

Low-Cost Shop Floor

Plywood laid over 2x4 sleepers makes a concrete floor easier on your body and tools

BY SCOTT GIBSON

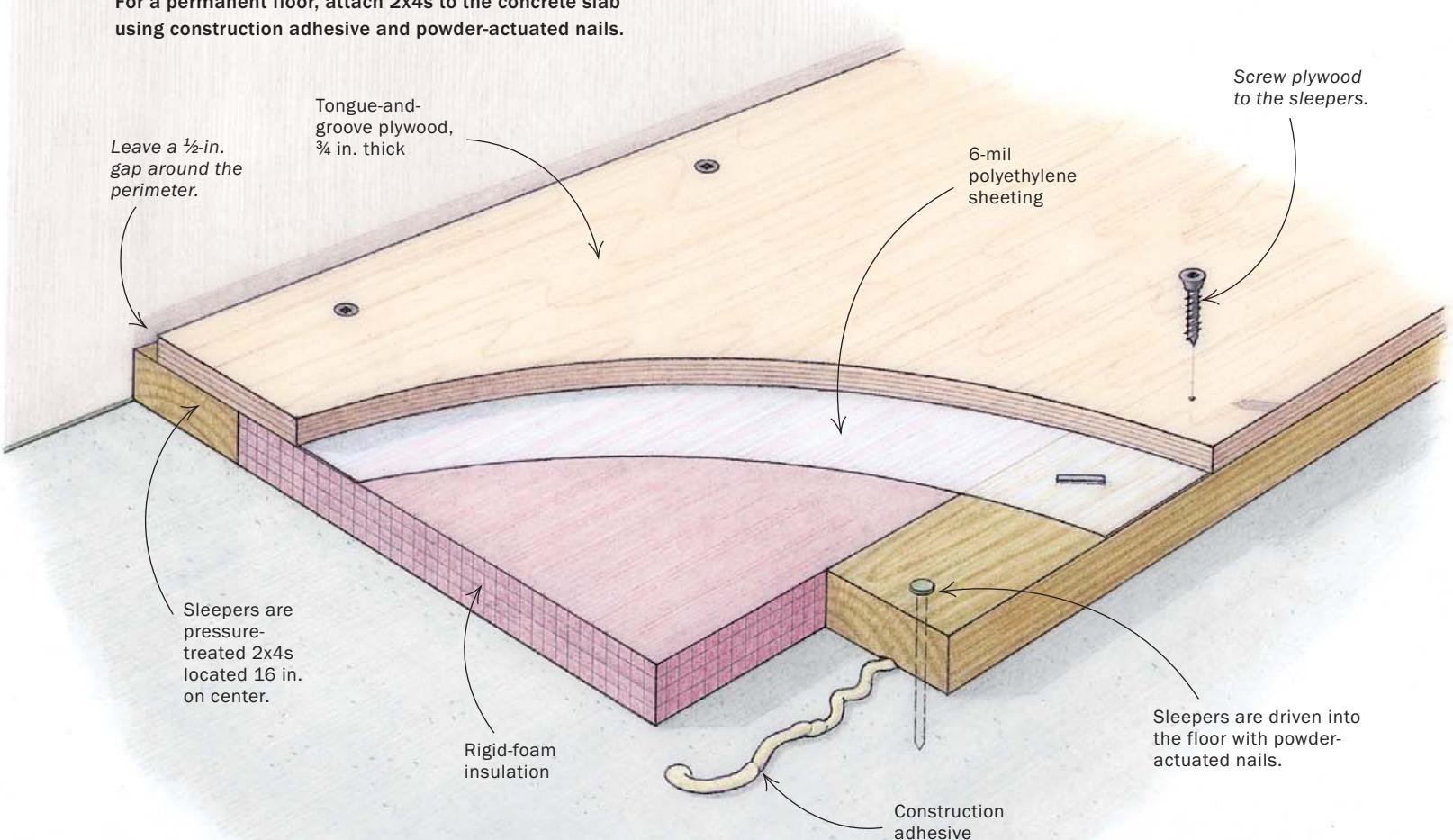
Many a shop is a converted two-car garage built on a concrete slab. I'll say this much for concrete: It's easy to sweep clean. It's also unforgiving. By mid-afternoon, feet hurt. By evening, a dull ache creeps up the back. Tools can be damaged if they're dropped on concrete. And in cold climates, concrete can be a heat sink.

