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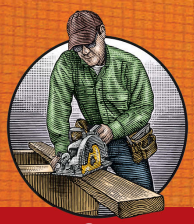
Photo by Charles Bickford

Old-School Path to



Master Carpenter

At age 10, Tom Meehan got his first taste of tilework when he started mixing mud for his father, a professional tilesetter. Almost 50 years later, Tom is now a master of tile and with his wife, Lane, owns Cape Cod Tileworks in Harwich, Mass. The couple co-wrote *Working With Tile* (The Taunton Press, 2005), and Tom has written on all things tile-related for *Fine Homebuilding* since 1991. To this day, Tom incorporates lessons he learned from his father, especially when it comes to his favorite method for a tile-floor installation, the classic mud job.

a Wide-Open Bath

A classic mud job forms the tile base for a modern curbless shower

BY TOM MEEHAN

Life is full of uncertainties. You can count on a few things, though, and here's one of them: Water runs downhill. In a bathroom, the trick is to keep water going toward the drain. Porcelain vessels are good at containment, but switching from a tub to a shower stall changes the game. Curbless showers, which make life easier for folks with special needs, also complicate the issue of the drain.

Before the advent of tile backerboard, tile was set on a substrate of troweled cement mortar, known in the tile world as a mud job. I've learned to apply this mud-and-tile method to a curbless shower so that the water goes where it's supposed to. (For a look at a similar job, see my article "A Sloping Floor for a Barrier-Free Bath," *FHB* #185.) For this job, I also installed a linear drain along the far wall, which means that the shower floor is pitched in only one plane, rather than in a bowl shape around a circular drain.

Prep the subfloor first

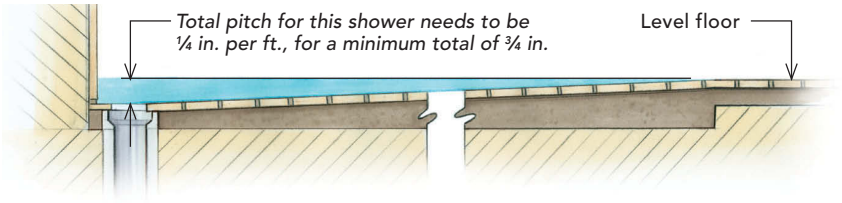
I begin by lowering the subfloor in the area of the shower so that I don't have to use as much mortar. There are three options for this step: (1) add an additional layer of ¾-in. plywood around the shower area; (2) notch the floor joists and resheathe the floor; or (3) add cleats to the joists. Whatever option I use, the idea is to lower the floor in the shower area by ¾ in. (Larger showers may require more pitch.) On this job, it was easier to add another layer of plywood to the subfloor.

Next, I put down a layer of #15 builder's felt, followed by galvanized 2.5-lb. diamond-mesh wire lath to anchor the mortar to the floor. I start nailing in the middle of the room, then push out the mesh to the perimeter as I nail so that the wire doesn't buckle in the middle.

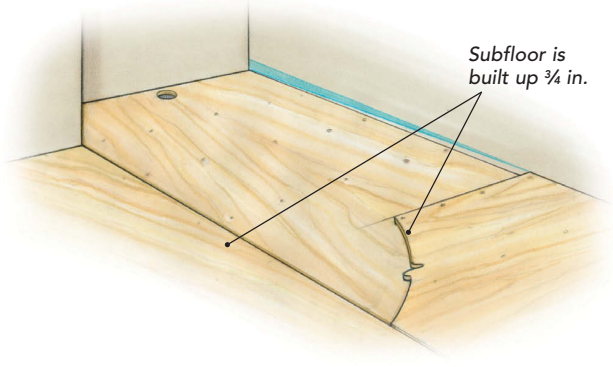
The floor needs a proper mix

It's extremely important that the mortar have the right consistency. If it's too wet, it has no

