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Not My Fault: What MyShake can (and won't) do to make you earthquake-safe

Lori Dengler/For the Times-Standard
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Last Thursday was the Great ShakeOut, an opportunity to train yourself to Drop, Cover and Hold On when earthquake shaking begins. Thursday was also the statewide launch of MyShake, a mobile phone app that may give you a few seconds to find a good spot to ride out the shaking. MyShake is the final step in California's Earthquake Early Warning (EEW) effort. It's last piece in the dissemination system – the part that delivers the information to you and me.

EEW is NOT an earthquake prediction system. It uses information gathered very quickly AFTER the earthquake has already begun. When we talk about earthquakes and faults, it's a common assumption that the whole fault breaks at once. It doesn't. Earthquakes start at a point at depth beneath the ground surface (the focus) and grows, like the crack when a rock hits your windshield. If the rupture stops after a few miles, it's a small or moderate earthquake. For big quakes, the rupture can extend many hundreds of miles. The 1906 earthquake began on the San Andres fault offshore of San Francisco and then grew 65 miles to the south to Santa Cruz and 200 miles to the north to Cape Mendocino.

Fault rupture is very fast, moving at several miles per second, and producing seismic P- and S-waves as it propagates. The P-waves are always faster (over 3 miles per second) and, luckily for us, rarely cause damage. A P-wave can travel the distance between Eureka and San Francisco in about 70 seconds. The slightly slower S-wave is about two-thirds as fast as P. It is stronger and shakes from side-to-side side-to-side motion, and causes most of the damage in earthquakes.

EEW takes advantage of both the time it takes a fault to rupture and the difference in wave speeds. If there are enough seismic stations (ideally one every ten square miles), three or four stations will detect the initial P-wave in the first two seconds of rupture. Algorithms analyze the signals and, in less than a second, estimate the location and magnitude. If the system determines that shaking will be larger than some threshold value, it quickly sends out an alert.

The project to develop a working EEW system is called ShakeAlert and has been under development for nearly a decade. A number of groups have been beta testing the system and in January of this year, a mobile phone-based alerting system was released in Southern California. MyShake, developed at the UC Berkeley in collaboration with the USGS and other research groups now takes the notification system statewide.

To use MyShake, you need an iphone or android phone. Notifications DON'T get sent to landlines, by text/email or through EAS on radios and televisions. Download the free MyShake App from your application store. To activate MyShake, you need to ENABLE the location services all of the time. When an earthquake occurs, an algorithm estimates the shaking strength (intensity) based on your location. If the phone is turned off or doesn't know where you are, you won't be notified.

If the earthquake is large enough for you to feel shaking, your phone will send audible alert: "Earthquake! Drop, cover and hold on. Shaking expected." It won't tell you the magnitude of the earthquake, its location or how strong the shaking is likely to be. It also won't tell you how soon the shaking will arrive. After the earthquake, you will get location and size information.

The alert will arrive before, during or after the earthquake depending upon how close you are to the epicenter and the instrumentation density. Areas within 15 miles of the quake will typically receive the alert AFTER the S-waves have arrived. If you are further away, the alert should arrive BEFORE the shaking. You may have anywhere between a few seconds and a minute before the shaking reaches you.

When you receive an alert, what you do depends on your situation. If you are indoors, find a table or desk to get under, just as you did during shakeout. If you are driving, slow your vehicle and look for a safe place to pull over on the side of the road. In a market or store, walk to an area where items are unlikely to fall on you and drop to the floor and cover your head and neck with your arm. Resist the urge to run.

MyShake also turns your phone into a sensor! All smartphones come with a built-in accelerometer. That's what lets your phone determine up and down directions when you move it. Your phone will record the ground shaking and automatically sends the shaking data back to Berkeley to be added to the data bank and help to refine the data about shaking strength. You can view the sensor

at any time by selecting the sensor under the menu options. I find it entertaining to wave my phone about and create my own earthquake.

For those of you worried about being tracked by your phone, don't worry about MyShake. No information is kept about your particular phone after the waveforms and location have been dumped into the system. You also have the options to give feedback on shaking strength and effects and add your intensity data to the USGS Did You Feel It site.

MyShake won't protect you from building damage or disrupted infrastructure. You still need to reduce hazards in your home and workplace and store emergency supplies. It will give you a precious few seconds to make your ride through the earthquake safer and to mentally prepare for the shaking. It is your responsibility to think about what you should do in that time and respond appropriately. It's also important to be tolerant as the system is being developed. There are likely to be some alerts with no earthquakes. But each alert is an opportunity to practice your Drop, Cover and Hold On skills.

More information on the MyShake App at https://news.berkeley.edu/2019/10/17/california-rolls-out-first-statewide-earthquake-early-warning-system/ and http://seismo.berkeley.edu/blog/index.html

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