



# SUCCESS STORIES



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## **ShakeCast: How the Los Angeles Unified School District Uses Technology to Prepare for and Respond to Earthquakes**

In 1994, the Northridge, Calif., region was struck by a 6.7 magnitude earthquake that damaged nearly 100,000 houses and buildings, including a number of Los Angeles Unified School District (LAUSD) schools. The entire school district was closed for five days to allow first responders and facilities personnel adequate time to assess damage and determine whether buildings were safe to reenter. In the years subsequent to this incident, the LAUSD forged a partnership with the U.S. Geological Survey (USGS) allowing the district to use two USGS tools at no cost: ShakeCast (an earthquake notification program) and ShakeMap (a companion product that provides users a map of the distribution of earthquake shaking). ShakeCast, a free online tool, delivers notification of shaking levels at user-selected facilities affected by an earthquake; this information also may be superimposed on to a geographical map, or ShakeMap created by USGS.

LAUSD has now been using ShakeCast and its companion tool, ShakeMap, for several years as a tool to help assess post-earthquake damage to schools in the district. Bob Spears, director of LAUSD's Office of Emergency Services, estimates that if the district had these tools in place in 1994, schools might have been closed for two days instead of five, saving the district a significant amount of money.

This issue of *Success Stories* describes the features of the program and the process undertaken by LAUSD to develop, implement, and promote the program. This document

*The Los Angeles Unified School District is comprised of over 670,000 students in nearly 1,100 K–12 schools (consisting of approximately 15,000 buildings).*

provides an example to districts interested in taking on similar earthquake preparedness strategies.

### **About ShakeCast and Its Purpose**

LAUSD currently uses ShakeCast in a variety of ways to help prepare and plan for a possible earthquake. The district also is better prepared to respond to an earthquake that occurs. Today, when an earthquake of a 3.5 magnitude or greater strikes within the LAUSD boundaries, subscribers are notified within minutes via email, pager, or text message and receive a ShakeMap that details:

- The location of the earthquake;
- A ranking of “perceived shaking” (from “not felt” to “extreme”); and
- A ranking of the potential structural damage to K–12 schools in the district (from “none” to “very heavy”).

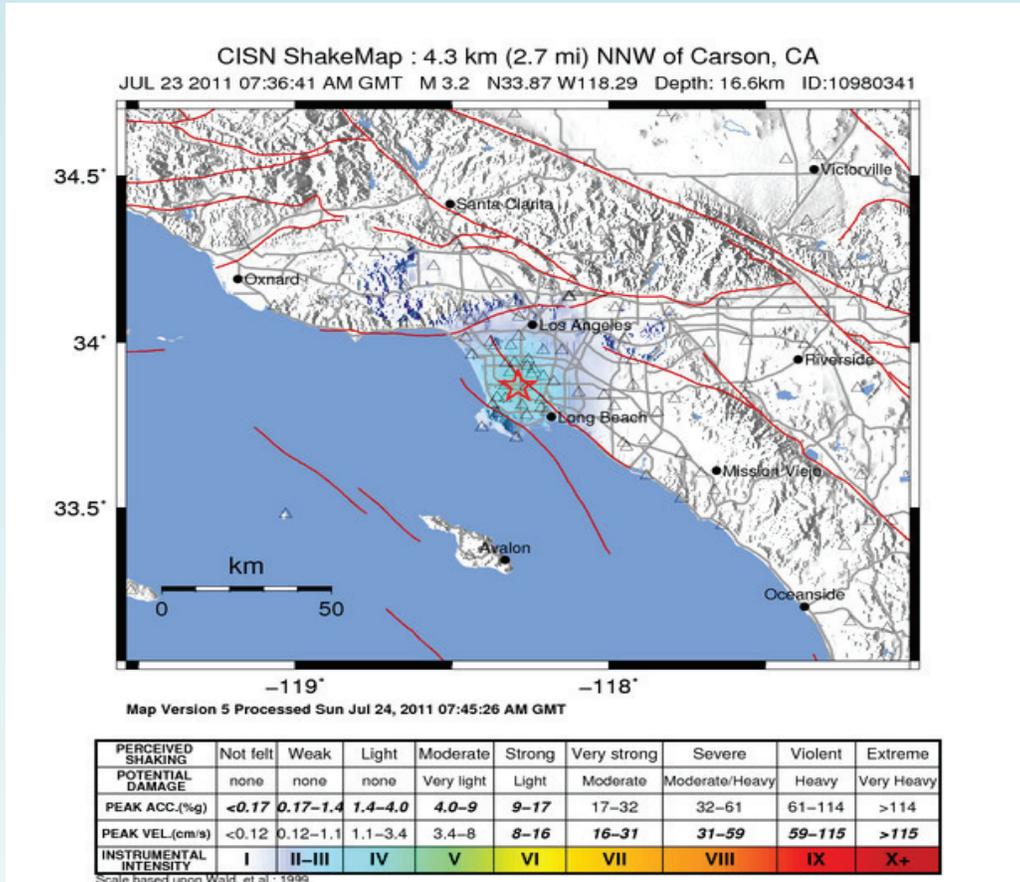
During the response and recovery phase following an earthquake, ShakeCast is used by emergency management personnel, and individual school operations and facilities personnel responsible for conducting initial building inspections in the aftermath. LAUSD uses the application to superimpose the geographic information system (GIS) locations of all district schools onto geological maps; armed with this information, emergency responders and facilities personnel are better able to “triage” their jurisdiction and determine which schools (and specific buildings) in the district need the most immediate attention and which can safely remain open.

