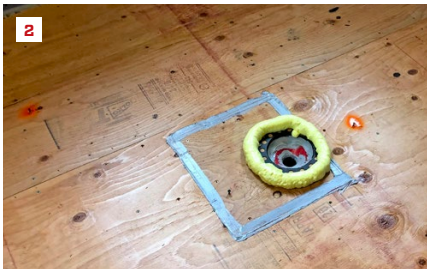
BY MIKE WHALEN

Prepping Floor and Wall Framing for Tile



Floor systems need to be strong and stiff enough to support tile, but often in an existing home, they are underdesigned, out-of-level, and structurally compromised (as shown here) and need to be evaluated by a design professional **(1)**. When pouring liquid-applied self-leveling compound, the author first sets screws to a level elevation using a laser, paints the screws fluorescent orange to stand out **(2)**, then works the compound flush to the tops of the screws **(3)**, feathering it out to level **(4)**.

I'm a lead carpenter for a company that specializes in kitchen and bath remodeling projects. We do all our own tile work, for the most part, but on the rare occasions we do sub it out, we'll do all the necessary prep work for the tile installation. Over the years, we've honed our skills installing tile over wood framing and have learned that a long-lasting installation depends on a sturdy and stable base—you can't just wade into a tile job without checking the existing framing and fixing any underlying problems, and then expect great results. With floors, we evaluate the strength of the existing floor system and its anticipated deflection and check it for level; with walls, we have to check whether they are plumb and square and whether the individual studs are in plane with one another. The following is a primer on how we approach prepping for tile in wood structures, focusing mainly on bathrooms.

Floor framing. The housing stock we work on varies in age. Older homes often have sawn joists and shiplapped or plank subflooring that can be underdesigned, out of level, and structurally compromised **(1)**. Newer homes tend to be framed with engineered lumber, such as wood I-joists or trusses, with OSB subflooring. More often than not, though, we're dealing with floor systems framed with 2x10s at 16 inches on-center and 3/4-inch T&G plywood subflooring.

Regardless of age and framing method, we have to verify that the home's floor system can support the tile specced for the project. We're concerned with the strength and stiffness of the floor as well as its deflection (expressed by values such as L/360, L/480, and L/720—see "Tiling Over Plywood Subfloors," Mar/11, for information about uniform vs. concentrated deflection).

Deflection. Ceramic tile smaller than 10 by 10 inches can withstand a moderate amount of deflection, or L/360, where "L" represents the span of the floor joists in inches and a 360-inch span can safely deflect 1 inch (360/360 = 1). Larger format tile, say 12x24, may require L/480, while natural stone tile has even more stringent deflection requirements of L/720 or greater. We consult with both the tile manufacturer for its installation requirements and our in-house design professionals to determine if the existing floor framing can support the tile. On older homes, we often have to sister

Photos by Mike Whalen and Tim Healey; illustrations by Tim Healey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Floors out of level by 1 inch or more typically need to be reframed. Here, a new kitchen floor is being framed in an older home; the original floor was 3 inches out of level **(5)**. The author installs blocking between existing floor trusses under a barrier-free shower to prevent flexing of the subfloor **(6, 7)**. He checks the subfloor for level prior to installing a pre-pitched shower pan **(8)**.

