people (e.g., building owners, maintenance personnel, building occupants) recognize symptoms of distress and how to respond.

Champlain Towers South Recommendation 4. If possible, based on this study, the CTS NCST should comment on existing and emerging assessment techniques for monitoring buildings exposed to aggressive environments and identify areas where new methods are needed. Particular attention should be given to features that are inaccessible or cannot be reliably assessed through visual inspection alone, such as concealed structural elements or critical connections.

Champlain Towers South Recommendation 5. Public commenters at the September 2025 meeting, as well as at prior meetings, have expressed frustration with the duration of the investigation and unmet expectations that the CTS NCST would assess or assign responsibility for the collapse. The report should clarify the statutory limits that constrain the NCST to the assessment of technical factors only and explicitly prohibit the NCST from making any determinations of responsibility.

THE COMMITTEE'S 2025 RECOMMENDATIONS: HURRICANE MARIA NCST INVESTIGATION

The Hurricane Maria investigation has two major components, the NCST investigation and the National Windstorm Impact Reduction Program (NWIRP) investigation. The Maria NCST investigation generated four technical projects: (1) Hazard Characterization, (2) Performance of Critical Buildings, (3) Public Response to Emergency Communications, and (4) Morbidity and Mortality. The NWIRP investigations generated an additional three technical projects: (5) Impacts to and Recovery of Infrastructure Systems, (6) Recovery of Business and Supply Chains, and (7) Recovery of Social Functions. These technical projects have been developed with the support of several federal, state, local, and territorial agencies. The data collection for these seven projects was completed as of November 2024. The focus of 2025 has been on completing analyses, refining findings, and writing the final report. According to the Maria NCST investigators, drafts of the seven technical project reports are currently in the review process, and the overarching summary report for a general audience is nearing completion.

The Committee commends the team for their efforts to document the impact of Hurricane Maria. The interdisciplinary team has identified numerous issues that will translate into increased safety in future hurricanes and associated compound disasters.

NCST Report to the Advisory Committee

The Maria NCST report to the committee was organized into five components:

Program Overview – The NIST study investigated Hurricane Maria's effects on Puerto Rico and the subsequent long-term recovery process with the goal to understand weaknesses in our knowledge, planning, communication, and construction to improve resilience to hurricane hazards. The Maria NCST reviewed the status of the associated seven projects with the Committee.

Investigation Timeline – The Committee heard a comprehensive timeline of NIST and project contractor activities from the event to the date of the meeting.

Data Collection and Analysis – The Maria NCST explained and reviewed data collection activities across the seven projects. Analysis of these data inform a broad understanding of Hurricane Maria's impact on Puerto Rico, its subsequent recovery, and NIST findings and recommendations.

Preliminary Findings: The Maria NCST summarized its findings on pre-storm emergency communication and protective actions; documentation of hazard exposure from measurements, modeling and laboratory testing; building damage and impacts on function; protective actions and sheltering; infrastructure dependencies and recovery; hospital accessibility and functionality; and financial assistance and recovery.

Anticipated Impacts: NIST intends to publish reports describing analyses, findings and recommendations. This will include draft reports for technical review from NIST and external consultants, followed by final reports that address these public comments. The NCST will prepare an overarching summary report for a general audience, highlighting key findings and recommendations. A more detailed technical report will be produced for each of the seven projects. The review process for these seven technical project reports is underway. The summary report draft is nearing completion.

It is appropriate to highlight the potential impacts of these seven projects as the investigation ends. The Committee anticipates that recommendations in these reports could result in improvements represented by the following illustrative, but incomplete, list:

- Robust measurement systems for wind, rainfall, and flooding to inform design criteria
- Standard provisions to account for topographic effects on wind loads for design of infrastructure
- Design standards for storm shelters and selection criteria for best-available refuge options
- Performance-based design criteria for hospitals, schools, and other critical facilities to enable operation during and after hurricane events
- Guidance on recording post-event incidents impacting networked infrastructure systems for prioritization of recovery activities
- Standards for attribution of disaster-related deaths

The following are the Committee's recommendations for the Hurricane Maria NCST:

> **Hurricane Maria Recommendation 1.** The Hurricane Maria NCST reported that the extreme wind speeds resulted in extensive damage to the tree canopy in portions of Puerto Rico, resulting in a reduction in the shielding effect for infrastructure. To the extent possible within the scope of this NCST's assignment, the team should include a recommendation in their reporting regarding the influence of tree loss on selecting exposure categories for design. Tree damage induced real-time changes in shielding may render traditional assignments of exposure category for design unconservative and inappropriate.

