Engineers deployed to Chile to study earthquake's impacts

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Engineers from the University of California, Berkeley, are traveling to Chile to help coordinate U.S. reconnaissance efforts to document the effects of the massive 8.8 magnitude earthquake that struck the region on Feb. 27.

Jonathan Bray, UC Berkeley professor of civil and environmental engineering, and David Frost, professor of civil engineering at the Georgia Institute of Technology, have organized a 16-member team from the Geo-engineering Extreme Events Reconnaissance (GEER) Association to study soil and geologic conditions in Chile. Bray is chair and Frost is co-chair of GEER.

Concurrently, Jack Moehle, UC Berkeley professor of civil and environmental engineering, is leading the Earthquake Engineering Research Institute's (EERI) Learning from Earthquakes Reconnaissance Team, which will include more than 20 researchers and practitioners from around the country.

The two teams will work closely with leading Chilean engineers, including researchers from the Universidad de Chile and the Pontifica Universidad Catolica de Chile, both in Santiago.

GEER is funded through a National Science Foundation (NSF) Rapid Response Research (RAPID) grant, and EERI receives ongoing NSF support for its Learning from Earthquakes program. Both teams will collaborate with each other and with experts from other groups,

including the U.S. Geological Survey, the American Society of Civil Engineers and the Tsunami Ocean Science Group.

"It is critical that we collect field observations soon after such an extreme event because the data we are seeking are perishable," said Bray. "What we find in Chile will have implications for Northern California, Oregon and Washington because there is a similar megathrust fault off the coast of the Pacific Northwest."

The GEER team will collect field observations of soil and geologic conditions, such as liquefaction, ground settlement, landslides and other mass ground movements. It will relate how the subsurface conditions influenced the damage of such infrastructures as dams, port facilities, mines, tailing dams and levees.

"It is important to understand how soil and geologic conditions influenced the damage patterns across the earthquake region," said Frost. "Field observations are particularly important in the area of geotechnical engineering because in the laboratory it is difficult to replicate soil deposits that have been built by nature over thousands of years."

The EERI team will focus on the performance of engineered structures in the earthquake, but its members are a multi-disciplinary group of structural and geotechnical engineers, nonstructural/contents specialists, tsunami experts, health care facility and health care experts, instrumentation specialists and social scientists. At least five members of the EERI team will come from the Pacific Earthquake Engineering Research Center, headquartered at UC Berkeley.

"U.S. engineers are particularly interested in examining how Chilean structures performed in the quake because modern buildings there were built using the American Concrete Institute's seismic building code provisions," said Moehle, who has conducted regular trips to Chile for

research, last visiting the country in mid-January. "There will be important lessons we can learn that will be directly applicable to structures here in California and elsewhere in the United States."

A number of researchers from both teams are already in Chile. An advance group of GEER investigators, led by Frost and including Nicholas Sitar, UC Berkeley professor of civil and environmental engineering, arrived over the weekend. The remaining GEER team members will land in Chile between March 13 and March 20.

Moehle will leave for Chile tonight (Monday, March 8), joining four EERI researchers already in the field. The majority of the remaining EERI team members will be in Chile by March 14.

Two additional UC Berkeley researchers will likely join the GEER team in Chile later this month. Ray Seed and Juan Pestana, both professors of civil and environmental engineering, plan to focus on the effects of the quake on the country's earthen dams and levees to see what lessons they might hold for California.

More information: After the field investigation in Chile is complete, observations and findings will be posted on the GEER (www.geerassociation.org) site and through the Chile Earthquake Clearinghouse site hosted by EERI (www.eqclearinghouse.org/20100227-chile/).

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