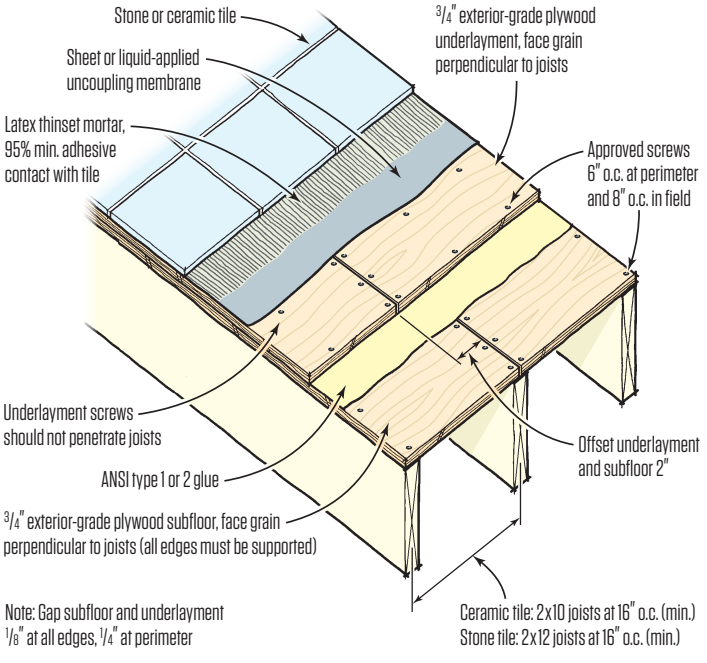
new joists onto existing ones and add midspan blocking to stiffen the floors and meet the deflection requirements.

Leveling. For floors 3/4 inch or less out of level, we apply a liquid-applied self-leveling compound (laticrete.com) to level out the floor **(2–4)**. If a floor is greater than 3/4 inch out of level, we talk to the client about methods to level the floor framing, including reframing the entire floor if it's too far out of whack (it's not unheard of for floors to be as much as 3 inches out of level) **(5)**.

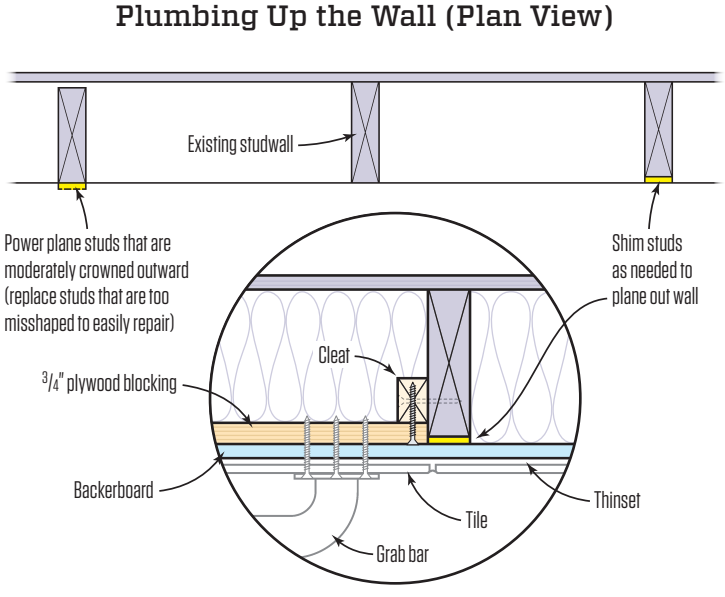
Subfloor. We inspect the existing subflooring to see if it's strong enough to support tile and if there is any water damage; we replace any undersized or rotted subflooring. Typically, we encounter existing 3/4-inch T&G plywood subflooring that has been fastened off with nails. Nails tend to pop over time and cause squeaking, so we enhance the subfloor's fasteners with 1 1/2-inch screws to suck it down to the framing.

We also check the gapping of the existing subfloor sheathing, which should have a 1/8-inch gap at all edges and a 1/4-inch gap around the perimeter to allow for seasonal expansion and contraction. If a seam between two sheets of subflooring was not properly gapped and it's squeaking, we have—as a quasi-last resort—run a circular saw down the problematic seams to create a gap. This has to

Laminated Plywood Setting Bed



The author checks for plane by spanning a 6-foot-long level across an existing studwall, revealing a gap between a stud and the level **(9)**; the stud will be shimmed later. Here, a stud crowned outward is power-planed **(10)**. The author rechecks the wall for plane after installing grab-bar blocking **(11, 12)**. Note: The unfaced batts are in a party wall between town-house units.



