

Anchor Equipment Properly

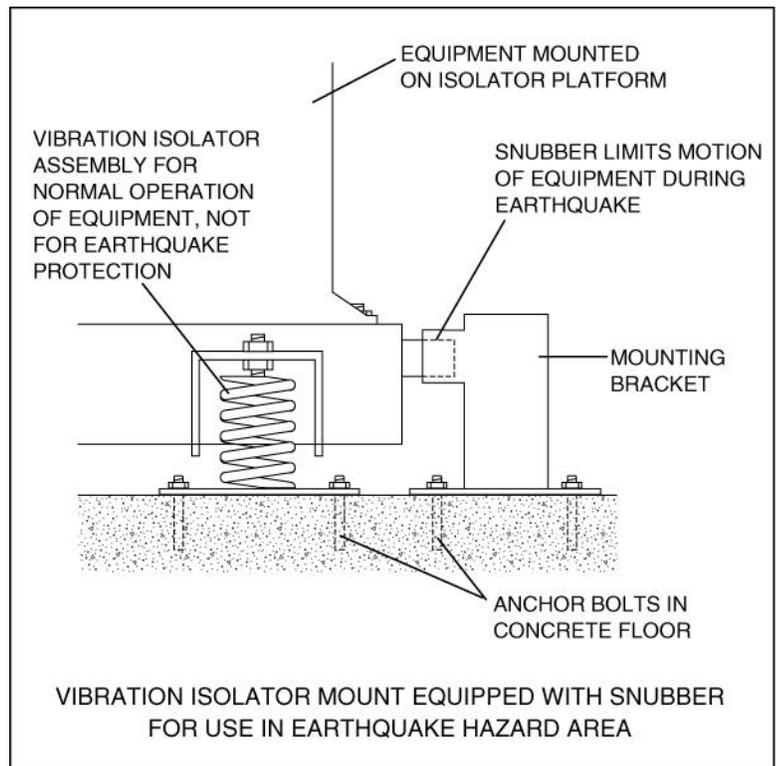


FEMA

PROTECTING YOUR PROPERTY FROM EARTHQUAKES

To control the vibrations created by heavy equipment, many property owners install such equipment on spring-loaded platforms or mounts known as vibration isolators. Isolators are designed to absorb the vibrations created by the normal operation of the equipment, but not the excessive movement that can occur during an earthquake. Earthquake forces, coupled with the weight of the equipment, can stretch the isolator springs beyond their ability to rebound. As a result, the isolators can fail, equipment can be overturned, utility line connections can be broken, and workers may be injured.

In earthquake hazard areas, anchoring equipment directly to the floor or another suitable part of the building is preferable to mounting equipment on vibration isolators. If isolators are used, they should be securely anchored and they should be equipped with “snubbers.” Snubbers limit the motions resulting from normal operation of the equipment and prevent the equipment from moving beyond the limits of the springs during earthquakes.



BENEFITS OF UTILIZING THIS MITIGATION STRATEGY

- Helps to prevent the failure of isolators, which can result in equipment overturning
- Helps to prevent broken utility line connections
- Helps to prevent injuries to occupants

TIPS

Keep these points in mind when you anchor heavy equipment:

- ✓ The multi-purpose isolator system shown in the figure is designed to absorb equipment vibrations resulting from normal operations and to prevent excessive motion during an earthquake. Systems of this type can be used for newly installed equipment and as replacements for existing isolator systems that do not include snubbers or other restraints.
- ✓ Equipment mounted on vibration isolators must be able to move freely. Be sure to use flexible connections wherever utility lines, piping, and ductwork are attached to the equipment.

- ✓ Before anchoring equipment to floors or walls, make sure they are strong enough to resist earthquake forces.
- ✓ Tall pieces of equipment with narrow bases are more likely to overturn during earthquakes and will therefore need additional anchoring.
- ✓ Equipment suspended from the ceiling must also be braced to resist earthquake forces.
- ✓ The equipment manufacturer or dealer may be able to provide or recommend mounting methods and hardware for use in earthquake hazard areas.

ESTIMATED COST

The cost of anchoring a piece of heavy equipment will depend on its size, weight, location, and operation; the type and number of utility lines connected to it; and the anchoring method used (e.g., rigid connectors or vibration isolators).

OTHER SOURCES OF INFORMATION

FEMA 74, *Reducing the Risks of Nonstructural Earthquake Damage: A Practical Guide*, Third Edition, September 1994, <http://www.fema.gov/library/viewRecord.do?id=1574>.

FEMA 547, *Techniques for the Seismic Rehabilitation of Existing Buildings*, February 2007, <http://www.fema.gov/library/viewRecord.do?id=2393>.

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