

**National Construction Safety Team (NCST)
Advisory Committee Meeting Summary**

**National Institute of Standards and Technology (NIST)
Gaithersburg, Maryland
November 27, 2018, at 10:00 am EST
(meeting conducted via web-conference)**

Advisory Committee Members

James R. Harris	J.R. Harris and Company
Ross Corotis	University of Colorado, Boulder
Reggie DesRouches	Rice University
Gary Klein	Wiss, Janney, Elstner Associates, Inc.
William Holmes	Rutherford + Chekene
Jeannette Sutton	University of Kentucky

NIST Representatives

Howard Harary	Director, Engineering Laboratory, Designated Federal Officer
Jason Averill	Chief, Materials and Structural Systems Division
Judith Mitrani-Reiser	Director, Disaster and Failure Studies Program
Benjamin Davis	Management & Program Analyst, Disaster and Failure Studies Program
Carmen Martinez	Information Technology Specialist, Engineering Laboratory
Steve Potts	Management & Program Analyst, National Windstorm Impact Reduction Program

Summary of Discussions

I. Welcome and Opening Remarks

Dr. Howard Harary welcomed the National Construction Safety Team Advisory Committee (NCSTAC) members and thanked them for their participation. Dr. Harary reminded the Committee that at the last meeting, NIST presented our response to the NCSTAC 2017 report to Congress - "A Summary of the Accomplishments and Implementation of the Joplin Recommendations" and gave an overview of the goals associated with the Hurricane Maria NCST investigation. The goals of the Hurricane Maria NCST technical investigation are:

- characterizing the hazards and the technical conditions associated with deaths and injuries;
- evaluating the performance of representative critical buildings, including dependence on lifelines, and
- evaluating the performance of emergency communication systems, and the public's response to such communications.

Dr. Harary stated that it was NIST's intention to clearly state the project objectives, connect the projects to the overall investigative goals, provide preliminary observations and background information, and to propose next steps for those projects.

He reminded the Committee that they are charged with providing advice to the NIST Director on carrying out the NCST Act for the Hurricane Maria NCST investigation. Specifically, he asked the Committee to:

- evaluate the function of the NIST team's ability to establish the likely technical cause of engineered building failures in Puerto Rico (PR);
- evaluate the technical aspects of evacuation and emergency response procedures;
- make recommendations for improvements in standards, codes, and practices, as well as future research to improve the structural safety of buildings;
- provide advice on the composition of the NCST, which currently includes combined expertise in structural engineering, social science, complex dynamic systems, risk modeling, epidemiology, meteorology, climate science, and hazard modeling;
- provide advice regarding our NIST's efforts to adhere to any other applicable authorities prescribed in the NCST Act.

Dr. Harary noted that the NIST investigations are not about finding fault, responsibility or negligence. The goal is to complete a thorough investigation that will result in recommendations that will improve the safety and structural integrity of buildings.

Finally, Dr. Harary noted that he recently approved a preliminary reconnaissance team to go to Paradise, California to collect perishable data on damaged structures. The team included three members from NIST, one member from the Federal Emergency Management Agency (FEMA) and two members from U.S. Forest Service. They were charged with working closely with CAL FIRE in the field. Dr. Harary committed NIST to briefing the Committee on the team's findings and subsequent actions at the next meeting.

Dr. Harary turned the meeting over to Committee Chair, Dr. James Harris, who referenced previous reports to Congress noting they were formatted as letters addressed to the Chair of the Committee on Science in the House of Representatives and to the Chair of the Committee on Commerce, Science, and Transportation of the Senate. He asked meeting participants if the level of detail in a report to the NIST Director would be the same as in the report that is developed for the Congress. He suggested that it would be appropriate to include more detail in the report to NIST. Dr. Harary responded that in the past, the Committee Chair had produced a second document that is a letter to the Director of NIST, as opposed to the report to Congress, which has additional detail. Dr. Harris noted that might have some bearing on what the Committee would decide to include in the report.

Dr. Harris led the Committee through a series of edits to their draft report. The first discussion centered on funding. Mr. Klein noted that disasters and building failures are inherently unpredictable, and suggested the Committee recommend that Congress provide funding to support long-term studies and also flexibility to enable the Teams to respond to new events. Dr. Harris confirmed there was nothing in the draft about that, but suggested the Committee commend NIST for their commitment to finding the funding for the investigation and studies when justified. Dr. Harris asked Committee members to respond to that statement. Dr. Corotis reiterated what was discussed at the last meeting – that NIST shouldn't have to take money from other programs when they need to conduct an NCST investigation. All Committee members agreed to edit Mr. Klein's paragraph and include this statement.

The Committee next discussed the methodologies for mortality studies. Mr. Klein read his proposed paragraph, which indicated that death certificates are the primary source for mortality statistics, but typically do not provide the information needed to determine if a death results from a disaster. Mr. Holmes suggested strengthening the point by also including that the public was confused by the way mortality was reported, and that great care is needed to communicate such information clearly to the public. Dr. Sutton highlighted the need to create standards for how mortality is measured in the future and not just the Hurricane Maria event. Dr. Corotis agreed with developing standards, as that it is the role of NIST to make technical contributions to consensus standards. He also suggested that the Committee include a statement explaining the difference between immediate death, death because of logistical or infrastructural failures, such as lack of oxygen supply in hospitals, and long-term induced mortality that have resulted from a lack of available care. He suggested these should all be measured and explained against background statistics of what would be expected. Mr. Holmes suggested the statement include the idea that more consistent methods are needed to measure deaths and injuries attributable to the event. This is in distinction to those that are related, but which are indirect. The Committee agreed to add the paragraph about the importance of developing consistent standards for measuring mortality attributed to disasters.

