

1 How to: Bolt Your Foundation

The first step to take if you find your home does not have anchor bolts, or has too few, is to install them! Bolting the mud sill to the foundation is one of the most cost-effective ways to protect your property from severe structural damage and one of the best investments you can make in your real estate "nest egg." Anchor bolts cost as little as \$2 each (depending on size) so the perimeter of the average size home can be bolted for a couple of hundred dollars. To install them, follow the procedure below.

\$200 in bolts can prevent many thousands of dollars of earthquake damage.



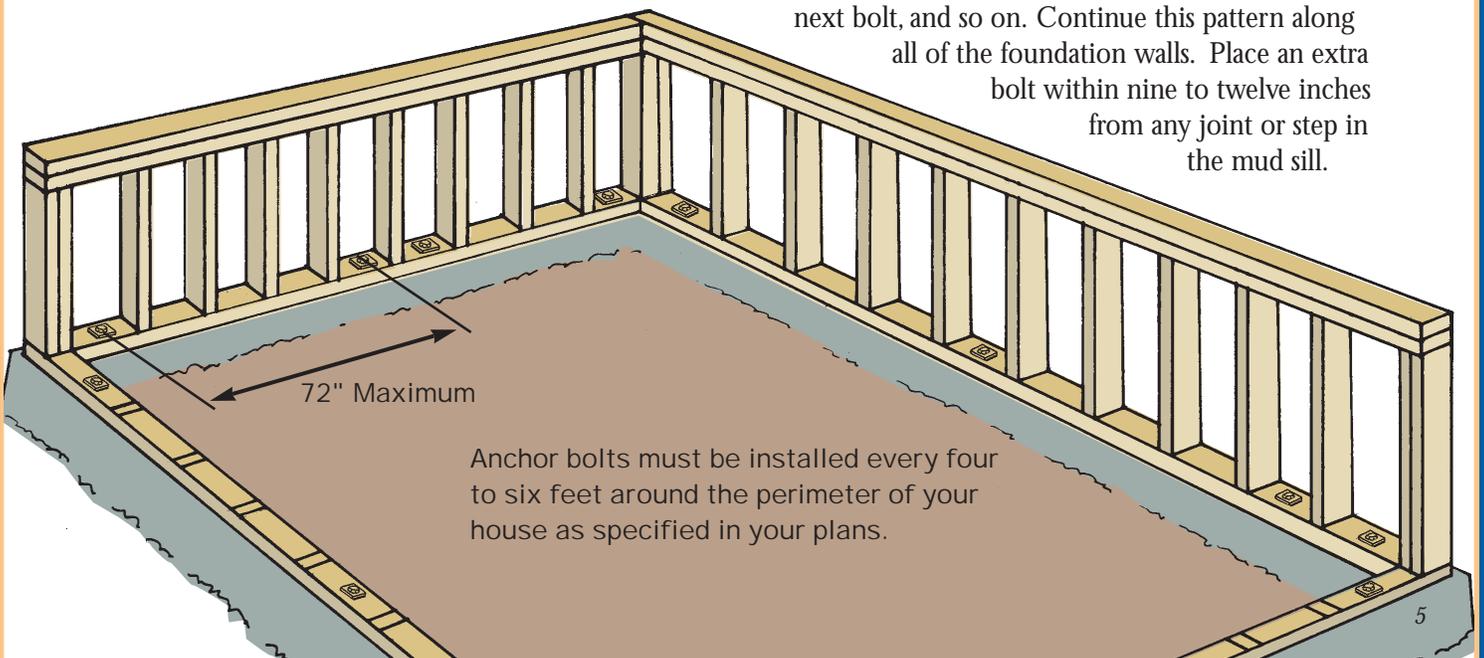
*Chemical anchors are the preferred option. (see page 6)

Checklist

- ✓ 1/2" or 5/8" diameter foundation bolts that are at least 7" long with nuts and square plate washers*
- ✓ Rotary hammer drill with an appropriately-sized carbide tip drill bit
- ✓ Short-handled sledge hammer for setting the bolts
- ✓ 3/8" diameter flexible plastic tubing
- ✓ Adjustable wrench
- ✓ Measuring tape and chalk line
- ✓ Dust mask and protection for eyes and ears
- ✓ Torque wrench

1. Measure & Mark

Mark the places for each bolt on the mud sill. Make the first mark between nine and twelve inches from the corner, and then measure another four to six feet for the next bolt, and so on. Continue this pattern along all of the foundation walls. Place an extra bolt within nine to twelve inches from any joint or step in the mud sill.



