

Earthquake engineers release report on damage in Haiti

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This is a leaning crane in Haiti's main port. Credit: Marc Eberhard, University of Washington

A five-person team sent to evaluate damage from the devastating magnitude-7 earthquake that struck Haiti on Jan. 12 found no surface evidence of the fault that might have caused the quake, but installed four instruments to measure aftershocks and help pinpoint the epicenter.

University of Washington civil and environmental engineering professor Marc Eberhard led the team that provided engineering support to the United States Southern Command, responsible for all U.S. military activities in South and Central America.

Eberhard is lead author on a report released late last week to the national

Earthquake Engineering Research Institute and the United States Geological Survey, both of which sponsored the trip. The report is posted at <http://tinyurl.com/yl7gtwb>.

A main conclusion is that much of the loss of human life could have been prevented by using earthquake-resistant designs and construction, as well as improved quality control in concrete and masonry work. The authors recommend that simple and cost-effective earthquake engineering be emphasized in Haiti's rebuilding effort.

The group also gathered more [seismic data](#). Assessing an earthquake's magnitude can be done from afar, Eberhard said, but establishing the location requires several stations fairly close to the earthquake's center. Such monitoring stations were not present in [Haiti](#). Knowing the location will help understand what caused the earthquake and forecast the likelihood of future quakes in the area, he said.

The team provided a ground assessment of places that were worst hit, including the port in Port-au-Prince, the cathedral, the National Palace, the Hotel Montana and the Union School, attended by children of many nationalities. They photographed damage in smaller towns and assessed the safety of hospitals, schools, bridges and other critical facilities.

A survey of 107 buildings in a heavily damaged part of downtown Port-au-Prince found that 28 percent had collapsed and a third would require repairs. A survey of 52 buildings in nearby Léogâne found that more than 90 percent had either collapsed or will require repairs.

"A lot of the damaged structures will have to be destroyed," Eberhard commented. "It's not just 100 buildings or 1,000 buildings. It's a huge number of buildings, which I can't even estimate."

Many people asked team members to inspect buildings where the

occupants were camped outside because they feared a collapse.

"There's an enormous amount of fear," Eberhard said. "People may see cracks in their houses. A large part of what we were doing was identifying what was serious damage versus what was cosmetic damage."

"Probably the most satisfying thing we did was to walk through the building and get people back inside."

Eberhard traveled into Port-au-Prince on a military airplane on Jan. 26. He and other team members camped in front of the U.S. embassy during the weeklong trip.

The group kept a blog of the trip at neescomm.blogspot.com/. Eberhard says he omitted some of the most disturbing images because members of his daughter's 2nd-grade class were reading the posts.

This is not the first such assignment for Eberhard, who did reconnaissance after major earthquakes in California, Seattle, Taiwan and Costa Rica. But he says this was the most difficult on a personal level.

"Usually when I go to earthquakes I find that the amount of damage is less than what appears on the television," Eberhard said. "In this case it was much more."

"The main reason for the difference is that usually when you see earthquake coverage the cameras will focus on one place that's really damaged, and you don't realize that around it there are plenty of things that are just fine. In this case, the cameras focused on one place that's really damaged, but because the cameras have a limited field of view you don't realize that the cameras could be panned 360 degrees and you would see the same thing."

The poverty of the people combined with the density of population and lack of building codes resulted in the widespread devastation, he said.

A follow-up team of engineers is scheduled to travel to Haiti on Feb. 28.

The engineering community, working with the United Nations and United States Agency for International Development, is assessing the next steps, including translating into French and Creole documents that explain in simple words and pictures how to rebuild structures that will be earthquake resistant.

Provided by University of Washington

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