

Caltrans photo by John Huseby



A Caltrans Maintenance employee pries off concrete from the Maxwell Bridge in Napa that was damaged by a 6.0-magnitude earthquake in August 2014. Based on the quake's intensity, Caltrans' ShakeCast system sent email alerts warning of possible damage to Department structures.

## ShakeCast Alert System Becomes Model

Other States May Emulate Quick Response to Quakes; Flood, Fire Use Planned

As its successful [ShakeCast](#) earthquake email alert system becomes a model for other states, Caltrans is developing similar platforms for using real-time data to respond to floods and fires. It's part of Caltrans' efforts to establish an integrated emergency-management system for all types of threats to the State Highway System and its facilities.

Caltrans' ShakeCast was developed in cooperation with the U.S. Geological Survey (USGS) and is now in its third version. It is a web-based application that sends out an alert to Caltrans staff when an earthquake of a certain magnitude occurs. The system identifies bridges and Caltrans buildings most susceptible in an area where an earthquake of certain strength occurs, so inspections for damage can be performed.

More than 12,700 state bridges and facilities statewide are catalogued in the ShakeCast system. There are 568 groups and individuals within Caltrans who receive e-mails within 15 minutes of an earthquake of magnitude 4.0 and greater occurring in Califor-

nia. The Department can then respond quickly to potentially damaging incidents and focus inspection efforts where needed, better protecting the transportation network.

ShakeCast has drawn attention from nine other states that want to adopt their own versions. They are: Washington, Oregon, Idaho, Utah, Texas, Missouri, Oklahoma, Mississippi and South Carolina.

In addition, Los Angeles Unified School District uses ShakeCast to monitor more than 1,000 buildings. In Japan, ShakeCast has been used to check nuclear plants.

Fires and floods also are major threats to the state and its transportation system, and a Caltrans-led effort is using ShakeCast as a guide to create FloodCast and FireCast applications — both of which are under development.

Working with the federal advisory Transportation Research Board, FloodCast is about two-thirds through the development process. The system would use data from Caltrans, USGS, National Weather Ser-

vice and National Oceanic and Atmospheric Administration (NOAA) to help predict where floods are likely to occur, and guide deployment of response resources. FloodCast could be in operation within two years.

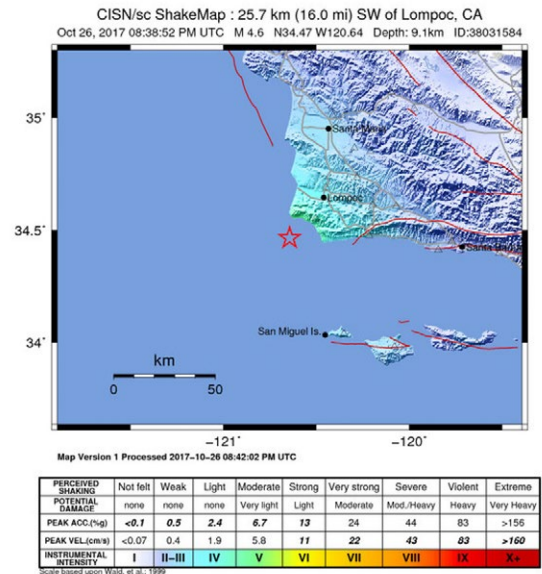
Similarly, FireCast would help predict where wildfires, such as those that devastated Napa, Sonoma and Mendocino counties in October 2017, might occur. The development of FireCast is in its infancy, although it's already operating at a basic level — a daily rating of fire dangers sent to Caltrans field staff.

Eventually, it's expected that FireCast will project the path of blazes along the State Highway System to better warn field staff and the public. It's intended to help guide where equipment should be staged and what roads should be closed.

Information from FireCast could be incorporated into FloodCast to predict locations of post-fire floods or mudslides, and set off email notifications such as those issued for ShakeCast.

ShakeCast sends “new event” emails for all earthquakes greater than 4.0 within California. ShakeCast has reported more than 300 earthquakes in the last decade. Though felt by many and reported by media, the vast majority did not produce enough shaking to damage Caltrans structures.

## ShakeCast Email Alert



Name: (not assigned at this time)  
 Magnitude: 4.6  
 ShakeMap ID: c138031584  
 Location: 25.7 km (16.0 mi) SW of Lompoc, CA  
 Latitude-Longitude: 34.4658, -120.643  
 Local Time: 2017-10-26 13:38:52

*ShakeCast identifies Caltrans' bridges and buildings that could potentially be affected by earthquakes stronger than 4.0 in California. This helps the Department guide the deployment of resources.*



Caltrans repaired parts of the Maxwell Bridge over the Napa River after pieces of concrete cracked and fell during a 2014 temblor.

However, several generated enough shaking to trigger secondary “potential impact” notifications. These messages identify bridges and buildings where ground movement was severe enough to warrant response. In each, damage to bridges was observed. Those earthquakes were:

- 2014: 6.0-magnitude Napa earthquake
- 2010: 7.2-magnitude Calexico earthquake
- 2008: 5.4-magnitude Chino Hills earthquake

ShakeCast, FloodCast and FireCast will expand the range of Caltrans' responses to natural disasters, but staff at the Department's Emergency Management Division aren't stopping there. They're already starting work on SnowCast. **MM**

*Sources: Rene T. Garcia, Branch Chief, Homeland Security, Office of Emergency Management and Infrastructure Protection; Loren L. Turner, Office Chief, Director's Office of Asset Management; Herby Lissade, Chief, Office of Emergency Management*