THREE METHODS OF CREATING A PITCH

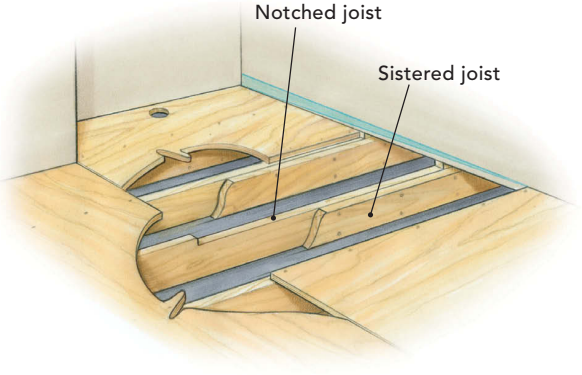


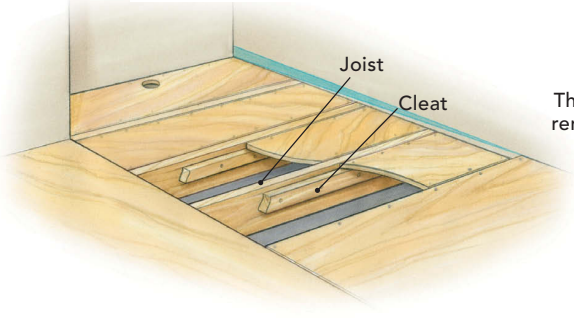
Because the tile mortar bed needs to slope about ¼ in. per ft. and the curbless shower needs to be about 1 in. deep around the room, the subfloor in the shower area must be lowered. Here are three ways the author has accomplished this.



1. Build up the surrounding floor
A layer of ¾-in. plywood added around the area of the shower increases the pitch to the drain. Factor in a ¼-in. drop per ft. when planning the shower.

2. Notch the floor joists
Certain situations, especially remodels, call for dropping the subfloor level by notching the joists (usually by ¾ in.) in the shower area. Reducing the width of floor joists can weaken the floor, so it's recommended that the notched joists be doubled across the area of the notch.



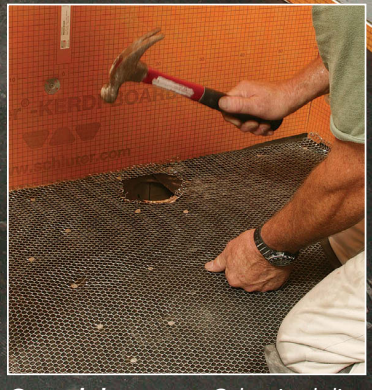


3. Add cleats and drop the subfloor
The author's favorite method is to remove the subfloor in the area of the shower, fasten cleats to each side of the joists at the thickness of the plywood (½ in. or ¾ in.) below the top of the joists, and then fill in the spaces between the joists with plywood.

Drawings: Bob La Pointe

READY THE FLOOR FOR MORTAR

Isolate and protect. *The first layer of the tile floor consists of overlapping pieces of #15 builder's felt, which prevents the subfloor from absorbing moisture from the mortar.*



Ground the mortar. *Galvanized diamond mesh gives the mortar an attachment point on the floor. Cut into pieces with a 2-in. overlap, and nail with 1½-in. galvanized roofing nails every 6 in. to 8 in.*

strength; too dry, and it won't pack down. I start with 25 full shovels of sand for every bag of portland cement. This basic batch unit will cover about 35 sq. ft. at a depth of 1½ in. To arrive at the correct consistency, I use about 5 gal. of water, added in small amounts as I mix.

Establish the perimeter

After I've mixed the mortar, I fill a 5-gal. bucket and start to dump the mortar around the perimeter of the room, up to the shower area. I tamp it down hard with a steel trowel and use a wooden float to pack the edges, especially the corners. (Be aware of the toilet flange's location. You don't want to cover it over and tile it—unfortunately, I know this from experience.) As I pack down the perimeter, I keep checking to make sure that it's level all the way around the room. I'll deal with the pitch in the shower once I have this level line as a reference.

At the door threshold, I nail a strip of 1x as a stopping point. When installed, the tile should come flush to the top of the strip. To establish the correct height of the mortar, I create a point ⅜ in. below the top of the strip, then check the height with a tile once I've laid the mortar. It all depends on how level the floor is, but I usually aim for a perimeter depth of about 1 in. and no less than ¾ in.

Fill and screed to the drain

When the perimeter is packed and level, I start to fill in the interior with mortar. Using the perimeter as a guide, I screed the mortar with a straightedge. The key to pulling the straightedge is not to pull it straight but at an angle from the perimeter. I pack everything down with the steel trowel, then smooth the surface with a wooden float in an orbital

TRICK OF THE TRADE

The right mix

One trick to mixing mortar is to use a chopping motion, bringing the hoe up high so that gravity helps to pull it through the dense sand and portland-cement mix. I mix the ingredients twice, once from each side, then add water and mix three more times.