Hurricane Maria Recommendation 2. The Committee recommends that all reports be translated into Spanish, to the extent possible and appropriate, so they are accessible to the full population of Puerto Rico.

Hurricane Maria Recommendation 3. The Committee commends the investigation team for conducting such a complete investigation of the impact of Hurricane Maria on Puerto Rico, particularly given the onset of the COVID-19 pandemic shortly after the investigation started. The team had to make numerous changes to be able to affect such an investigation. It would be helpful for future teams and other scientists if the Maria NCST documents how they adapted their data collection efforts in response to the pandemic in a separate brief report or as part of an appendix to one of the seven reports. Further, it would be helpful for the Maria NCST to detail the delays caused both by the pandemic and the various contracting issues experienced.

UPDATES TO THE DISASTER AND FAILURE STUDIES PROGRAM

The Committee commends the NCST for the extraordinary amount of work they have continued to perform often under exceedingly difficult post-disaster conditions. We have been impressed with the high level of scientific rigor matched by an ethical commitment to community engagement in places affected by deadly disasters. The NCST has operated with a limited budget yet has managed to produce cutting-edge interdisciplinary disaster research. Further, they have regularly communicated their preliminary findings to a range of groups—from disaster survivors, the family members of victims, engineers and scientists, and government officials—with the careful attention to scientific detail and sensitivity. The two ongoing and soon-to-be finalized investigations are of great national significance. Based on the NCSTs impressive achievements, we hope that future NCST investigations will be supported at the highest levels.

CROSS-CUTTING COMMENTS AND RECOMMENDATIONS

We applaud the creative, sensitive, and community-grounded communication efforts that the NCST has led in Puerto Rico and in south Florida. The NCST team has helped advance new methods and approaches for encouraging community sharing of data and for communicating findings with affected people and civic leaders. These efforts should be documented in published form to ensure that other large, interdisciplinary disaster research teams can learn from these approaches. We encourage the NCST to continue to invest their time and resources in ensuring that materials are shared through multiple channels and trusted outlets to ensure the widest possible reach with their messages. Ultimately, when the final reports are released, we look forward to seeing a communications plan that will ensure that all the American people—who can benefit from the lessons learned—learn of this important work.

During the September meeting, the Committee learned more about NIST's limited involvement in investigations of this year's wildfires in Los Angeles. As the NCST team works to complete the full reports for their two ongoing investigations, we encourage them to seek and receive funding to share information based on their preliminary efforts in response to the Los Angeles fires of 2025. These were nationally significant events that disrupted countless lives and destroyed thousands of homes, schools, and businesses, among other vital infrastructures. There are important lessons to be learned, but due to budgetary, personnel, and other resource limitations,

the NCST was unable to launch a formal investigation. We hope, however, they will be funded so that they can better share what they found during their reconnaissance activities. This sharing may take the form of attending relevant professional meetings, writing preliminary reports, or providing briefings on their investigation scoring system and decision-making processes.

SUMMARY

The Committee met with NIST to review progress on initiatives over the past year and to provide feedback to NIST. Based on our discussions with NIST, we make the following observations:

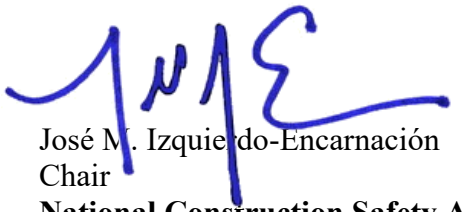
1. The NCST program is highly valuable to the safety and resilience of the built environment—and the people who occupy it in the United States mainland and its territories.

2. We commend NIST for diligently administering the NCST program and developing and maintaining an extraordinary technical workforce.

3. The NCST teams investigating Hurricane Maria and the Champlain Towers South collapse are making appropriate progress toward completion of their assignments, using comprehensive state-of-the-art investigative tools and techniques. They are also pioneering new approaches to ethical, rapid, interdisciplinary research.

NIST and the NCST teams have been highly responsive to feedback from the Committee.

Sincerely yours,



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National Construction Safety Advisory Committee