

# ShakeAlert: West Coast Earthquake Early Warning System

## Anticipating an earthquake

Seismologists are testing an earthquake early warning system similar to one being used in Japan that can send out warnings of earthquakes to your computer or mobile device seconds to minutes in advance. Here's how the system works:

- 1 When an earthquake occurs, it sends out three different waves: P-waves, S-waves, and surface waves. The P-wave is the initial wave detected by seismometers. It travels the fastest.
- 2 Sensors detect the P-wave and immediately transmit data to an earthquake analysis center where the location and size of the quake are determined. The surface and S-waves are the wave types that mark the start of potential damage from shaking. They follow the P-wave.
- 3 An alert from the analysis center is immediately transmitted to your computer or mobile phone. Using GPS coordinates, the system calculates the arrival time of the shaking.

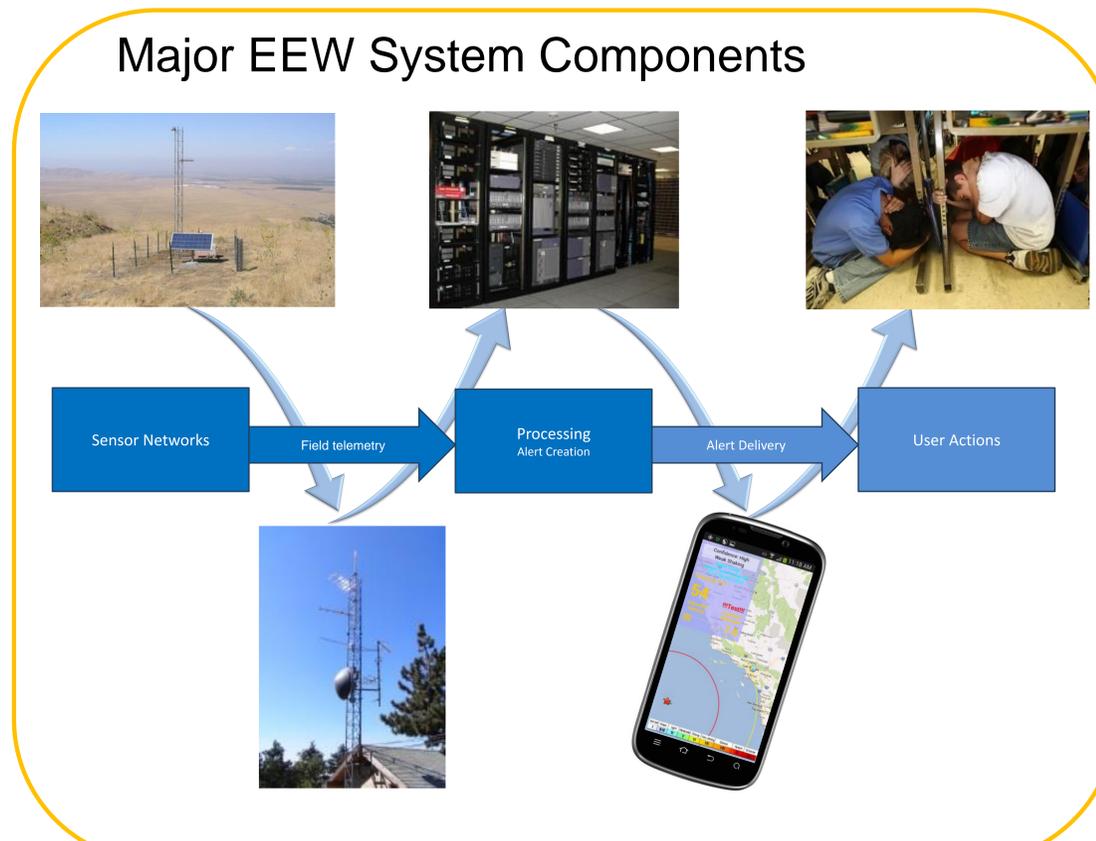
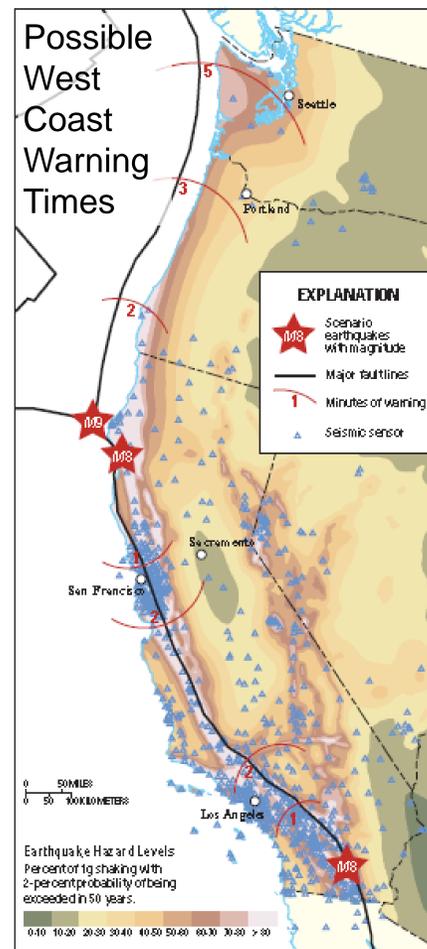
There are 400 sensors positioned throughout California approximately 12 miles apart.