Not too wet or too dry. *The mortar is just right when it holds together.*

Dump the mortar. *Use a 5-gal. pail to distribute piles of mixed mortar evenly around the perimeter.*

LAY THE MORTAR BED

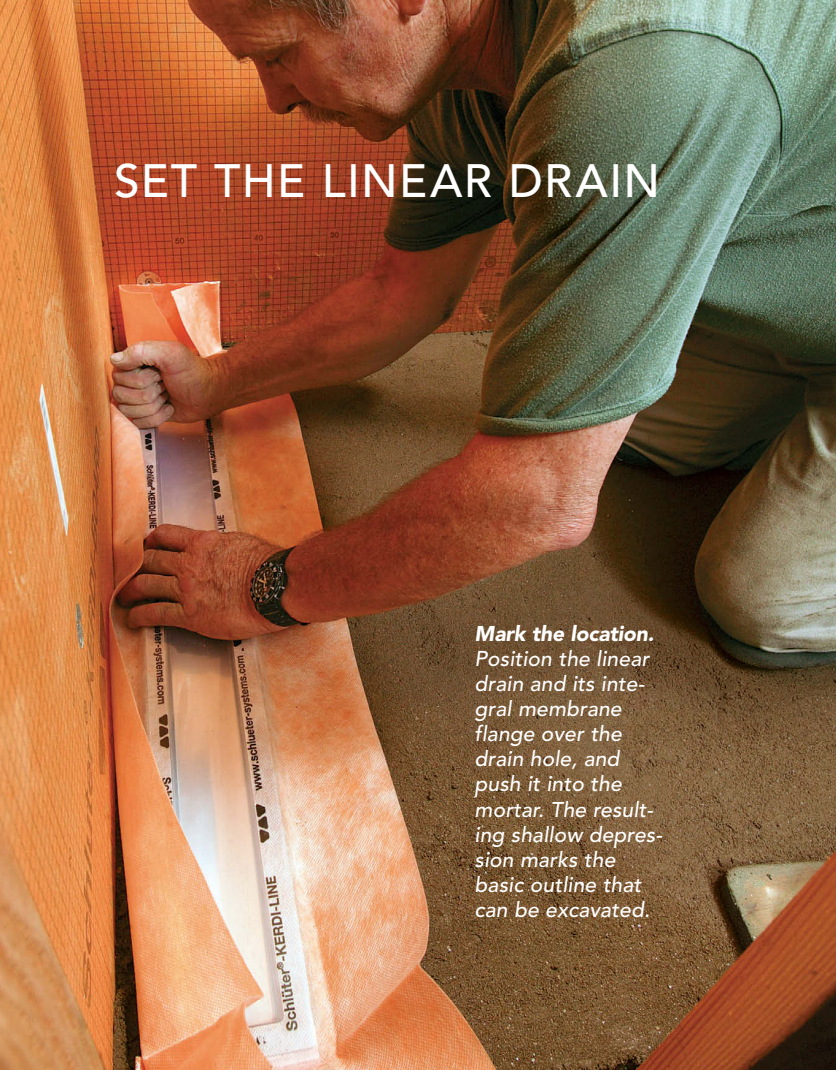
Using a mortar underlayment makes pitching the floor toward the drain possible. While round drains require the surrounding floor to be bowl-shaped, a linear drain is positioned against the shower's back wall, so the shower floor needs to slope only in a single plane to the drain.

Pack and level. *On the level part of the floor, use a steel trowel to pack down the loose mortar so that it forms a level perimeter about 1 in. thick around the room.*

Fill and screed. *Dump more mortar in the middle of the floor, and pack it down. Use a level as a screed, resting one end on the perimeter as a reference for the floor's center.*

Create the pitch. *In the shower area, extend the level floor grade to the high end, then create a single slope to the drain. The total difference in grade should be about ¾ in. for a 3-ft.-long shower like this.*

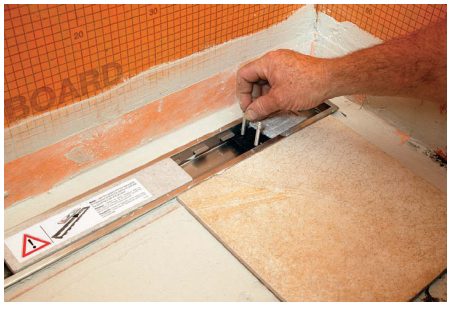
Smooth transitions. *Once the pitch is established, use a wooden float to grade the transition from the level floor to the shower along the side.*



Mark the location. *Position the linear drain and its integral membrane flange over the drain hole, and push it into the mortar. The resulting shallow depression marks the basic outline that can be excavated.*

Double-check with a template. *Use the drain's foam spacer as a template to check the excavation. Remove any excess mortar with a narrow trowel, then check the drain's fit.*

Glue it in place. *Fill the cavity and cover the immediate area with thinset; then place the drain and membrane. Firmly press the membrane into the thinset with a trowel.*



Check the height. *Before the thinset is dry, it's a good idea to make sure that the drain will lie just below the surface of the tile. The finished height of the drain grate is adjusted with screws.*

motion as I go. If there are any low points, I fill them in and pack them down again. I use a steel trowel for a last finishing pass. It's a good idea to work from inside the room toward the door.

