

# Wood Floors on a Concrete Slab

When gluing prefinished engineered flooring to concrete, detailing the prep and ensuring a careful layout are key

BY KEVIN WARD



## Master Craftsman

Originally from Olympia, Wash., Kevin Ward grew up in a flooring family. His father was a flooring salesman who liked to work on his own house. After college, Kevin took a couple of construction jobs that led him to his next job, where he learned to install tile, sheet goods, carpet, and hardwood floors. With that experience under his belt, he partnered with a friend and built up a business specializing in hardwood floors. In 2010, Ward moved to Austin, Texas, and got a job as the installation supervisor with custom-flooring manufacturer Hardwood Designs. His other job these days is helping girlfriend Naomi Seifter run Pikknik, a food-truck restaurant, in downtown Austin.







**H**ere in Texas, as in much of the South and West, houses are built on concrete slabs. For a flooring contractor like me, a slab can be a mixed blessing. Concrete is stable, doesn't bounce, and won't expand or contract seasonally like wood. However, it does limit the clients' choices for wood-flooring installations. Obviously, you can't use nails to attach the flooring. The advent of engineered flooring (hardwood veneer glued to a plywood substrate) made the choice of hardwood on a slab an easy one. Glued down with a urethane adhesive, engineered flooring doesn't move in service as much as solid wood, is easy to install with the right prep work, and looks great for years.

There are a few tricks to a successful installation, and in this case, preparation is more than half the job. Recently, my company was contracted to install more than

## TOOL OF THE TRADE

### Moisture meters

On this job, the engineered flooring's plywood construction isn't particularly susceptible to seasonal changes, but we test the product anyway to make sure its moisture content is less than 10%. I've found that the Mini-Ligno E/D (Lignomat; \$130) is portable and accurate. Concrete's density and lower moisture levels require a separate meter, and I use a Tramex CME 4 (Tramex; \$485), a pinless meter that lets me take a number of accurate readings quickly.





## EVEN OUT THE HIGHS AND LOWS

A glue-down floor must be installed on a slab that has less than a  $\frac{3}{16}$ -in. deviation in level over 10 ft. The slab must also be at the proper height so that the transitions are smooth between flooring and adjacent tiles, doorways, and stairs.

### **Check for flatness.**

Examine the entire slab with a long straightedge (at least 10 ft. is preferable), and mark high and low areas with a pencil.



### **Flatten the high spots.**

Use a rotary hammer or angle grinder to grind down high spots, periodically checking progress with a straightedge. Afterward, sweep and vacuum the area.

### **Prime the low spots.**

Before the low areas can be filled, the slab surface must be abraded with a buffer and 36-grit sandpaper, then painted with an acrylic bonding agent.



### **Make it flow.**

Mix the self-leveling compound, pour it onto a low area, and use a long straightedge as a screed to smooth its surface. Blend the edges into the slab with a trowel.

1000 sq. ft. of reclaimed-oak engineered flooring of random widths in a new house outside of Austin, and the job provided a good example of how we work.

### **Ensure the substrate is flat and dry**

Before the job starts, I go to the site and check the slab's moisture content. There are a couple of different methods for doing this, but the easiest and most accurate is to use a moisture meter. The slab's moisture content should register about 4% or less. If you're working with a new slab, it's a good idea to allow it to cure for at least 90 days before checking its moisture content. If the slab is too wet, the flooring adhesive won't bond properly. Alternatively, you can use either a moisture-barrier membrane that's applied before the adhesive or a moisture-barrier/adhesive combination. (These alternatives are available from many manufacturers, but they cost twice as much as the simple adhesive process.) Even if I know the slab is dry, I always check and record the moisture reading in case something goes wrong later.

Next, I use razor scrapers to clean the accumulated paint, dirt, and gunk off the slab. Then I sweep and vacuum it clean so that nothing interferes when I check the slab's flatness.

I use a 10-ft.-long aluminum straightedge to find the high and low spots on the floor. Doorways, transitions, and floor outlets are the serial offenders here.

I grind down the high spots, checking with a straightedge as I go. I use a flooring buffer to scuff up the low areas. While I'm scuffing, one of my crew is mixing the self-leveling compound in a 5-gal. bucket. The compound's consistency must be liquid enough to seek its own level but stiff enough not to run across the floor.

After vacuuming and applying a polymer bonding agent to the low areas to be filled, I screed the leveling compound, trowel the edges into the slab surface, and let it dry overnight.