The program also is used in LAUSD's emergency operations centers as a tool to help identify schools that can receive displaced students and to pinpoint locations that can serve as shelters, if needed. Schools are able to reopen faster thanks to the

## Supporting Emergency Management With ShakeCast and ShakeMap: A Recent Example

In the week before the interview for this document was conducted with LAUSD staff, a 3.7 earthquake struck the Carson and Long Beach areas of LAUSD. USGS published a ShakeMap for this event, and ShakeCast provided a list of “facility damage estimates” that ranked individual school buildings located in the district by the amount of shaking they experienced (see figure below). Facility staff from those schools were able to use this information to inspect the specific buildings that experienced the highest level of shaking to ensure they were structurally sound and safe for reoccupancy.

### ShakeMap and Snapshot of Damage List for Long Beach and Carson, Calif., Earthquake



#### Facility Damage Estimates from ShakeMap

Facility	Description	Damage Level	Metric	Value	Exceedance Ratio
GARDENA BUS GARAGE	8	Unlikely	MMI	4.29	0.823
GARDENA HS	8	Unlikely	MMI	4.29	0.823
GARDENA HS FOR LANG MAG	8	Unlikely	MMI	4.29	0.823
GARDENA INF. CTR	8	Unlikely	MMI	4.29	0.823
M&O DISTRICT 8	8	Unlikely	MMI	4.29	0.823
MONETA CONT HS	8	Unlikely	MMI	4.29	0.823
186TH ST EL	8	Unlikely	MMI	4.19	0.798
GARDENA CAS AEWC	8	Unlikely	MMI	4.19	0.798
GARDENA CAS EEC	8	Unlikely	MMI	4.19	0.798
GARDENA-CARSON CAS	8	Unlikely	MMI	4.19	0.798
GARDENA EL	8	Unlikely	MMI	4.13	0.782
SELLERY SP ED CTR	8	Unlikely	MMI	4.13	0.782

Source: USGS ShakeCast, Facilities Information Systems, LAUSD ShakeMap and ShakeCast damage estimate report, generated July 23, 2011.

utility of this program, which restores the community operational status—an important component of the recovery phase of emergency management.

In turn, the information from ShakeCast can be used to enhance preparedness efforts for future earthquakes, helping those in planning and intelligence departments predict future resource needs. Spears explains that this has made them much more prepared than before ShakeCast. Staff in finance and logistics departments of the district also use the data to direct resources more strategically.

### **Overcoming Challenges**

Despite the multiple benefits to the district as it is now used, ShakeCast proved challenging to implement in several ways. For one, interfacing between LAUSD and the USGS presented a technical challenge. In the early stages of program implementation, a district GIS specialist worked closely with USGS staff to develop an agreement and construct the system. The district's information technology department set up a server that constantly requests data from the USGS site and downloads and distributes relevant information to subscribers. Initially, it took several weeks to streamline the system, but the need for assistance has decreased over time. Spears also said that it took project staff a good amount of time to key in and upload the data on the physical location of all the schools. Ongoing, the primary challenge is keeping subscribers' email and other contact information current.

### **Replicating Success**

The USGS does not charge organizations to use ShakeCast or its accompanying tool, ShakeMap. Spears explained that the primary costs to LAUSD

instead are associated with sustaining their off-site, backup remote server and funding staff who oversee all of LAUSD's GIS. No formal training on the ShakeCast system is offered by the district, said Spears, since the main way users interface with the system is only through receipt of email and/or other alerts.

Reflecting on the greatest benefits to using the system, Spears describes it as “automating something that used to take days.” For anyone interested in replicating the system, Spears encourages them to contact him directly. Having been involved from the beginning, he is happy to talk to another school district through the implementation process.

Spears also encourages district representatives to reach out directly to the U.S. Geological Survey. While earthquakes are one of several potential natural disasters schools may face, the availability of this great resource from an established organization like USGS presents a valuable opportunity for partnership in a way that can broadly benefit a school and region. ShakeCast provides LAUSD a tool that optimizes resources and enhances preparedness and response efforts in the case of an earthquake emergency. For this district and districts everywhere, it may even save lives.

### **For More Information**

Bob Spears, director, LAUSD Office of Emergency Services (Calif.), e-mail: [bob.spears@lausd.net](mailto:bob.spears@lausd.net)

### **USGS ShakeCast**

<http://earthquake.usgs.gov/research/software/shakecast/>

This *Success Stories* publication was written with the assistance of Bob Spears, director of LAUSD's Office of Emergency Services, during the summer of 2011.

The REMS TA Center was established in October 2007 by the U.S. Department of Education's Office of Safe and Healthy Students (OSHS), formerly the Office of Safe and Drug-Free Schools (OSDFS). The center supports schools and school districts in developing and implementing comprehensive emergency management plans by providing technical assistance via trainings, publications, and individualized responses to requests. For additional information about school emergency management topics, visit the REMS TA Center at <http://rems.ed.gov> or call 1-866-540-REMS (7367). For information about the REMS grant program, contact Madeline Sullivan ([madeline.sullivan@ed.gov](mailto:madeline.sullivan@ed.gov)).

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