Once I've established a level plane in the rest of the room, I start working on the pitched floor of the shower. Here, the outside edge of the shower is level with the rest of the room. Inside the shower area, I pitch the mortar down to the drain, aiming for a ¼-in. difference in grade from one end to the drain. I use 2x2 tiles in the shower to ease the transition in grade from the shower to the floor, which will be covered in 12x12 tiles.

With the pitched floor established in the shower, my next task is to set the drain. For this job, I'm installing a linear drain. Unlike a traditional round drain flange that's installed before the mortar, this drain is tied into the membrane overlay. Besides its shape, the main difference in a linear drain is that it doesn't require a flange. Once installed in the floor, it's tied directly to the drainpipe with a flexible coupling. When the drain fits, I finish the rest of the floor and allow the mud to dry overnight.

Protect the floor with a waterproof membrane

Now that the mortar has set up, I can set the drain and then install a waterproof membrane that seals the porous mortar layer. (I used Schlüter's Kerdi membrane on this job, but Noble's NobleSeal and Laticrete's Hydro Ban are two alternatives.) Using the drain template, I check to see that the space is the right size. The mortar is still relatively soft, so it's easy to make adjustments with a small trowel. I vacuum up the crumbs, apply the thinset, and install the drain. This whole trough should be level so that water will go to the center drain evenly.

Once the drain is in, I start the membrane process by installing the 5-in. band around the room's perimeter, splitting it between the wall and the floor. I use a 3/16-in. V-notch trowel to spread the thinset, lay out the band, and squeegee out the excess thinset with a drywall knife whose corners have been rounded off. The preformed corners are installed the same way, and I am especially careful to make the inside corners tight against the wall. Next, I cut sheets of membrane and dry-fit them around the room, making sure that I have at least 2 in. of overlap on all seams. I draw a line at the edge so that I apply the thinset only where I need it.

With the sheet back down, I start at the center and work my way toward the outside, first with my hands, then with the drywall knife, pressing out all the voids and air pockets. The joints should be nice and tight. The worst thing you can do is start on the outside from each direction and have the whole thing buckle in the middle. Whatever excess is outside, I flatten down with the trowel. Voids will eventually cause cracks in the tile. In the shower area, I overlap the entire drain flange with the membrane.

Tile is the easy part

When I first spread the thinset, I use the back side of the trowel and burnish it over the membrane. I also do this over plywood or

any other surface, because rubbing the thinset deeper into the membrane with the back of the trowel gives you a much better bond. When it's set and done, I turn over the trowel and use the toothed side, which creates a consistent height for the tile and at the same time allows me to even out any highs or lows that might be in the membrane.

Once the first tile is set in place, the placement of every piece of tile in the room is determined. I use a rubber grout float to pack the tiles down to set the bond and flush up the corners. For this project, the shower area was to be covered with 2x2 tiles, with 12x12 tiles used for the remainder of the floor. Behind the drain, rather than put in a few small pieces with the 2x2s, I cut down 12x12s; I think that's a better look.

The final step in the floor installation is grout. The grout should be mixed so that it's workable, but fairly stiff. Too much water weakens grout and can cause color variations. I start in the far corner and spread the grout across the whole floor, let it set for about 15 minutes, then come back and wash it off. The key to trowel work is to hold the trowel at about a 30° angle to the floor so that the grout really gets pushed down into the joints. A second swipe at 60° cleans off the excess. There's no problem leaving a little bit of excess, because that helps in the cleanup. □

Photos by Charles Bickford.

INSTALL THE MEMBRANE

Start with the border. *Spread thinset into the corners a few inches up the wall and onto the floor. Fold the corner strips in half, press them into the thinset, and squeeze out any excess.*

Cover lots of ground. *After dry-fitting sheets of membrane to overlap the edges, spread thinset out for each piece individually. Keep the trowel tight to the floor so that it cuts through to the concrete and leaves a consistent surface.*

Start in the middle and work outward. *Once the membrane is pressed into the thinset, start in the center of the sheet, and begin troweling any excess thinset out toward the edges.*

In a perfect world, tile would be flexible

Tiles, especially large tiles, must be installed so that they're fully supported on a flat surface, or they'll crack. In situations where the floor is not flat (in a shower stall, for instance), small tiles conform more easily. In this bath and curbless shower, both conditions exist, and rather than use small tiles throughout, I made a transition from large field tiles to small tiles in the shower with intermediate-size tiles that could handle the switch between level and sloped floors. I decided to go with a diagonal layout bordered by 4-in.-wide strips. After bringing the small shower tiles to the edge of the transition, I cut 4-in.-wide strips from the 12x12 tiles and mitered each corner. Next, I cut the big square tiles in half diagonally, which established the pattern for the rest of the floor.

Online members can watch this *Master Carpenter* video at **FineHomebuilding.com/extras.**

PROFILE OF INNOVATION

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