The next day, I use the buffer again to flatten any ridges in the compound. After a good vacuuming, I protect any finished surfaces close to the floor with painter's tape. At this stage, I also use an oscillating multitool and a scrap of flooring as a gauge to undercut door casings, cabinet stiles, and kicks so that the flooring has plenty of clearance.

### **Establish a starter row**

The best way to start the installation is to create a starter row that's about 2 ft. wide and that runs across the entire room. I like to establish



## START THE LAYOUT IN THE MIDDLE

To avoid accumulated errors, start the layout in the middle of the room and work toward the walls. (In this house, the central hallway determined the location of the starter row.) After snapping two lines about 2 ft. apart and parallel to both walls, dry-fit areas that need to be scribed, then begin installation. Painter's tape and buckets of sand keep the glued starter row in place.



**Dry-fit the first pieces.** Because the flooring must fit under the cut door jambs and around jogs in the walls, dry-fit those pieces, then check to make sure that they are parallel to the chalkline.



**Start spreading the glue.** After fitting and gluing the scribed areas in the hallway, use a  $\frac{3}{16}$ -in. V-notch trowel to spread the adhesive between the chalklines of the starter.



**Stay between the lines.** Push the first course of flooring into the adhesive, and check to see that it's aligned with the chalkline. A couple of hammer taps help to set the pieces. As you fill in the rest of the starter, make sure the flooring isn't wandering over the line.



## WORK TOWARD THE WALLS

With the starter row established, continue the installation in one direction in increments approximately 2 ft. wide. Within a couple of courses' width of the wall, dry-fit the last course against the wall, then glue it down. Repeat the process on the opposite side of the room.

TRICK OF THE TRADE

### Hide cut edges

Whenever I crosscut a piece of prefinished flooring, I knock off any fuzz from the cut end and then give it a quick swipe with the proper stain so the cut edge won't show.



TOOL OF THE TRADE

### Adjust width with a rabbet plane

Occasionally, a board that's  $\frac{1}{16}$  in. or so wider than its nominal width gets installed. Rather than pull it out, it's sometimes easier to use a rabbet plane (I like the Stanley No. 92) to gradually reduce the excess width over the length of the piece.



the starter row near the center of the room so that I can adjust in both directions. After measuring the space, I snap a chalkline along the long axis and check to see if it is parallel to each wall. A second line about 2 ft. from the first gives us the limits of the starter row.

Before spreading any glue, I start to fit the flooring to the doorways and bump-outs in the hall. It's important not to apply more glue than can be covered in about 40 minutes, the average working time for the urethane adhesive. Once the glue is applied, you only want to put the flooring down once. It's critical that the starter row remain straight, so I always check the distance to the chalkline after fitting a piece.

