BY ANDY ENGEL

Installing a subfloor

The subfloor is the layer of structural sheathing applied directly to the joists that provides a base for all the finish floors to come. Some types of flooring, such as carpet or traditional hardwood, can be installed directly on top of the subfloor. Others—such as tile, vinyl, and some engineered-wood products—require an additional layer called underlayment before they are installed.

The most important function of a subfloor is to create a structural diaphragm that helps to distribute wind and seismic loads through the house frame. That's the main reason subflooring has a code-specified nailing schedule (every 6 in. on edges parallel to joists, and 12-in. spacing in the field). But perhaps the most obvious reason that proper subfloor installation is important is to minimize floor squeaks down the road. If subflooring panels can move against the joists or abutting sheets, they will squeak. Gluing the panels down in addition to nailing them is considered best practice for eliminating squeaks, although it's

STEP BY STEP

1 *Start straight.* *Snap a chalkline across the joists 4 ft. from the outside of the rim joist.*

2 *Start spreading the glue.* *Apply a bead of adhesive on each joist up to the chalkline.*

3 *Lay the first sheet.* *Align the edge with the chalkline. Choose either the tongue or the edge of the sheet; just be consistent.*

4 *Start at one corner and work out.* *Keep the nails between ⅜ in. and ½ in. from the edges of the panel.*

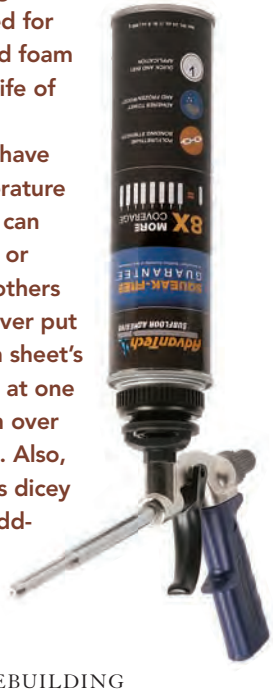
STEP BY STEP

Subfloor adhesives

Although not required by code, gluing down subflooring helps to prevent squeaks. That's so widely accepted that I've never seen a subfloor installed without adhesive.

The most common adhesives come in 28-oz. tubes and are applied using a large caulk gun. Keep these adhesives warm in the winter. When cold, they don't adhere as well, and they become extremely viscous. I've broken guns trying to get cold glue to come out. Also, pay attention to the expiration date. When the solvents in old glue evaporate, it thickens, is hard to apply, and doesn't adhere well.

More recently, polyurethane foam adhesives have hit the market, and they're applied with the same type of applicator gun used with pro-style cans of spray foam. With foam-based adhesives, the problem is more likely to be the glue hardening inside a gun that's unused for months. Unopened foam cans have a shelf life of 18 months.



Many adhesives have application temperature ranges, and some can be applied to wet or icy lumber, while others should not be. Never put down more than a sheet's worth of adhesive at one time, or it can skin over and lose adhesion. Also, walking on joists is dicey enough without adding slippery, wet adhesive to the equation.

5 ***Space the nails correctly.*** *Drive the nails no farther apart than 6 in. on the short edges and 12 in. in the middle of the sheet, completely nailing each sheet before moving to the next one.*

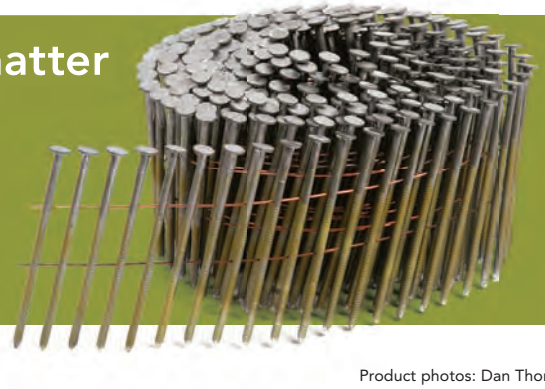
6 ***Space the ends of subsequent sheets.*** *Use a 10d common nail to create an expansion space between sheets. After a few sheets, you may need to cut one shorter to keep the edges on the joists.*

7 ***Repeat these steps on succeeding rows.*** *Stagger the sheet ends, and slide their grooves over the tongues of the previous row.*

8 ***Tap gently.*** *If the tongues and grooves in succeeding rows of sheathing don't engage easily, a few taps with a hammer against a 2x block should be enough to persuade them together.*

The right nails matter

Use ring-shank or screw-shank nails long enough to penetrate the joists at least 1 in. Smooth-shank nails can withdraw over time.



Product photos: Dan Thornton

not included in the structural calculations, nor is it required by code. Some engineered floor specifications, however, may require the use of adhesive. Whenever working with engineered floor systems, be sure to follow the manufacturer's instructions to the letter.

New materials solve old problems

Most subflooring used these days is either ¾-in. plywood or ¾-in. OSB, one long edge of which has a tongue and the other long edge a matching groove. Tongue-and-groove subflooring was pretty new to the market when I started framing in the 1980s. Prior to that, the standard was regular old ⅝-in. or ¾-in. CDX plywood. To support the edges of the sheets so that they didn't sag between the joists, carpenters installed blocking where the long edges of the sheets would meet. This required extra material for the blocking as well as a fair amount of extra work.

The introduction of tongue-and-groove subflooring eliminated the need for the extra work of installing the blocking because the sheets support each other when their edges interlock. Getting the sheets to go together could sometimes be challenging, however, particularly if they'd been exposed to much moisture prior to installation. The solution with the commodity sheets I saw in years past was to beat them together with a sledgehammer, using a length of 2x to cushion the blows.

Even after subflooring has been installed, extended exposure to the elements often can lead to trouble. Plywood subflooring can delaminate, and OSB is famous for its edges swelling (sometimes to the point where the joints must be sanded down prior to the finish flooring being installed). The market responded to these problems with premium grades of subflooring, such as the Huber AdvanTech used here. The company promises that AdvanTech can be exposed to the weather for 500 days with no edge swelling severe enough to require sanding, and says that carpenters should never need to use more than a few taps with a block and a framing hammer to drive the sheets home.

Andy Engel is a senior editor. Technical expertise provided by carpenters Robert Scott and Ken Whiting. Photos by the author, except where noted.