

Hurricane Maria in Puerto Rico: NIST Researchers Study What Happened, Will Recommend Improvements

Background and Goals:

On September 20, 2017, Hurricane Maria caused devastating damage in Puerto Rico, severely affecting buildings that its communities relied upon for medical care, safety, communications, education, business, and more. To better understand failures in buildings and infrastructure as well as emergency communications – and how we can prevent such extensive failures in the future – in 2018 the U.S. National Institute of Standards and Technology (NIST) launched a multi-year effort. The NIST program is studying how critical buildings performed during the storm, as well as how emergency communications systems worked. NIST is a science and engineering agency of the U.S. Department of Commerce.

The goal of this effort is to recommend improved building codes, standards and practices that would make communities in Puerto Rico and across the U.S. more resilient to hurricanes and other disasters. The results should help to mitigate future disasters and assist in recovery efforts to build back better, leading to more resilient communities.

NIST has a long history of studying disasters so that we can learn from them and improve our buildings or practices. For example, after the World Trade Center disaster, NIST's recommendations led to changes in how we build buildings and respond to emergencies. NIST's work studying the effects of tornadoes, building codes, and communications practices have led to changes to keep people safer. NIST has statutory authority to study these disasters and to make recommendations but it has no regulatory authority to require its recommendations to be followed. Rather, NIST works cooperatively with government agencies at all levels as well as with the private sector and academia.

In Puerto Rico, NIST specifically seeks to understand:

- Hurricane Maria's wind environment and the conditions that led to injuries and deaths;
- how critical buildings (especially hospitals and schools) and designated shelters performed – including their dependence on electricity, water, transportation and other infrastructure;
- how emergency communications systems performed and the public's response to those communications; and the
- impacts to, and recovery of, selected businesses, hospitals and schools, as well as the critical social functions they provide

To get the most accurate information, the NIST team is involving local and regional emergency management officials; building departments, transportation and other

public utilities; education and healthcare officials and staff; and local, regional, and Commonwealth elected officials and civil servants as well as individuals. NIST also is coordinating with other federal agencies, private sector organizations, and academic institutions. Several contractors are assisting the NIST team's engineers, sociologists, economists, meteorologists, and other researchers who are carrying out the studies. NIST will work with all relevant public and private partners to encourage voluntary implementation of the recommendations in its final report.

Key Points:

- NIST is a science and engineering agency with a long track record of impartiality. It is not a regulatory agency.
- NIST has many decades of experience studying structures after disasters – including, but not limited to, hurricanes.
- These studies have led to better understanding of how those structures perform and have helped to improve standards, codes, and practices.
- The recommendations NIST makes will be valuable to Puerto Rico and to the U.S. more broadly and result in improved standards, codes, and practices that will strengthen resilience, save lives, and make better use of resources.
- NIST studies are focused on fact finding, not fault finding, and are conducted separately from decisions by others about funding repair, recovery, or assistance efforts. NIST does not provide funding as part of, or as a result of, its studies of disasters.
- NIST's work also includes pathbreaking research and the development of planning guides to help communities to become more resilient.
- NIST makes all of its findings and recommendations public and gives full credit to those who contribute to its research.

Timeframe and for Further Information:

NIST conducted a preliminary reconnaissance of the hurricane's damage in Puerto Rico in December 2017 and launched the program in early 2018. This is a multi-year effort, with updates to be issued periodically.

A progress report, [Learning from Hurricane Maria's Impacts on Puerto Rico](https://www.nist.gov/topics/disaster-failure-studies/huracan-maria/avances) [Spanish: <https://www.nist.gov/topics/disaster-failure-studies/huracan-maria/avances>], was issued in January 2021.

NIST will add details on a dedicated website: <https://www.nist.gov/topics/disaster-failure-studies/hurricane-maria>

For further information, email: HurricaneMaria@NIST.gov

January 2021