

Maintenance

FEBRUARY 2023

Project Title:
ShakeCast, Connecting the DOTs

Task Number: 2949

Start Date: November 01, 2017

Completion Date: September 30,
2024

Task Manager:
Sharon Yen
Senior Research Engineer
sharon.yen@dot.ca.gov

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.



DRISI provides solutions and
knowledge that improves
California's transportation system

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.
- 3.

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 operates a fully functional ShakeCast system. In order to optimize system performance, Caltrans has completed the migration of 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, ShakeCast system automatically retrieve seismic data and analysis 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 DOTs are under development.

On May 2nd, 2022, in partnership with United States Geological Survey (USGS), the Transportation Pooled Fund Project DOT partners and FHWA, Caltrans Division of Research, Innovation and System Information (DRISI) hosted the ShakeMap & ShakeCast 101 Training.

The team is working on updating state inventory to the new 2022 NBI database.

IMAGES

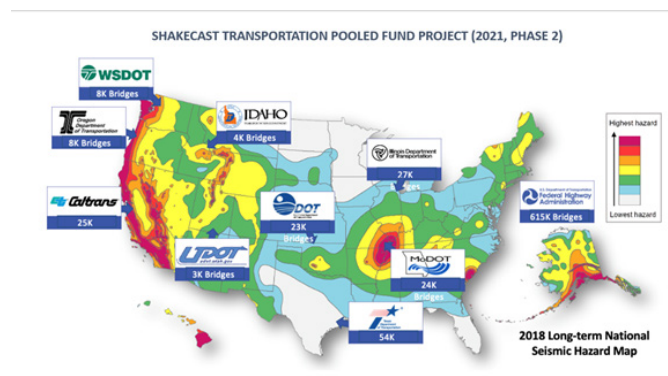


Image 1: ShakeCast Pooled Fund partnering states

The contents of this document reflect the views of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the California Department of Transportation, the State of California, or the Federal Highway Administration. This document does not constitute a standard, specification, or regulation. No part of this publication should be construed as an endorsement for a commercial product, manufacturer, contractor, or consultant. Any trade names or photos of commercial products appearing in this document are for clarity only.