

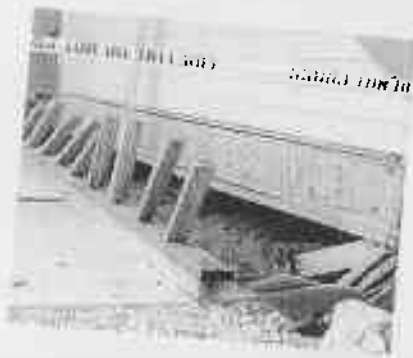
Checklist

- ✓ 1/2" CDX five-ply plywood (do not use "shop-grade" plywood)
- ✓ 8-penny or 10-penny common nails
- ✓ Drill
- ✓ Saw
- ✓ Hammer
- ✓ Nail gun
- ✓ Measuring tape
- ✓ Chalk line
- ✓ Dust mask and protection for eyes and ears

Bolts are not enough

Even when your house is bolted to its foundation, the sideways (lateral) force of an earthquake can make the weakest part of your house (typically the cripple walls) buckle and collapse.

Plywood sheets should be nailed to the cripple walls on all sides of your house. These sheets create "shear panels" that give the house lateral strength. Old-fashioned 2x4 or 2x6 cross-braces and horizontal siding are not strong enough to resist earthquake forces.



2 How to: Reinforce Walls with Plywood

1. How much and where?

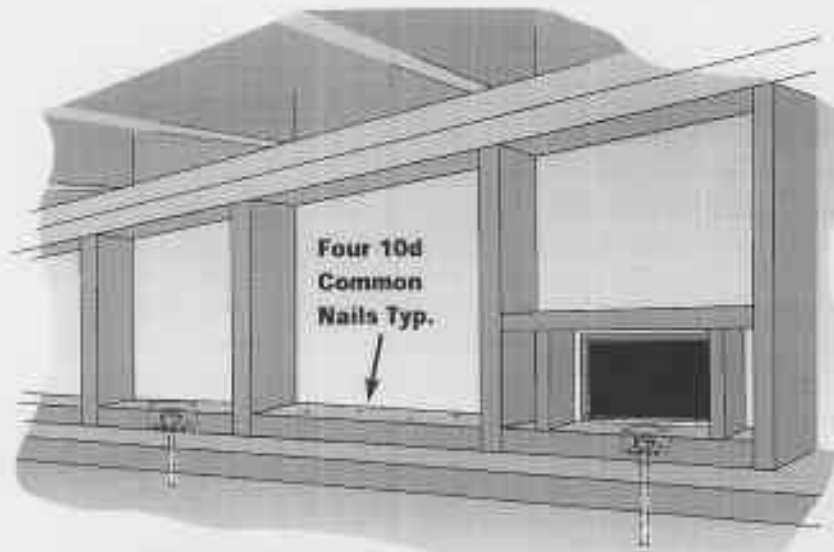
Determine the number and size of plywood braced panels you will need and where they should be placed. The number and length of panels needed will depend on the height and the length of each section of cripple wall and how many stories the cripple wall supports. For all houses, panels should be placed at both ends of each cripple wall section. For a single-story house, additional panels should be spaced evenly so that not less than 50 percent of the total length of each cripple wall section is braced. For two-story houses, panels should be spaced to cover not less than 80 percent of each cripple wall section. For optimum strength, use the longest piece of plywood possible; avoid using multiple pieces of plywood to form your four to eight foot panels. The distribution of plywood panels should be "balanced" by keeping the panels approximately equal in length and as evenly spaced as your condition allows. For example, a cripple wall which is 52 feet long and 12 inches in height in a single-story house would require a minimum of 26 feet of braced panels. A typical solution would be a 4 foot plywood panel at each end and three 6 foot panels evenly spaced between the end panels.

2. Measure, Mark and Cut

To provide adequate strength, each plywood sheet must be nailed along all edges, and along the interior studs. In most cases, the cripple wall studs are flush with the mud sill and with the "top plates" (located at the top of the cripple wall). This provides an even nailing surface for each plywood edge. However, if the cripple wall is set back from the edge of the mud sill, you will have to add blocking between the wall studs to create a nailing surface for the plywood.

Measure the height from the top of the double top plate to the bottom of the mud sill. If your condition requires blocking above the mud sill, then measure to the bottom of the cripple studs. Cut the plywood so that it covers this area and reaches from the center of one stud to the center of another. Mark the center of each stud on the foundation and above the top plates. These marks will provide a nailing guide. Remember, you must nail the plywood securely to all studs at the specified nail spacing. Also, note the location of any pipes so you can cut rounded notches in the plywood to fit around them.

