

Maintenance

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Project Title:
ShakeCast, Connecting the DOTs

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ShakeCast, Connecting the DOTs

This Transportation Pooled Fund project will bring participating DOTs into full ShakeCast operation for post-earthquake assessment of state and local bridge inventories.

WHAT IS THE NEED?

When an earthquake occurs, the U. S. Geological Survey (USGS) ShakeMap portrays the extent of potentially damaging shaking. In turn, the ShakeCast system, a freely-available, post-earthquake situational awareness application, automatically retrieves earthquake shaking data from USGS ShakeMap, analyzes shaking intensity data against users' facilities (e.g., bridges, buildings, roads), sends notifications of potential impacts, and generates maps and other web-based products for emergency managers and responders.

ShakeCast is particularly suitable for earthquake planning and response purposes by Departments of Transportation (DOTs). The California Department of Transportation (Caltrans) has been working with the USGS over the last ten years to develop a robust and operational ShakeCast platform. A long-term goal is to "connect the DOTs" to bring this technology to all states with seismic hazards, as the major earthquakes anticipated to occur in the future will cross state borders.

The recently released ShakeCast V3 system includes a full statistical fragility analysis framework for general structural assessment of bridges as part of the near real-time system; significant improvements in the graphical user interface, including a console view for operations centers; and custom, user-defined hazard and loss modules. The new version also includes advancements in estimating the likelihood of shaking-induced secondary hazards to bridges and along roadways due to landslides and liquefaction.



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WHAT ARE WE DOING?

This collaborative effort will bring participating DOTs into full ShakeCast operation for post-earthquake assessment of state and local bridge inventories. The project will provide a mechanism to actively engage representatives from state DOTs with common interests in implementing and expanding the application of ShakeCast technologies to improve emergency response capabilities.

WHAT IS OUR GOAL?

The primary goals of the project are to:

1. Bring participating DOTs into full ShakeCast operation for post-earthquake assessment of state and local bridge inventories
2. Provide a mechanism to actively engage representatives from state DOTs with the common interests in implementing and expanding the application of ShakeCast technologies to improve emergency response capabilities.

WHAT IS THE BENEFIT?

The project will enable Caltrans and neighboring State DOTs to more effectively respond to cross-border earthquakes following a major earthquake. The collaborative effort will leverage funds from multiple state DOTs to deliver a product of interest to all State DOTs with seismic hazards.

WHAT IS THE PROGRESS TO DATE?

Caltrans and all partnering DOTs successfully operate a fully functional ShakeCast system. In order to optimize system performance, Caltrans has completed the migration of the in-house ShakeCast system to the USGS server in Denver, CO (primary server) and Sioux Falls, SD (backup server).

In the event of an earthquake, the ShakeCast system will automatically retrieve seismic data and analyze ground shaking distribution with facility vulnerabilities. From the system analysis, ShakeCast generates email event notifications to users with a hierarchical list of potential impacted state and local bridges within the regions of strong shaking.

Currently, new system features and product enhancements specific to each partnering DOT are under development.