

Earthquake Emergency Response Plan



Earthquakes are devastating. Even at low magnitudes, earthquakes can cause heavy or tall items to fall or topple over resulting in damage to property, equipment and machinery, and even employee casualties.



Unlike hurricanes and some other natural hazards, earthquakes strike suddenly and without warning. For a business owner or risk manager, investing in strong buildings, as well as bracing or anchorage of non-structural elements within a building, can reduce the risk of damage and, more importantly, reduce casualties and even save lives.

An Emergency Response Plan is an important tool to help reduce the impact of damage of a natural hazard to your property, business and employees. This Earthquake Emergency Response Plan details some actions to consider before, during, and after an earthquake to help reduce damage, restore operations and protect lives.





PREPARATION PHASE (BEFORE THE EARTHQUAKE)

| ACTION | DETAIL | | |
|---------------------------------------|--|--|---|
| Check your exposure | Earthquake exposure can be determined using local or national earthquake hazard maps and building codes. | If your location shows a high exposure, develop an earthquake emergency and disaster recovery plan to | prepare your business and employees to survive and recover from an earthquake. |
| Prepare your buildings and facilities | <p>Depending on when and how they were designed, built and furnished, your buildings may have weaknesses that make them more vulnerable to earthquakes.</p> <p>Consider the following elements to help mitigate earthquake related losses:</p> <p>Structural elements</p> <ul style="list-style-type: none"> • Have a qualified structural engineer evaluate your property, particularly for older buildings that were designed based on older versions of the building code. • The structural design review must propose strengthening strategies for any weaknesses identified in the structure. The structural engineer must consider non-structural elements in the evaluation process. <p>Non-structural elements</p> <p>Non-structural weaknesses can be more dangerous, costly and disruptive as structural vulnerabilities during an earthquake. Secondary damage, such as water damage or gas release due to ruptured piping, or the collapse of unreinforced masonry walls onto equipment, can occur even at low shaking levels.</p> | <ul style="list-style-type: none"> • Brace or anchor heavy machinery, containers, tanks, stock and appliances that could shift, fall, hurtle or rupture during an earthquake. • Ensure that unreinforced masonry walls are strengthened according to the engineer’s recommendations. • Anchor filing cabinets, mirrors or pictures to wall studs. • Lock the rollers of large pieces of furniture. Attach computers and towers to desks. Secure ceiling lights and false ceilings to joists. • Design firefighting installations (pumps, water tanks, piping etc.) to be earthquake resistant. • Apply safety film to windows and glass doors, especially where breakage could cause the most injuries or damage. • Ensure enough gap around pipes at penetrations through walls. | <p>Emergency readiness</p> <ul style="list-style-type: none"> • Form an emergency response team of employees responsible for evacuation, shut-down of utilities (power, natural gas), firefighting equipment checks, evacuation procedures, first aid training, drills, and internal and external communication in the event of an earthquake. • Prepare a document of contacts for authorities, construction material suppliers, building contractors, loss adjustors, insurance providers and other agencies in the event of an earthquake. • Having qualified personnel install a main gas shut-off device and flexible connections on gas appliances. Ensure these devices are regularly maintained. Discuss and post directives for employees on how and when to shut off gas, electricity and water. Keep any necessary tools, such as wrenches, close by. |
| Prepare your workforce | <p>Prepare your employees about what to do during and directly following an earthquake. This should include:</p> <ul style="list-style-type: none"> • Evacuation procedures, emergency escape routes and congregation points. | <ul style="list-style-type: none"> • Establish clear shut-down procedures as part of an earthquake scenario. • Expected behavior such as, ‘drop, cover, and hold on’. | <ul style="list-style-type: none"> • Speak to employees with disabilities to see if any special preparations need to be arranged. • Hold earthquake drills to give employees opportunities to practice this protocol. |



PREPARATION PHASE (BEFORE THE EARTHQUAKE)

Location selection

Avoidance of earthquake exposure begins with location choice. Consider the following when choosing the location of a facility or building:

- Avoid building in proximity of known fault zones or along coasts exposed to tsunamis. Consider terrain prone to landslides and landfill that could suffer significant settlement or liquefaction.
- Consider proximity to nearby exposures, such as natural gas pipelines or petrochemical plants.
- Consider access. Transportation infrastructure is often damaged during earthquakes – does your property or facility have alternative means of access?
- If the structure is going to be constructed in a known seismic zone, ensure the design, detailing, and construction are performed according to the highest requirements of the national design code or the highest international standards.
- Ensure all critical contents, e.g. piping, firefighting systems, and emergency generators, are also designed for seismic forces (i.e. anchored and braced). Such components are usually off-the-shelf and sourced based on cost.