The Committee discussed updating a paragraph about NIST's work on research to improve knowledge of tornado wind speeds and improve codes and standards. The existing description was a very short statement about studies that have been done following the Joplin tornado. The Committee considered adding a description of the vulnerability of housing to tornadoes, since housing is not thoroughly addressed in the ASCE standards, and it is almost entirely covered by the International Residential Codes (IRC). In addition to the engineering impacts, there are tremendous societal and economic impacts which need to be considered. Dr. Corotis communicated that the Committee is not suggesting what changes should be made relevant to the standards, and NIST has a unique role in providing the kind of information that is useful in improving the standards. He suggested specific studies be conducted to

enable improvements to the standard. He committed to emailing these sentences to Dr. Harris, to be incorporated in their letter to Congress, along with the point made about economic impacts.

The next topic discussed by the Committee was raised by Dr. Sutton, who noted the importance of going into the field with local researchers. She asked NIST if their social science field efforts were in collaboration with local researchers in Puerto Rico. Dr. Mitrani-Reiser stated that DFS made extensive efforts to collaborate with local researchers in Puerto Rico. She stated that NIST hosted a research method meeting in Washington, DC. Four scientists from Puerto Rico participated in the meeting. She added that DFS has included language in all solicitations for contracts that specifies integrating local knowledge and local scientists. Many of the contracts issues to support the program specify that contractors are expected to have a physical presence in Puerto Rico. Some contracts have also required that designers have experience with the cultures and communities in Puerto Rico. She intends for NIST's response teams to incorporate local knowledge into every investigation, as done previously. Dr. Sutton suggested the Committee add language to their report to Congress supporting the efforts that NIST has already begun. Dr. Corotis added that sensitivity to local culture adds a lot of value to guiding questions and calibrating responses. Dr. Sutton agreed, and the Committee agreed that Dr. Harris should add these points to the report.

Dr. Harris reminded the Committee that the Lead Investigator of the Hurricane Maria NCST, Dr. Erica Kuligowski, had previously asked the Committee if they had input on how to better interface with social media. Dr. Sutton remembered that question and responded saying that the Committee did not have a good answer about how to help NIST get the data they seek. Dr. Sutton stated that it is difficult to get organizations to share their data. She elaborated that it is possible to pay a private company to get data that is archived. The goal is to find a clean set of messages that have been shared on that social media platform, based on a set of criteria. It's similar to building a survey; you have to know exactly what you're trying to collect. Dr. Harris thought it was beyond the scope of the Committee to provide a formal response, but that individual members can certainly help Dr. Kuligowski and NIST. The Committee considered recommending that companies and organizations that own relevant data share it with NIST but decided it's better to stay away from trying to tell companies what to do with their data. The Committee agreed to include the idea that social media is an important source of disaster information, and that work is needed to develop strategies and research methodologies to ethically access, collect, publish, and analyze such data. Dr. Sutton made the point that this moves the conversation beyond NIST, to all organizations who are accessing this information, including those companies that have sold information for private gain. This could help define how this type of work is done in the future.

Mr. Holmes suggested adding a recommendation to the report that NIST coordinate with the National Science Foundation's (NSF) Natural Hazards Engineering Research Infrastructure (NHERI) (<https://www.designsafe-ci.org/facilities/experimental/>) during investigations. He added that there is a Natural Hazards Reconnaissance (RAPID) facility at the University of Washington with top-notch reconnaissance equipment which would be a great asset to NIST's investigations. Dr. Mitrani-Reiser responded that NIST is actively coordinating with NHERI and that members of both the RAPID facility and DesignSafe Center came out to NIST last year. Committee member Dr. DesRoches recommended that NIST also coordinate with the Computational Modeling and Simulation Center (SimCenter) (<https://simcenter.designsafe-ci.org/>). He explained that they are one of the hubs of NHERI and have access to all the data at the University of California, Berkeley. He elaborated that Dr. Sanjay Govindjee

and Dr. Gregory Deierlein are developing a framework for conducting regional risk assessments under a variety of hazards. They are using wind loads, earthquake loads, and flooding data to develop simulation tools that can be used by the research community. Mr. Holmes added that there is a new program at NHERI called CONVERGE (<https://www.designsafe-ci.org/community/news/2018/november/nsf-creates-3m-converge-center-augment-natural-hazards-research/>). It is part of the National Science Foundation's efforts to improve collaboration across the scientific disciplines. He suggested that the Committee include CONVERGE, along with RAPID and SimCenter as programs that NIST should coordinate with during investigations. The Committee agreed that Dr. Harris will edit the recommendation and will add it to the report.

No other suggestions were offered. The Committee agreed with the changes to the report to Congress made during the meeting. Dr. Harris proposed that he incorporate these changes into the report and send it back out for final review. Once finalized, he will send it to Congress. He also recommended the Committee craft a letter with more detail to the NIST Director. He emphasized that it does not need to be the same letter and encouraged the Committee to think about what might be included.

II. Public Comment Period

At 12:09 pm, Dr. Harris opened the meeting for public comment. There were no responses, and Dr. Harris stated that the Committee will interpret the silence to mean there are no public comments.

III. Closing

Dr. Harary thanked everyone for their work and adjourned the meeting at 12:11 pm.