Anchor bolts must be installed every four to six feet around the perimeter of your house as specified in your plans.

2. Drill the holes

Using the rotary hammer drill equipped with an appropriately-sized carbide bit, drill down through the mud sill at least five inches into the concrete. Pay special attention to the tool's operating instructions before drilling.



3. Clean the holes

Use flexible tubing to gently blow the concrete dust out of the hole. (This is especially important if you are using chemical anchors.)



4. Install the bolts

Expansion bolts are designed to be hammered into place. This can be done without damaging the bolt's threads by turning the washer and nut past the end of the bolt and tapping on the end of the bolt shaft to hammer the assembly into place. Once the bolt is in place, tighten the nut down firmly using an adjustable wrench.



Expansion Bolts

When you tighten the nut on an installed expansion bolt, the bolt's other end expands to grip the concrete. When the bolt is inserted properly, you will actually feel it "grab" the foundation as you tighten the nut. Test at least one out of every four new bolts for tightness with a torque wrench applying 40 foot-pounds of pressure.

Chemical Anchors (epoxy bolts)

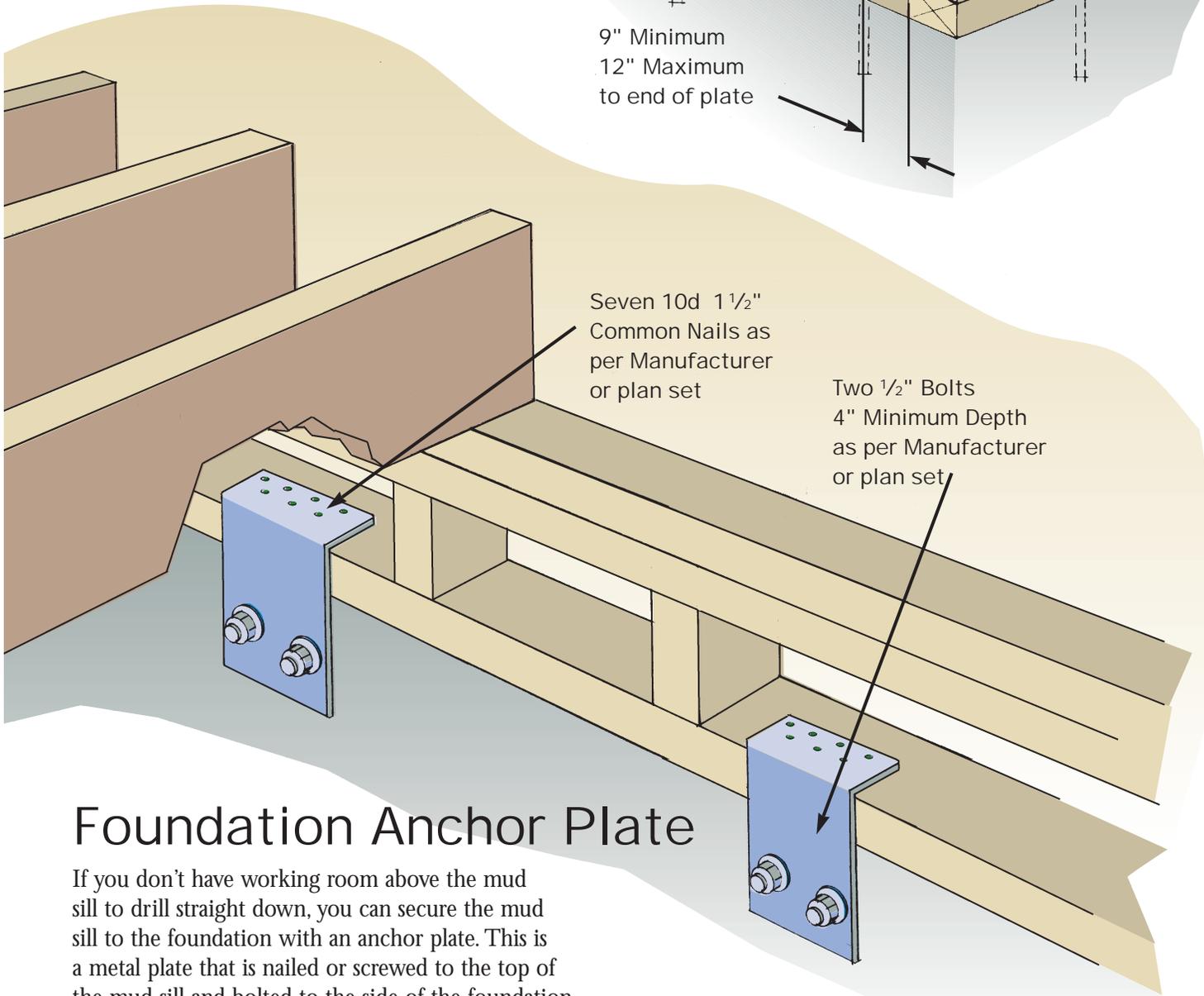