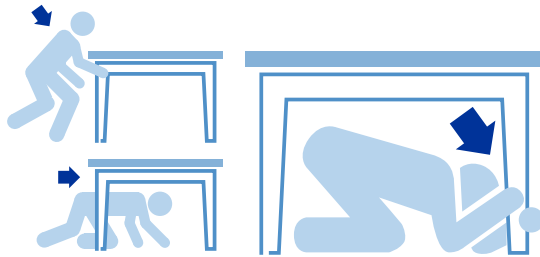




RESPOND PHASE (DURING THE EARTHQUAKE)

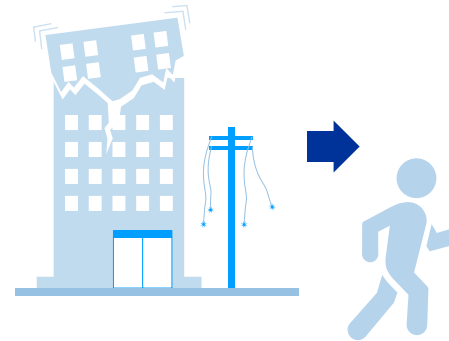
Inside a building

Move away from windows and doors. Drop to the floor, take cover under a sturdy table or desk against an inside wall. Grasp one of its legs while covering your head with your other arm. Expect fire alarms and sprinklers to go off. Do not use elevators. Stay inside until the shaking stops. DO NOT run outside.



Outside

If possible, move into a clearing, away from power lines, trees and buildings. Drop to the ground and wait for the shaking to stop. If you are near slopes, cliffs or mountains, be alert for falling rocks and the possibility of landslides.



Driving

Pull to the side of the road away from traffic, road signs and power lines. Avoid stopping on or under bridges. Stay in your seat with your seatbelt fastened until the shaking stops. If you resume driving, beware of possible damage to the road.

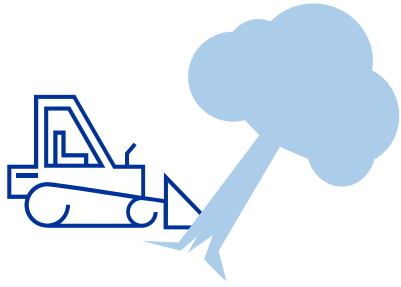


How to stay safe after an earthquake¹

- Expect aftershocks to follow the largest shock of an earthquake.
- Check yourself for injury and provide assistance to others if you have training.
- Do not enter damaged buildings.
- If in a damaged building, go outside and quickly move away from the building.
- Save phone calls for emergencies.
- If you are in an area that may experience tsunamis, go inland or to higher ground immediately after the shaking stops.
- If you are trapped, cover your mouth. Send a text, bang on a pipe or wall, or use a whistle instead of shouting so that rescuers can locate you.
- Use extreme caution during clean-up of buildings and debris. Do not attempt to remove heavy debris by yourself. Wear protective clothing, including a long-sleeved shirt, long pants, work gloves, and sturdy, thick-soled shoes during clean-up.
- Once safe, monitor local news reports via battery operated radio, TV, social media, and cell phone text alerts for emergency information and instructions



¹ www.ready.gov/earthquakes



RECOVERY PHASE (AFTER THE EARTHQUAKE)

Business continuity planning should spell out procedures to organize your recovery following an earthquake.

The plan should address business interruption risks and the loss of essential utilities and services (e.g. power, water supply), restricted access to your site or neighborhood, and anything that could increase the risk of secondary effects (e.g. fire, gas release, water damage).



The plan also should encompass the following:

- Plans for an inventory of damage.
- Gradual and safe restoration of essential services, e.g. power, gas.
- Assessment and repair of fire protection systems. For example, inspection of pipe damage, ensuring sprinkler and hydrant valves are open and fire water supply is in service. Prohibit hot work until fire protection is restored.
- Assessment of what utilities exist, what can be restored, and expected downtime.
- Priorities for other repairs.
- Contact procedures for suppliers (to find out availability of supplies after an event).
- Communication procedures with customers to inform them of delays or reductions in your capabilities.
- Easy access to up-to-date contacts with external contractors critical for damage assessment, repairs and resumption of operations. After an earthquake, regional demand for key technical and repair personnel often outstrips demand.

After the resumption of operations, it is important to review the emergency response plan and implement any lessons learned. Note which parts of the plan have worked well and which need to be updated.

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