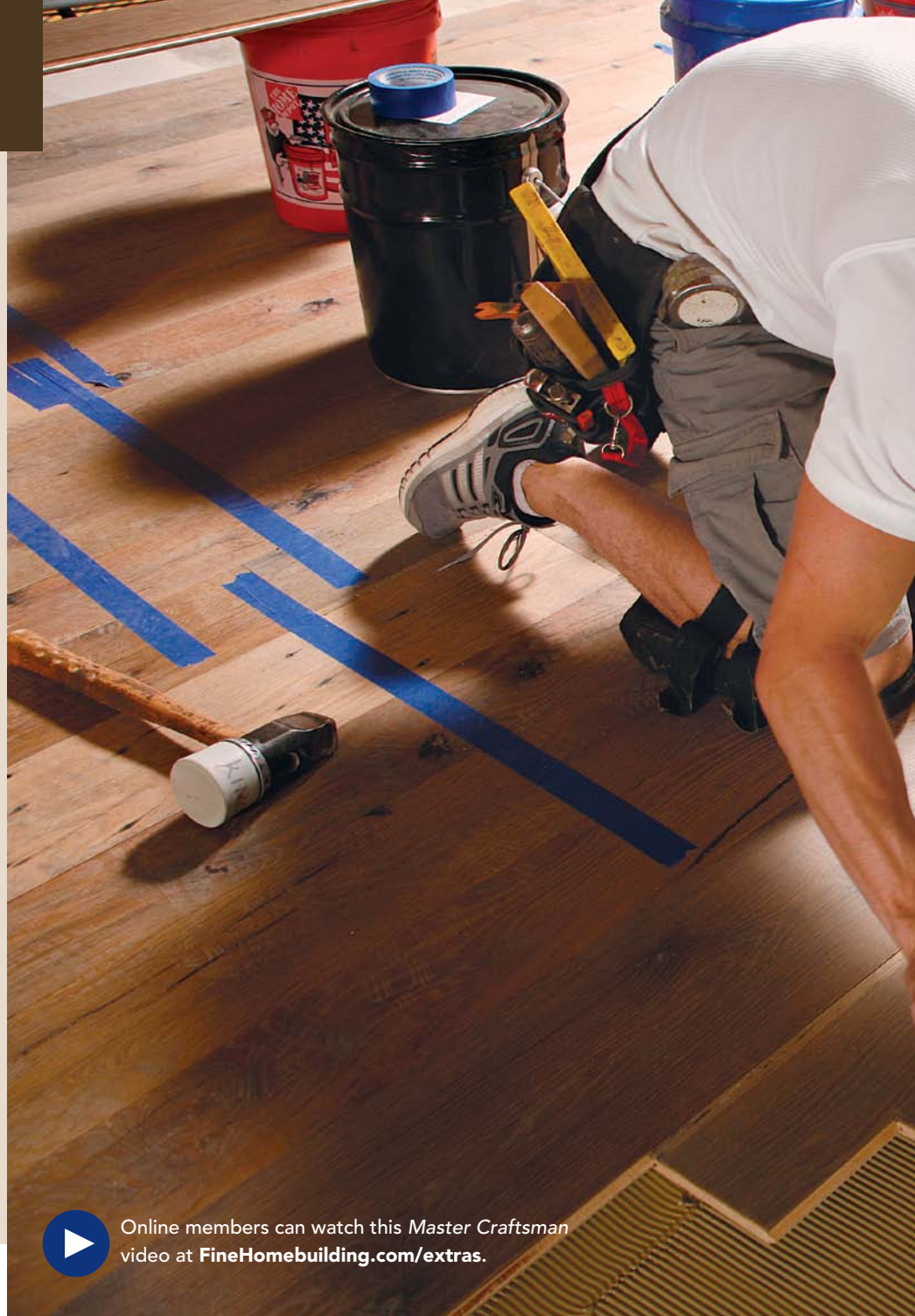
I spread this glue with a  $\frac{3}{16}$ -in. V-notch trowel within the chalked lines. (To set the starter on this job, I wanted at least 20 ft. of length.)

I lay the flooring onto the glue, aligning it to the chalkline and staggering the joints at least 12 in. between courses. A few taps with a rubber mallet help to push each board into the glue. With three courses down, I stretch a piece of painter's tape across the row every couple of feet to help hold the boards together.

After checking to see that the starter row is on the line and parallel to the walls, I weigh it down with 5-gal. buckets filled with sand and let the adhesive cure overnight.

### Switch to production mode

The next day, I measure out about 2 ft. from the starter courses, snap a chalkline, spread the glue, and lay down the flooring as before.



Online members can watch this *Master Craftsman* video at [FineHomebuilding.com/extras](http://FineHomebuilding.com/extras).





## SOURCES

Manufacturers of sealers, adhesives, and self-leveling compounds include:  
 Bostik  
 Mapei  
 DriTac  
 Franklin

I repeat this sequence to within two or three courses of the wall. Because the last course must be fit to the wall, I scribe, cut, and dry-fit the last course, then apply the adhesive, install the pieces, and bring in the sand buckets.

When the adhesive is dry and the floor is complete, I vacuum and sweep thoroughly until every speck of dirt is picked up. To protect the floor from the next wave of trades, I cover it with a tough, vapor-permeable covering such as Ram Board and tape all the seams. I also schedule a day to return and repair any scratches or blemishes, right before the clients are scheduled to move in. □

Photos by Charles Bickford, except where noted.

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## ALWAYS DRY-FIT TRICKY AREAS

Flooring must be scribed to fit around floor outlets, doorways, and walls that aren't parallel. Double-check measurements, then try a dry fit before gluing. Always leave a  $\frac{3}{16}$ -in. gap around the perimeter of the room.



**Switch places.**  
 To scribe the last row of flooring, begin by aligning the piece to be scribed to the previous row.



**Scribe the line.**  
 Holding a short scrap of flooring (under 12 in.) of the previous row's width against the wall and on top of the piece to be scribed, trace its edge. Repeat along the wall until you've scribed the line along the entire piece.



**Rip and fit.** After ripping the piece at the pencil line, test the fit, then spread the glue and drop the piece in. The width of the tongue on the scrap piece creates the  $\frac{3}{16}$ -in. gap at the wall.



**Squeeze it in.** Use a flat bar to lever the last piece into place. A scrap of flooring used as a backer prevents the bar from damaging the drywall.