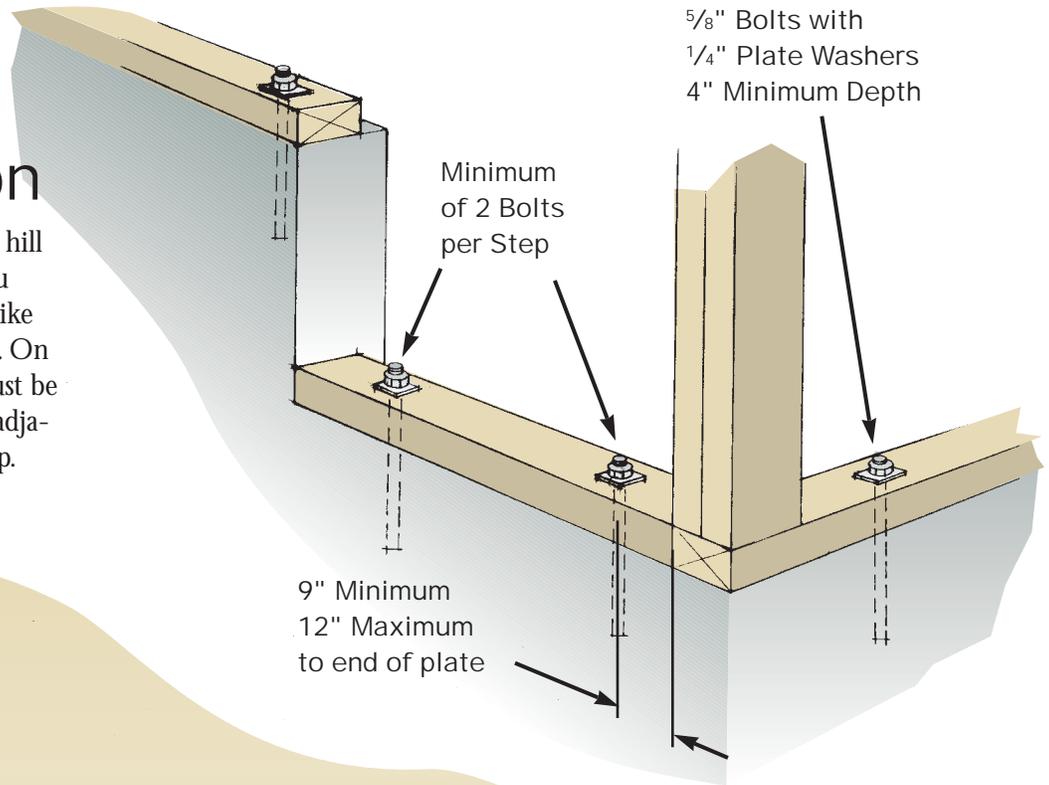
If you have an older foundation and worry about cracking it with the pressure of expansion bolts, consider using chemical anchors (also called epoxy bolts). Always follow the manufacturer's installation instructions. Measure, drill and clean the holes per the manufacturer's instructions. Be careful not to drill deeper than the bolt's length. Before you place the bolt in the hole, inject the epoxy mixture into the hole.

Press the bolt into place and wait for the epoxy to harden (usually 24 hours). Once the epoxy has hardened, tighten the nut with an adjustable wrench until the washer just begins to indent the wood mud sill. Chemical anchors can be a bit more time-consuming to install. However, they are very effective, and are the preferred method.



Stepped Foundation

If your house is built on a hill or even a slight grade, you probably have some step-like offsets in your foundation. On every step the mud sill must be bolted down, even if it is adjacent to another bolted step.



Foundation Anchor Plate

If you don't have working room above the mud sill to drill straight down, you can secure the mud sill to the foundation with an anchor plate. This is a metal plate that is nailed or screwed to the top of the mud sill and bolted to the side of the foundation.