EARTHQUAKES

An earthquake is a sudden slipping or movement of a portion of the Earth's crust or plates, caused by a sudden release of stresses. Earthquake epicenters are usually less than 25 miles below the Earth's surface and are accompanied and followed by a series of vibrations.

The reason that earthquakes are such a risk is because shaking ground can:

- Cause buildings to move off of their foundations or collapse.
- Damage utilities, structures, and roads.
- Cause fires and explosions.
- Cause structural instability, such as dam failures that can trigger flash floods.

Earthquakes can also trigger landslides and avalanches or tsunamis. After an earthquake, it is important to listen for emergency instructions.

Together, all of these types of damage threaten lives, property, and the environment.

The greatest likelihood of a major earthquake is in:

- The Western United States, particularly along the San Andreas Fault in California and up the Alaskan coast.
- The New Madrid Fault Zone in Missouri.
- A few pockets on the east coast.

Some statistics about earthquakes include:

- Fifteen percent of the population lives in the zones of potential major disaster.
- California's 17 million people face the highest risk, followed by the residents of Washington State.
- Four million people are within the destructive reaches of the New Madrid Fault.
- Residents of Massachusetts, North Carolina, and South Carolina are also at risk.

EARTHQUAKES (CONTINUED)

Hundreds of tremors are felt each year, particularly in California. Major earthquakes are rare, however. Five major earthquakes have occurred in the last century in the United States. They occurred in:

- San Francisco, 1906 (2,000 lives lost).
- Alaska, 1964 (131 lives lost).
- San Fernando, California, 1971 (65 lives lost).
- Loma Prieta (Northern California), 1989 (66 lives lost).
- Northridge (Southern California), 1994 (61 lives lost).

There is no seasonal or yearly cycle of earthquake occurrence; earthquakes can happen at any time. Major earthquakes appear to occur in cycles of between 50 and 275 years. It is likely that an earthquake will hit California and perhaps other parts of the United States in the next decade or two.

An earthquake may last for seconds or minutes, while aftershocks may occur for months after the main earthquake.

Earthquakes are classified, based on the Richter Scale, as:

- Small: 5.0-5.9.
- Moderate: 6.0-6.9.
- Major: 7.0-7.9.
- Great: 8.0 or greater.

The Richter Scale has a logarithmic base, so each increment on the scale is multiplied by a factor of 10. For example, an earthquake of magnitude 8.6 would not be twice as violent as one of 4.3, but rather would be 10,000 times worse.

EARTHQUAKES (CONTINUED)

EARTHQUAKE SAFETY

It is recommended that you:

- Develop a home earthquake plan so that you know what to do during and after an earthquake.
- Conduct earthquake drills with your family or coworkers. Locate safe spots (e.g., under a sturdy table), and identify danger zones (e.g., near windows).
- Develop a plan for reuniting all family members after an earthquake occurs.
- Identify an out-of-state contact for family members to phone.
- Keep supplies on hand, including food and water for 3 days, a flashlight with extra batteries, a portable radio, a fire extinguisher, and tools.
- Store heavy and breakable objects on low shelves. Weed killers, pesticides, and flammable products should be stored on bottom shelves or in closed cabinets with latches. Chemicals will be less likely to create hazards if they are stored in lower, confined locations.
- Secure bookshelves, water heaters, and tall furniture to wall studs. Install latches on all cabinets, and anchor overhead lighting fixtures. Secure items that might fall, such as televisions.
- Have a licensed professional install flexible pipe to avoid gas or water leaks.
- Move beds away from windows.
- Move or secure hanging objects over beds, couches, and other places where people sit or lie.
- Keep shoes and a flashlight under the bed. Keeping shoes under the bed ensures quick access to prevent cutting feet on glass and reduces the risk that glass could fall into them.

You should hire a structural engineer to evaluate your home. Ask questions about home repair and strenthening for exterior features, such as porches, decks, sliding doors, canopies, carports, and garage doors.

