Earthquake warning alerts on your phone?

Sanden Totten, Southern California Public Radio, 10-24-14

What's that blaring from phone? One day, it might be an alert warning you of an earthquake headed your way.

Before that can happen though, federal officials need to address some serious issues in the Wireless Emergency Alert system, or WEA.

That's the program that allows the National Weather Service to send out severe weather warnings and the California Highway Patrol to issue Amber Alerts to help track missing children.

Officials can select a region and send a blanket message to all wireless alert-capable mobile phones in the area using the local cell towers.

U.S. Geological Survey hopes to hook up its planned earthquake early warning system to WEA once it is completed, allowing the agency to potentially reach millions of people.

One of the biggest challenges though, is making sure WEA is fast enough to warn residents before dangerous shaking reaches them. In some tests, it's taken up to five minutes for messages to show up.

"Time is really important here," said USGS' Doug Given.

He's helping to build the early warning system. Right now it's just a prototype.

The system relies on a series of sensors placed near major faults. When those sensors detect shaking, they determine the size and scope of the quake and send an automatic warning message.

Those right on top of the fault are too close to get any lead time, but those further away can sometimes get up to a minute of warning.

That's because the message can travel at near light speed, notably faster than the seismic waves which ripple out from a fault at roughly the speed of sound.

For this to work though, the system has to be lightening quick in generating and sending that alert.

"Every second that's consumed by the alert system is a second you don't have to respond," said Given.

According to Given, it takes about three seconds for the sensors to generate an alert. But he added that the biggest lag comes after that, when the message reaches cell phone carriers.

There are roughly 60 companies working with the Wireless Emergency Alert program.

But they have designed their systems with weather alerts and terrorist threats in mind, scenarios where a minute of lag is usually considered acceptable.

To handle earthquake warnings, cell companies will need to upgrade their technology. That takes money and many cell providers may not be keen on incurring the extra costs.

"They don't have a lot of incentive for speeding up their system until people start to demand this sort of service," Given noted.

USGS, FEMA and the Federal Communications Commission plan to take up this issue sometime in the next few years, when the early warning system is closer to completion.

Targeting the right people might also be tricky.

When the City of Los Angeles recently used the Wireless Emergency Alert system to send out warnings during a fire at the Port of Los Angeles, they focused the message on neighboring communities.

But Chris Ipsen with City of L.A. Emergency Management Department said somehow the alert inadvertently reached some people as far away as Hollywood.

"That's one of the challenges of the system," he said. "You may get a text that really doesn't impact you because you are not in that area."

There's also the question of what sound to use for the alert.

The standard Emergency Broadcast System tone often heard on TV and radio would need to be scrapped since it takes 8 seconds to play, wasting valuable time in the process.

In Japan, where they've used an early warning system for years, there are two alert noises.

One is loud and severe, the other is much friendlier and typically used on TV, as heard below.

Doug Given said the USGS alert should be distinct from other warnings, so when people hear it they immediately know to drop, cover and hold on.

Currently, the prototype system uses a combination voice and tone, as the video below demonstrates.

Doug Given said his team is studying what other options might work better.

The final challenge of course, is with the people receiving the message, said Rick Wimberly, president of Galain Solutions, a consulting company focused on mass notification systems.

"Often it's easier to overcome the technical challenges than it is to overcome the human behavior challenges," he said.

He pointed out people will need to be educated on how to interpret the alerts, and that'll take public outreach and practice.

Fortunately for the USGS, there is time to work out these details.

State officials are currently seeking 80 million dollar to build out the warning system.

They are optimistic though and expect to have it online within two years.