Shear Panels & Cripple Walls

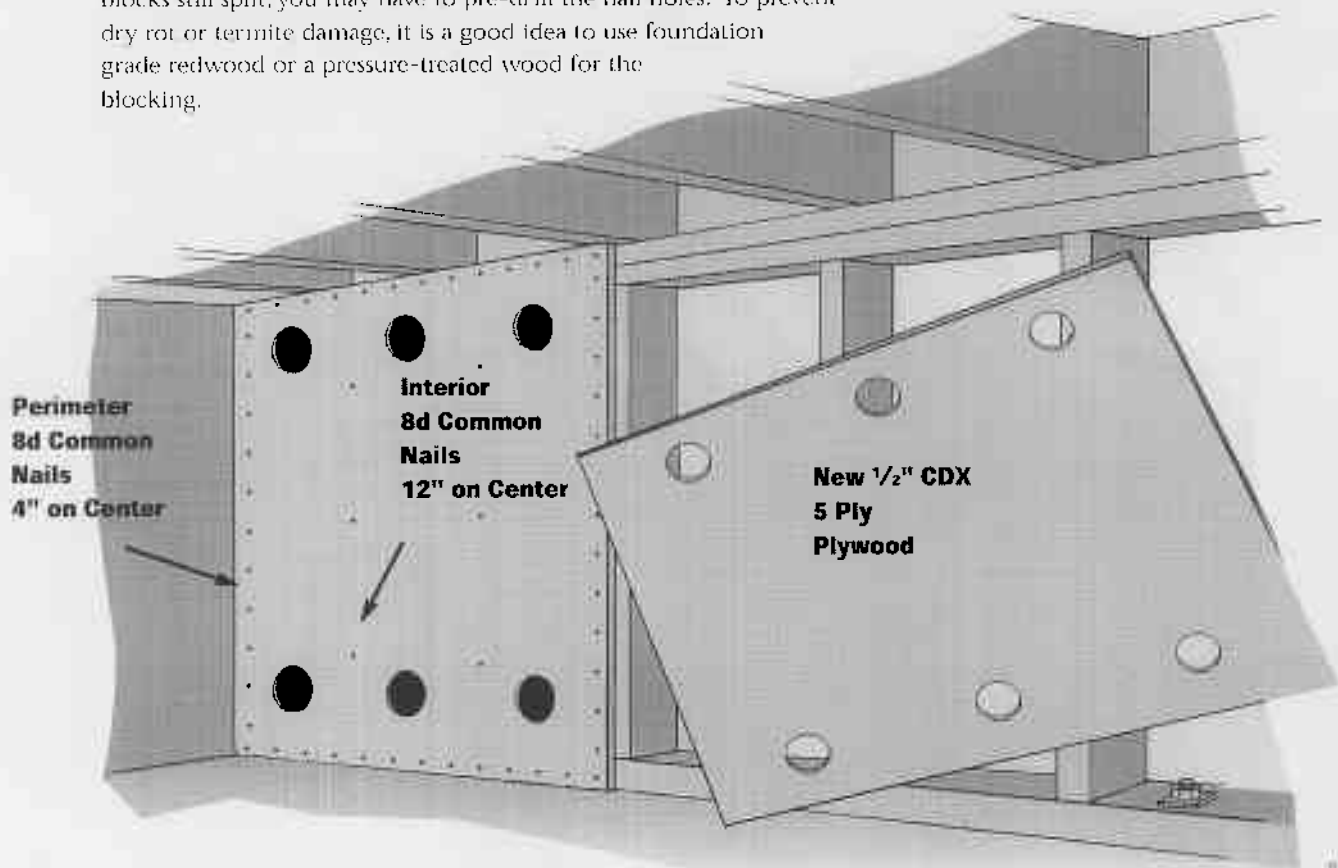


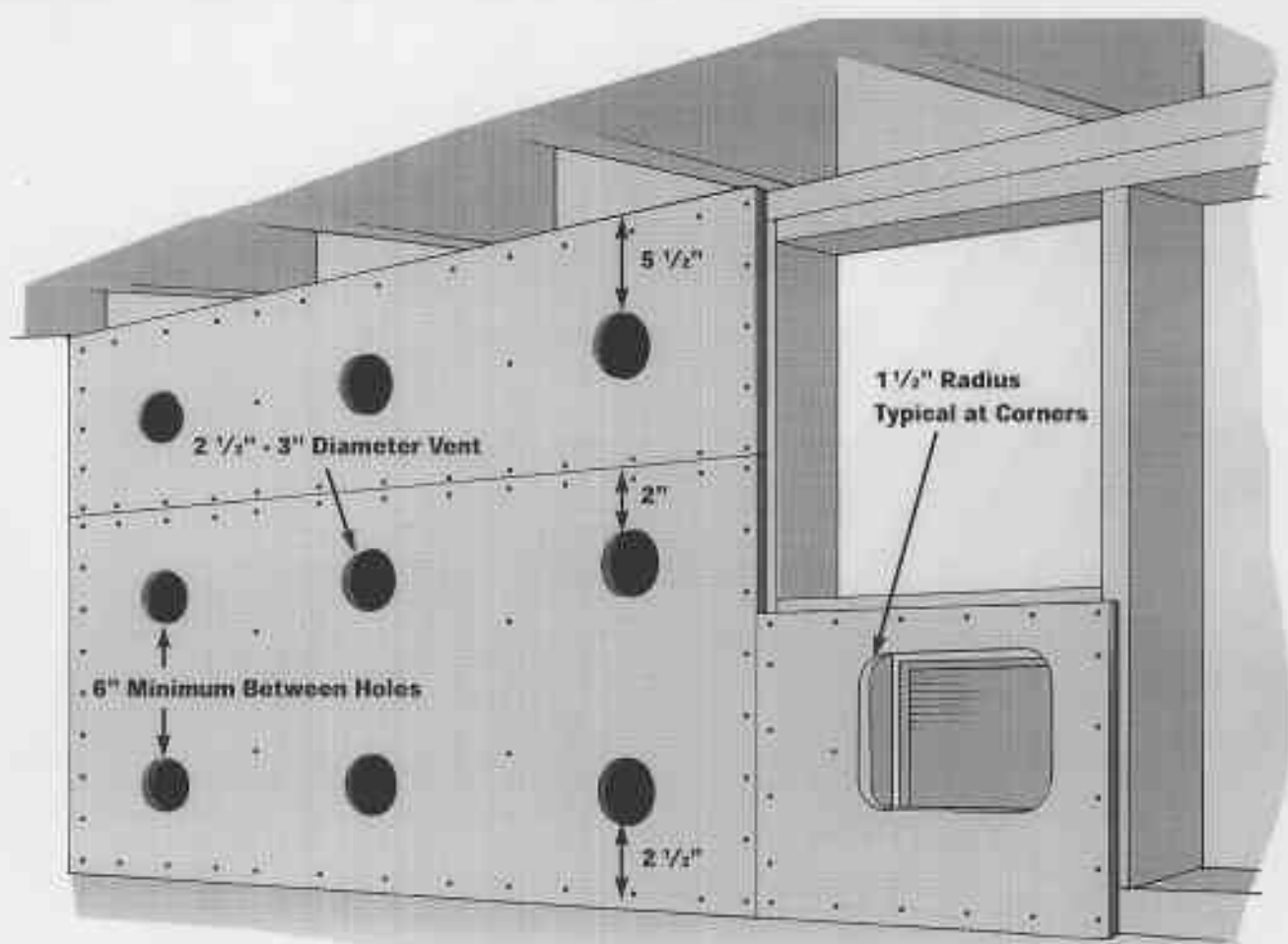
3. Blocking

Often the mud sill is wider than the stud wall or embedded into the concrete foundation too deeply to allow nailing along its edge. If so, you will need to add a piece of wood 2x4 or 2x6 blocking on top of the mud sill, as shown above, to provide a nailing surface. Install blocking to fit over the anchor bolts per the city's plan set, and nail it to the mud sill using four 10-penny common nails. Blunt the tips of the nails and stagger them across the wood to prevent splitting. If the blocks still split, you may have to pre-drill the nail holes. To prevent dry rot or termite damage, it is a good idea to use foundation grade redwood or a pressure-treated wood for the blocking.

4. Nailing

This task requires a lot of nailing, and a nail gun speeds the work, eases the wear and tear on your arm, and minimizes wood splitting. Whether you use a nail gun or a hammer, nails are a critical part of effective bracing. Each sheet of plywood must be nailed every four inches around the edges and every twelve inches along all interior studs and cross bracing in the "field" area. The edge nails provide most of the strength and the field nails prevent the center of the sheet from bowing outward during an earthquake.





5. Ventilation Holes

With the plywood in place, drill 2 1/2" to 3" diameter ventilation holes in each sheet. These holes should be centered between each set of studs and 2 1/2" above the mud sill and 2 1/2" below the bottom of the top plates. The holes will provide ventilation and allow inspection of the cripple wall and mud sill bolts. Drill only one hole if the plywood sheet is less than 18" tall. If your wall has an exterior ventilation screen, you should cut a hole in the plywood opposite the screen and similar to it in size. Don't forget to add blocking around this vent hole and nail the plywood edges at 4" on center (see page 9, top).

6. Repeat on All Walls

With the first sheet of plywood nailed into place, repeat the process to create a braced wall of plywood in sheets no shorter than four feet in length. Remember, long continuous sheets provide maximum strength. When you are installing adjacent pieces of plywood, make sure they join at the center of a stud or that an additional stud has been added to provide for proper nailing. Also, check the cripple walls for termite and dry rot damage, and replace any damaged materials before installing the plywood shear panels.