### On your screen

- 1 Real-time tracking of seismic waves from quake's epicenter.
- 2 Real-time tracking of the fault rupture.
- 3 Your current location tracked by GPS.
- 4 Seconds remaining for arrival of the destructive seismic waves.
- 5 Expected intensity of quake at your current location.
- 6 Estimated magnitude of quake.
- 7 Intensity scale.

Source: USGS

JEFF GOERTZEN, STAFF



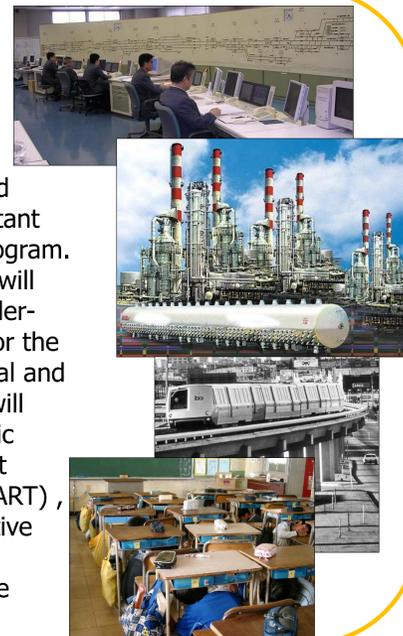
## Using Early Warnings

What can you do when you receive an EEW alert?  
Get out of harms way, and drop, cover and hold on.

### Earthquake Early Warning: Dos & Don'ts

<b>At Home</b> - Protect your head and shelter under a table - Don't rush outside - Don't worry about turning off the gas in the kitchen	<b>In Public Buildings</b> - Follow the attendant's instructions - Remain calm - Don't rush to the exit
<b>When Driving</b> - Don't slow down suddenly - Turn on your hazard lights to alert other drivers, then slow down smoothly - If you are still moving when you feel the earthquake, pull safely over to the left and stop	<b>Outdoors</b> - Remain calm, and secure your personal safety based on your surroundings! - After seeing or hearing an Earthquake Early Warning, you have only a matter of seconds before strong tremors arrive. This means you need to act quickly to protect yourself! - Look out for collapsing concrete-block walls - Be careful of falling signs and broken glass - Take shelter in a sturdy building if there is one close enough
<b>On Buses or Trains</b> - Hold on tight to a strap or a handrail	<b>In Elevators</b> - Stop the elevator at the nearest floor and get off immediately
<b>Near Mountains/Cliffs</b> - Watch out for rockfalls and landslides	

Public education and training is an important part of any EEW program. USGS and partners will develop easy to understand instructions for the public. Also industrial and government users will implement automatic responses for transit systems (such as BART), factories with sensitive equipment, and emergency response entities.



## Japan: EEW success story, \$15M saved

**OKI** OKI Engineering Co., Ltd. chip manufacturer

2003: Two damaging earthquakes

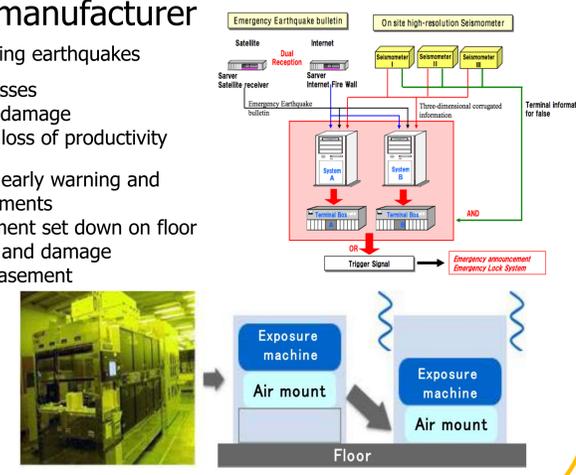
- \$15 million in losses
- fire, equipment damage
- 17 and 13 days loss of productivity

\$600K invested in early warning and structural improvements

- Sensitive equipment set down on floor to reduce shaking and damage
- Shear walls in basement

Two quakes after EEW implemented

- \$200K in losses
- 4.5 and 3.5 days loss of productivity



## Receiving demo alerts today:

- >50 scientists
- Cal OES
- Google.org
- BART
- LA Metro
- Metrolink
- Amgen
- So Cal Edison
- San Francisco
- L.A. City
- L.A. County
- UC Berkeley OEP
- many more...

