Protecting Your Property From Earthquakes

Federal Emergency Management Agency

Are You at Risk?

If you aren't sure whether your house is at risk from earthquakes, check with your local building official, city engineer, or planning and zoning administrator. They can tell you whether you are in an earthquake hazard area. Also, they usually can tell you how to protect yourself and your house and property from earthquakes.

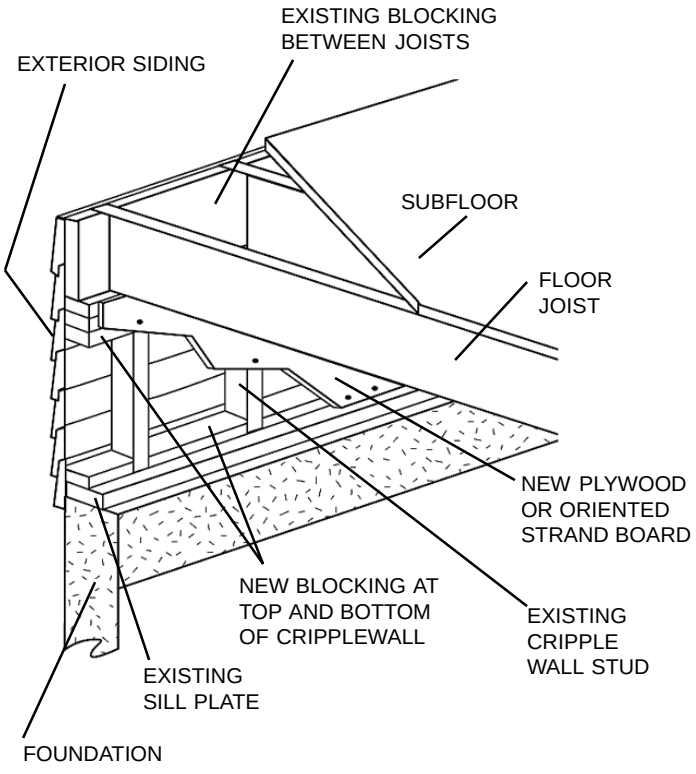
What You Can Do

Earthquake protection can involve a variety of changes to your house and property — changes that can vary in complexity and cost. You may be able to make some types of changes yourself. But complicated or large-scale changes and those that affect the structure of your house or its electrical wiring and plumbing should be carried out only by a professional contractor licensed to work in your state, county, or city. For a house built on a cripple wall foundation, one example of earthquake protection is bracing the cripple wall to increase structural stability. This is something that skilled homeowners can probably do on their own, provided they obtain any necessary permits.

Brace Cripple Walls

Some houses are built on cripple walls. As shown in the figure, a cripple wall is a short wall that rests on the foundation and supports the floor and exterior walls. If the cripple wall is not braced, it can shift during an earthquake. When this occurs, there is a greater likelihood that the house will be severely damaged and that anyone inside will be injured.

If your house is built on cripple walls, one way to increase its stability and reduce earthquake damage is to brace the cripple walls. In this method, horizontal blocking that consists of 2" by 4'' boards is added between the vertical studs at the top and bottom of the cripple wall and, if necessary, at other locations between the studs. New vertical studs can also be added if necessary. Plywood or oriented strand board is then nailed to the interior face of the cripple wall. Also, nails are added through the existing blocking between floor joists to ensure that the floor is securely attached to the cripple wall.



Brace Cripple Walls

Tips

Keep these points in mind when you brace cripple walls:

- ✓ Check with your local building officials to see whether you need a permit to do this work.
- ✓ Before adding any bracing, check to see whether the sill plate below the cripple wall is bolted or otherwise anchored to the top of the foundation. If it is not, you should consider having bolts or anchors added. Any anchoring of the sill plate should be done before you add bracing. For more information, refer to the separate earthquake protection fact sheet titled *Bolt Sill Plates to Foundation*.

Estimated Cost

Bracing a 2-foot-high cripple wall will cost about $1.50 per linear foot of wall. For example, a house measuring 60 feet by 30 feet will have a perimeter of 180 feet. So the cost for that house would be about $270. This figure covers only the materials you will have to buy and excludes the cost of any tools you use, building permit fees, and the value of your time. This figure also excludes the cost of having a contractor anchor your sill plates. Also, bracing higher cripple walls may require more lumber and therefore may be more expensive.

Other Sources of Information

Seismic Retrofit Training for Building Contractors and Building Inspectors: Participant Handbook, FEMA, 1995

Reducing the Risks of Nonstructural Earthquake Damage: A Practical Guide, FEMA-74, 1994

Protecting Your Home and Business from Nonstructural Earthquake Damage, FEMA, 1994

To obtain copies of these and other FEMA documents, call FEMA Publications at 1-800-480-2520. Information is also available on the World Wide Web at **http//:www.fema.gov.**