One solution is to install a wood floor directly over the concrete. A wood surface is easier on your feet as well as any tools that roll off the bench. There are other advantages. Electric cable can be routed beneath the floor to power equipment located away from walls. Stationary tools, workbenches and other fixtures can be screwed down easily. If there is enough headroom, a wood floor can be raised enough to locate dust-collection ducts below. And the cost of material for covering a concrete floor with wood is minimal—about \$1.60 per square foot.



PLYWOOD FLOOR OVER CONCRETE SLAB

For a permanent floor, attach 2x4s to the concrete slab using construction adhesive and powder-actuated nails.



However, if a wood floor is going to drop the ceiling height to less than 8 ft., I'd think twice about adding one. But a floor consisting of 2x4 sleepers and $\frac{3}{4}$ -in.-thick plywood is only $2\frac{1}{4}$ in. thick.

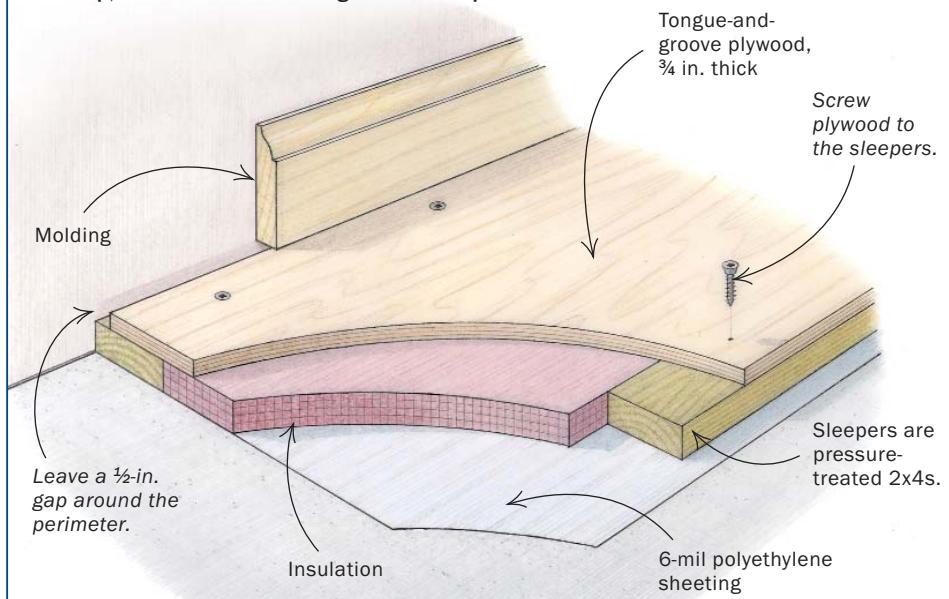
Lay out the sleepers first

Because the sleepers will be in direct contact with concrete (for a permanent floor), they should be pressure-treated material rated for ground contact. Concrete can absorb water like a sponge, and untreated wood not only decays, but it also invites carpenter ants and termites.

Don't forget to wear eye and lung protection when cutting pressure-treated wood and to wear gloves when handling it (splinters are nasty). Even though damp concrete won't degrade pressure-treated material for a very long time, really serious water problems should be cured before the new floor goes down. In a basement shop, that may mean cutting a trench at the perimeter of the room and installing a sub-

TEMPORARY FLOOR

For a removable floor, leave out the adhesive and fasteners, and place the polyethylene sheeting directly on the concrete. To keep the floor from lifting should it warp, attach a base molding around the perimeter walls.



GLUE AND NAIL THE SLEEPERS



Construction adhesive and nails provide added holding power. Lay a bead of glue under each sleeper, then nail it to the concrete using a powder-actuated driver.

surface drain system and sump pump. Better to do that now.

Sleepers are laid flat, not on edge, over the concrete. They should be spaced 16 in. on center so that the long edges of the plywood always fall on solid wood (see the drawings on p. 61). An easy way to get the layout right is to snap chalklines on the concrete to mark the edge of each 2x4. Snap the first

line $14\frac{3}{4}$ in. from the wall, then add 16 in. to each successive line. Sleepers will span minor gaps and voids in the concrete, but serious dips should be filled before installing the floor. Be sure to use a cold chisel to knock off any obstructions that would prevent the sleepers from lying flat.

