



## Affordable, effective ways to protect your business from earthquake damage

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Unlike most other natural disaster events, earthquakes have no season: they can cause devastation any time of the year and without warning. Businesses in earthquake-prone areas need to be prepared for an earthquake year-round.

As the foundation of the building moves to follow the ground motion caused by an earthquake, the building structure tries to follow along and the result is that large inertial forces are generated by the movement of the mass of the building's walls, floors, roof and contents. The lateral forces caused by side-to-side motion are usually the most damaging. To survive an earthquake, your building's structure must absorb the energy associated with these inertial forces and provide a stable path to transfer these forces back into the ground.

Your building is more likely to pass this test when its structural system is properly designed to resist lateral loads and detailed to absorb the energy. That is, when the roof and floor systems are properly connected to the walls and/or structural frame and the walls and/or structural frame are properly designed and anchored to a strong foundation.

To determine your building's risk for structural damage from an earthquake, complete the [Earthquake Risk Assessment](#), which is part of IBHS' *Open for Business®* Property Protection Checklist. While, major changes to your building's structure may be quite costly and time-intensive, other retrofits that are intended to reduce non-structural damage, as well as damage to water, gas and power systems can be quite effective in maintaining the functionality of the building during earthquakes that produce ground motion below the design level.

If you decide to retrofit your structural system, the best time is when you are making a significant change such as remodeling or residing the exterior. Be sure to enlist the help of a knowledgeable structural engineer to both assess the vulnerability of your structural system and to design the retrofits. A list of possible structural retrofits can be found on [www.DisasterSafety.org](http://www.DisasterSafety.org). If you rent your business space, you may not have the authority to make structural changes to your building. Speak with your building manager or landlord about what actions might be taken to strengthen your building so that it can better resist a potential earthquake.

According to the California Seismic Safety Commission, the foundation and superstructure only account for approximately 20 percent to 25 percent of the original construction cost of a building, while the other 75 percent to 80 percent is made up of mechanical, electrical and architectural elements within the building. It is, therefore, extremely important to take measures to protect the interior elements and systems, both for life safety reasons and to reduce financial losses due to property damage.



The simple measures outlined below can be taken to reduce the risk of personal injury and property damage from non-structural sources.

1. Fasten bookcases and cabinets to nearby walls when possible, or stabilize central bookcases by attaching them back-to-back to each other. Further reduce spillage by affixing self-locking latches to cabinet drawers or doors.
2. Secure heavy decorations and electronic equipment to the floor or table surface with braces, hook and loop closures, or heavy glue to prevent overturning.
3. Secure picture frames and bulletin boards to the wall using closed screw-eyes to prevent falling.
4. Provide an extra layer of protection against falling hanging fixtures (lights, chandeliers, ceiling fans, etc.) and suspended ceilings by attaching safety cables and straps.
5. Have any storage racks and shelves that hold large amounts of supplies or heavy articles braced to withstand side-to-side movement and make sure they are well anchored to the floor.
6. Use a protective film on all glass windows, doors and walls to prevent shattering, which can cause serious injury.
7. Replace rigid supply lines and couplings for plumbing, natural gas and sprinkler systems with flexible ones to reduce the chance of rupture.
8. Ensure the hangers supporting your mechanical and plumbing systems are less than 12 inches long to reduce the sway during a tremor.
9. Brace major appliances, such as boilers, furnaces and water heaters to the wall and/or floor to prevent overturning or shifting.

## Data Centers

Bracing the expensive equipment in your data center poses new problems. Because of the sensitive nature of the equipment, rigid bracing techniques could result in damage from excessive shaking of the equipment during an earthquake. There are several unique solutions on the market, some of which isolate the most sensitive components, others of which utilize specialty storage racks that gently move in the opposite direction that the ground is shaking to provide a stable surface for the equipment. IBHS recommends meeting with your Information Technology specialist and engineers who are specialists in this area to determine a solution that best fits your company's needs.

For additional information about earthquakes including more detailed project instructions, visit [www.DisasterSafety.org](http://www.DisasterSafety.org).