EARTHQUAKES (CONTINUED)

To stay safe during an earthquake, you should:

- Drop, cover, and hold. Move only as far as necessary to reach a safe place. Most persons injured in earthquakes move more than five feet during the shaking.

- If indoors, stay there. Many fatalities occur when people run outside, only to be killed by falling debris from collapsing walls. It is safer to stay indoors until the shaking stops and it is safe to exit. When going outdoors, move quickly away from the building to prevent injury from falling debris.

- If outdoors, find a spot away from buildings, trees, streetlights and power lines, and overpasses. Drop to the ground and stay there until the shaking stops. Injuries can occur from falling trees, street lights and power lines, or building debris.

- If in a vehicle, pull over at a clear location and stop. Stay in the vehicle with seatbelt fastened until the shaking stops.

Provide the following tips based on the area in which you live:

- If in a high-rise building, expect the fire alarms and sprinklers to go off during an earthquake. Check for and extinguish small fires. Do not use the elevators.

- If in a coastal area, move to higher ground. Earthquakes often generate tsunamis.

- If in a mountainous area or near unstable slopes or cliffs, be alert for falling rocks and other debris that could be loosened by the earthquake. Also, watch for landslides that could be triggered by the earthquake.

EARTHQUAKES (CONTINUED)

After you have taken care of yourself, you should:

- Look for and extinguish small fires. Fire is the most common hazard following earthquakes. Extinguishing small fires and eliminating fire hazards will minimize the risk of a fire getting out of control.

- Clean up spills. By cleaning up medicines, bleaches, flammables, and other spills, it is possible to prevent many small but potentially dangerous hazardous-materials emergencies.

- Inspect the home for damage. Aftershocks can cause additional damage to unstable buildings. If there are major cracks in the chimney or foundation or if the home or utilities have been moved by the earthquake, get everyone out of the home. Take photographs of the home and its contents to document insurance claims.

- Help neighbors who may require assistance.

- Tune to the Emergency Alert System (EAS) for emergency information and instructions.

- Expect aftershocks. Aftershocks often occur minutes, days, or weeks following an earthquake. When aftershocks occur, drop, cover, and hold.

Earthquake Myths and Facts

Myth: **Fact:**	Use a doorway for protection during an earthquake. While doorways can provide adequate protection during small earthquakes, doorways should not be used for protection because: ▪ Not all doorways are built into the physical structure of a building. ▪ Many doorways are too large for children or shorter adults to use correctly for protection. ▪ Even if they are part of the building's structure, doorways can provide protection for only one person. ▪ Earthquakes with moderate to extreme ground motion can cause a person using a doorway to fall out of the doorway or become injured when attempting to get to the doorway.
Myth: **Fact:**	Animals can sense earthquakes and give advance warning. Animals may be able to sense the first low-frequency waves of an earthquake that occur deep within the Earth, but the damage-causing primary and secondary waves follow just seconds behind. Animals do not make good earthquake warning devices.
Myth: **Fact:**	Big earthquakes always happen in the early morning. Although several recent earthquakes have occurred in the early morning, others, including the 1990 Upland earthquake and the 1989 Loma Prieta earthquake, occurred in the afternoon. It's easy to remember earthquakes that fit the morning pattern and forget those that don't.
Myth: **Fact:**	Beachfront property in Arizona . . . The motion of the plates is horizontal, not vertical. California will not drop into the ocean, even following a great earthquake.
Myth: **Fact:**	Good building codes mean safe buildings. The tragedy of Kobe, Japan, is a good reminder that the best building codes in the world do nothing for buildings that were built before the codes were enacted. Fixing problems in older buildings is the responsibility of the building's owner.

Earthquake Myths and Facts

Myth:	Scientists can predict earthquakes.
Fact:	No scientist or university has successfully predicted an earthquake's time within days, nor do they expect to be able to do so in the near future.

Source: Southern California Earthquake Consortium, University of Southern California.

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