Once all of the sleepers have been cut to size, place them on or near the layout lines.

Then, starting at one end of the room, pick up a sleeper and lay a fat bead of construction adhesive on the floor where the center of the sleeper will fall. Press the sleeper into place. Adhesive alone should hold down the 2x4s, but I recommend using powder-actuated nails, which will ensure that the wood is secure. Powder-actuated nails are inexpensive, and you can find them at a

Concrete: The floor of hard knocks

Industrial ergonomists—specialists who look for ways to make the workplace more user-friendly—would rather see you work on almost any surface other than plain concrete.

“Concrete floors are a very hard, very dense material. As a result, if you have to stand on them for any length of time, most likely you’re going to experience some level of discomfort,” said Rob Nerhood, director of consultative services for the NC Ergonomics Resource Center in Raleigh, N.C.

Dan MacLeod, a consultant in ergonomics in Milford, Pa., said standing on hard surfaces can result in a variety of ailments, including fatigue, stress on the spinal column and heel spurs. “The latter is more or less a type of tendinitis of the heel,” he said, “the symptoms for which are sore heels, particularly in the morning when you first get out of bed.”

Adding a floor of 2x4 sleepers and plywood over a concrete slab does provide some relief. But consider also using antifatigue mats.

Nerhood said the goal is to provide a material that can be com-



local hardware store. Don't, however, skip the adhesive and rely on powder-actuated fasteners alone. Over time, the floor can wiggle loose. Because the adhesive starts to dry quickly, glue down one sleeper at a time. Remember to leave a $\frac{1}{2}$ -in. gap between the walls and perimeter sleepers. In a cold climate, a layer of rigid-foam insulation cut to fit snugly between the 2x4s helps keep out the chill.

Follow with plastic sheeting and plywood

Once the 2x4s have been anchored to the floor, they should be covered with a layer of 6-mil polyethylene sheeting. The sheeting prevents moisture from migrating up through the floor and protects the plywood from damp air. Overlap any seams by 6 in. and tape them with housewrap tape. If the floor is not to be permanent, omit the adhesive and fasteners and allow the sleepers to float on the concrete. Lay the polyethylene directly over the concrete first, then lay the sleepers on top of the polyethylene (see the bottom drawing on p. 61).

Plywood is next. My first choice would be $\frac{3}{4}$ -in.-thick tongue-and-groove, exterior-grade plywood, but you also can use oriented-strand board (OSB), which is less expensive. Arrange the sheets so that the seams are staggered. That is, start in one corner with a half sheet. On the next course, start with a full sheet. That way, the seams will be staggered 4 ft. apart. The plywood can be nailed to the sleepers, but screws allow you to remove and replace damaged plywood sheets easily. Fasten the plywood every 16 in. with either steel wood screws or drywall screws.

Although plywood is more dimensionally stable than solid wood, it's not a good idea to run the edge of the sheets right up to the wall. Leave a gap of $\frac{1}{2}$ in. all the way around to give the plywood a little breathing room. You can cover the gap with a piece of baseboard or shoe molding.

Finishing the floor is a matter of personal preference. A coat or two of paint or clear finish will help protect the plywood from the inevitable coffee or paint spill. But for a shop, that may be more trouble than it's worth. Your feet, knees, ankles and back—as well as your edge tools—will be just as happy with an unfinished floor. □

Scott Gibson, a contributing editor to Fine Homebuilding, lives in Maine.

INSULATION, VAPOR BARRIER, THEN PLYWOOD



Insulation to keep your toes warm. In colder climates, place rigid insulation between the rows of sleepers.



Sheeting provides a vapor barrier. Spread 6-mil. polyethylene sheeting across the top of the sleepers and insulation. Cover the whole space, and if you need more than one sheet, overlap seams by 6 in.



Get the first piece right. Take your time placing the first plywood sheet because all of the other pieces will follow its course. Be sure to leave a $\frac{1}{2}$ -in. gap at the walls around the perimeter to give the plywood some room to expand.