



Loss Control Department
Technical Information Paper Series

Preparing for Earthquakes

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Preparing for Earthquakes

What is an Earthquake?

An *earthquake* is a shaking of the earth that is volcanic or tectonic in origin. Though earthquakes do not occur frequently, they can be very disruptive because they affect very large areas and occur with no warning.

Earthquakes vary in duration. The shaking can be a single event of a few seconds, or it may be a series of events of varying duration. The series can occur over several hours, days, weeks, or even months.

Severe tremors that occur after the main seismic event can be particularly damaging, since structures may have already been weakened during the initial shake. These tremors also have a devastating effect on many people who have already gone through previous shaking.

The energy expended during an earthquake will vary depending on the location. It will affect structures differently depending on soil type, geological formation, the distance from the epicenter, the type of structure, and other factors.

Where Do Earthquakes Occur?

Most Americans think that earthquakes are limited to the West Coast. However, they occur in other areas of the country. Some areas are more likely to experience earthquakes than others.

Know the earthquake potential of the area in which the facility is located. Information about active fault zone locations is usually available through local municipal planning departments. Dangerous areas include:

- areas near fault lines
- soft, water-saturated soils, such as mud or artificial fill
- certain sands that liquefy and amplify shaking
- areas prone to settling or landslides.

When Do Earthquakes Occur?

Earthquakes occur without warning. Since it is not possible to predict an earthquake, all preparations must be done with the anticipation that an event may occur at any time.

Emergency Preparedness: Before the Earthquake

- Establish an Emergency Preparedness Plan (EPP) that takes prevention, emergency response, and disaster recovery into consideration. If an EPP is already in place, review and update it as needed for earthquake readiness.
- Designate an Emergency Coordinator and an EPP Team. Assign responsibility to specific employees for advance arrangements to initiate the plan.
- Develop a contingency plan to allow for continued business operations.
- Conduct a hazard assessment and safety appraisal of the facility and its operations. Upgrade deficient areas.
- Upgrade the facility to current earthquake codes.
- Inspect tanks, stacks, signs, and chimneys for deterioration and bracing. Repair and strengthen as necessary.
- Identify and designate safe shelter areas in the structures.
- Identify and designate at least two evacuation routes for all areas.
- Brace all tall shelves and cabinets, tall machinery and equipment, or any top-heavy objects that could topple.
- Brace and support overhead-mounted fixtures, suspended ceilings, piping, heaters, and other overhead-mounted devices.
- Provide flexible fuel supply connectors.
- Bolt down and secure fuel-fired appliances.
- Provide isolation valves for piping systems.
- Provide adequate support for mainframe computers.
- Provide alternate energy sources for vital equipment and services.
- Provide auxiliary equipment and energy supplies for critical services such as communications and lighting.
- Plan for continuous plant security.
- Plan for customer and client awareness and communications.
- Provide an alert and warning system for all personnel on the premises.

Emergency Response: During the Earthquake

Most earthquakes last only a few seconds to a couple of minutes. There's not much time to do anything other than sound an alarm to warn all personnel to seek cover in the designated safe areas.

Emergency Recovery: After the Earthquake

It is important to know that aftershocks can occur after the main event. They can be as strong as the main event, but they usually diminish in strength. However, *extreme caution must be exercised*, since structures may have been weakened during the initial shaking.

- Be prepared for aftershocks.
- Shut down equipment and evacuate the building.
- Stay out of the building until the aftershocks have ceased and the building has been inspected and declared safe.
- Conduct a roll call of all personnel on site (including visitors).
- Inspect the structure.
- Shut off all leaking utilities.
- Inspect all utilities and turn off those that are damaged.
- Do not use open flame in enclosed areas where flammable gases may be present.
- Brace, relocate, or remove any hazards that could fall during aftershocks.
- Document the damage.
- Communicate with employees and customers to keep them apprised of the damage and organizational progress.
- Begin salvage operations.

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