

# Bolt Sill Plates to Foundation

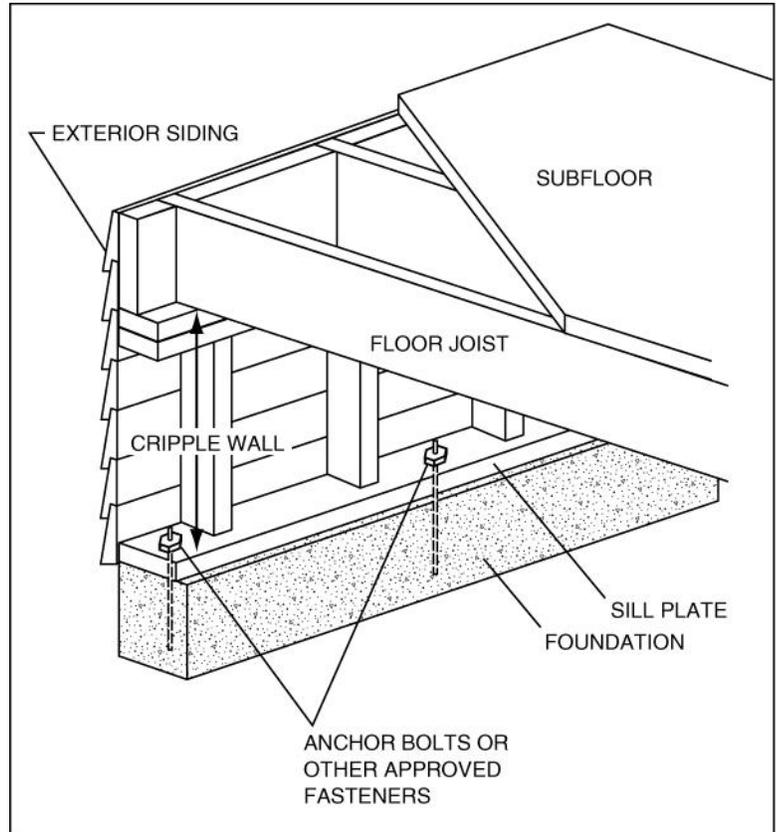


FEMA

## PROTECTING YOUR PROPERTY FROM EARTHQUAKES

As shown in the figure, the sill plate of a structure rests directly on top of the foundation. (This figure shows the sill plate for a structure built on a cripple wall and crawl space foundation, a type of construction that is especially susceptible to earthquake damage.) If the sill plate is not securely anchored, an earthquake can cause it to slide with respect to the foundation. When this occurs, there is a greater potential for severe damage as well as injury to you and others.

One way to increase the stability of your property and reduce earthquake damage is to have the sill plate bolted or otherwise anchored to the foundation. In the method shown in the figure, bolts long enough to pass through the sill plate and penetrate several inches into the foundation are installed every few feet along the base of the exterior walls. This method is not limited to cripple wall construction; it can also be used for a structure built on a basement or slab-on-grade foundation or on another type of crawl space foundation.



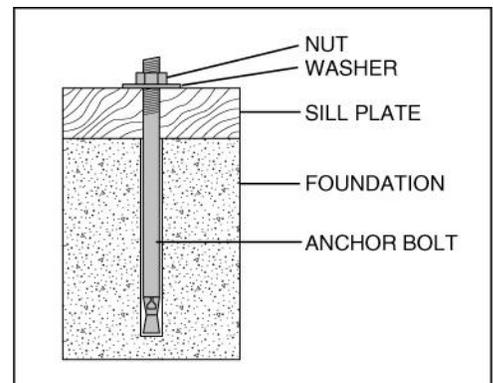
## BENEFITS OF UTILIZING THIS MITIGATION STRATEGY

- Helps to prevent a structure from shifting, which can result in severe damage
- Helps to prevent injuries to occupants

## TIPS

Keep these points in mind when you have the sill plates bolted to the foundation:

- ✓ Modifications to the foundation must be done by a licensed contractor, who will ensure that the work is done correctly and according to all applicable codes. This is important for your safety.
- ✓ Anchor bolts are usually installed no more than 6 feet apart. The work involved is likely to be extensive and may require that portions of the walls or floor be cut away temporarily.
- ✓ Your contractor may be able to recommend an alternative anchoring method based on other approved fasteners or connectors that can be installed with fewer changes to your property and less work.



- ✓ If your property is built on cripple walls, you should consider bracing them after the sill plates are bolted. For more information, refer to the separate earthquake protection fact sheet titled “Brace Cripple Walls.”

## ESTIMATED COST

Having a contractor bolt the sill plates to the foundation will cost approximately \$50 to \$75 per bolt, depending on the type of foundation you have. For example, a structure measuring 60 feet by 30 feet would have a perimeter of 180 feet and would therefore require a minimum of 30 bolts (if the bolts are placed no more than 6 feet apart). So the cost for that structure would be about \$1,500 to \$2,250.

## OTHER SOURCES OF INFORMATION

*Brace Cripple Walls* Fact Sheet, FEMA, April 2008, <http://www.fema.gov/plan/prevent/howto/index.shtm>.

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 232, *Homebuilders' Guide to Earthquake-Resistant Design and Construction*, June 2006, <http://www.fema.gov/library/viewRecord.do?id=2103>.

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