What would you do if you have seconds to tens of seconds to prepare for shaking from an earthquake that has already begun? More than 143 million people in the United States are exposed to potentially damaging shaking due to earthquakes. Most of our nation’s earthquake risk is concentrated in highly populated areas on the active plate tectonic boundaries of the West Coast of the continental United States.

The U.S. Geological Survey operates the ShakeAlert© Earthquake Early Warning system, which is part of the Advanced National Seismic System. ShakeAlert© is ***NOT*** earthquake *prediction*, but a ShakeAlert message issued by the USGS indicating that an earthquake has begun and shaking is imminent.

With even a few seconds of warning, ShakeAlert© can save lives and reduce injuries by alerting people to take a protective action such as, “Drop,…. Cover…., and Hold On….”.

ShakeAlert further protects people and infrastructure by triggering automatic actions such as slowing down trains to prevent derailments, opening fire house doors so they don’t jam shut, closing valves protect water systems, and to stabilize equipment during life critical situations..

How does ShakeAlert© work?

When an earthquake occurs, seismic waves carry energy in all directions away from the epicenter. *P*-waves, similar to sound waves, move quickly through the ground, followed by the slower and generally more damaging *S*-waves and surface waves.

Sensors detect the seismic waves and send that information to a ShakeAlert© processing center which requires that at least four sensors detect the earthquake. If the earthquake fits the right profile, the USGS issues a ShakeAlert© message. Distribution partners then produce and deliver an alert to people and trigger automated systems. Alert delivery can be before, during, or after shaking from S waves and surface waves arrive.

Alerts can be delivered to people through apps designed for cell phones and other wireless devices, over public address systems, TVs, and radios, and by FEMA’s Wireless Emergency Alert system, which is also the source of AMBER alerts.

For every earthquake, there is a region near the epicenter where alerts will *not* arrive before shakingbegins. That is because close to the epicenter, the P and S waves are too close together and the ShakeAlert© system needs time, often just seconds, to estimate the earthquake’s magnitude and shaking levels, before issuing a ShakeAlert© message. That means that people close to the earthquake epicenter might not get an *alert* until after the shaking has already started. Those farther away from the epicenter could receive more warning time before shaking arrives.

If an earthquake continues to grow in size, additional ShakeAlert© messages might be issued updating the estimated magnitude and expected shaking for that event which will result in alerts being delivered to a broader area. The USGS recommends that when you receive an alert, you should take protective action immediately. Do not wait for the shaking to arrive.

If you are near the coast in a tsunami-prone region, it is important to get to high ground quickly, but only after shaking stops. Before traveling to a new place, learn about both the local hazards, and recommended precautions to take, by reading information found in the city, county, or state’s emergency management websites.

Knowledge of your surroundings and practicing protective actions are critical components of preparedness for any disaster. Always remember: if you receive an earthquake alert or experience shaking, Drop, Cover, and Hold On until all shaking stops.