Plywood blocking helps lessen compressing of batts in exterior wall cavities and provides a greater area and more flexibility for mounting accessories. Blocking is screwed to cleats ripped from 2-by stock.

be done somewhat surgically, though, to avoid cutting the tongues off the panel edges and compromising the stiffness of the subfloor.

Underlayment. We're typically striving for a 1 1/2-inch-thick wood base—along with an uncoupling membrane—for floor tile. So, we install a second layer of 3/4-inch T&G CDX plywood, or underlayment. We glue the underlayment down with construction adhesive (loctiteproducts.com), gap it, and fasten it off with 1 1/2-inch screws (see illustration, page 8). In addition, we shoot 1 1/4-inch crown staples in a tight spacing in the field to help prevent any squeaks from occurring.

One caveat with regard to installing this second underlayment layer is that in bath remodels, we're frequently asked to install barrier-free showers—they seem to be the norm today as opposed to curbed ones. To accomplish this, we thinset a 3/4-inch-thick pre-pitched shower pan (wedi.net) to the existing subfloor in lieu of 3/4-inch underlayment, then block between the joists under the shower pan to prevent flexing of the subfloor **(6–8)**.

Wall framing. With the underlayment installed, we begin tweaking the existing studwalls. Using a long straightedge, typically a 6-foot level, we span across as

To help with jobsite communication, the design plans are posted on the walls, and the locations of critical items are marked on blocking and studs **(13)**. On a wet wall, a metal protection plate (below the controls) was recessed flush with the face of the framing **(14)**. The floor surface is vacuumed **(15)**, then the uncoupling membrane is thinset to the underlayment **(16)**.

many of the studs as possible to see how they're planing out **(9–11)**. We power-plane individual studs that are crowned outward, shim ones that are sunk back with a strip of lauan or ripped-down 2-by stock, and replace any gnarly 2-bys that are too difficult to repair (see illustration, page 9). If a studwall is significantly out of plumb (some walls can be out of plumb 3/4 inch or more), we'll sister new studs to the existing ones to bring the entire wall to plumb.

For walls that are out of square, we shim out one of the walls to be at a right angle to the other one. It's important that the walls are square, particularly in the shower area where underlying backerboard and shower-pan systems have to join together perfectly. Tile layout and installation can be infinitely more difficult if the walls are not 90 degrees from one another.

Communication. After the initial demolition, we post the plans on the walls for reference not only for us but for our trade partners and clients. We tack up the interior elevation and details specific to each wall and begin to mark the layout on the framing. We mark the fixture layout and blocking locations for grab bars, hand-held shower devices, benches, niches, shelves, and glass shower doors, if applicable. We note items such as what style of vanity we're installing, and if it has a decorative bottom. Again, we're doing this not only for us but to help communicate with trade partners and the homeowners. Some clients have trouble envisioning their project and it helps them to, say, physically stand in the shower and mark where and how high the shower controls and head should be, how high grab bars should be, and so on.

Blocking. Prior to installing blocking, we insulate the wall cavities as necessary for thermal comfort or for sound attenuation. We install a mix of solid and plywood blocking (3/4-inch plywood blocking screwed to cleats ripped down from scrap 2-by stock) **(12, 13)**. The plywood blocking helps lessen compressing of batt insulation in exterior wall cavities, while also providing a greater area for mounting accessories. For example, if a client wants to change the height of a grab bar at the last minute, we've got it covered.

Finishing the rough-in. We flush up any protection plating to the face of framing by chiseling out the framing and resetting the plates **(14)**, then check the floor for fastener heads that are proud of the surface and vacuum the floor area **(15)**. We thinset the uncoupling membrane (schluter.com) to the underlayment per the manufacturer's recommendations **(16)**. If we're not going to tile right away, we protect the floor surface with sheet stock until we're ready to proceed. Finally, we take photographs to document the blocking locations prior to closing up the walls (after the rough-in inspection by our local building official).

Mike Whalen is a project manager at DBS Remodel, a design-build residential remodeling company based in Poughkeepsie, N.Y. Check out Mike's new residential-construction-themed podcast, "Beyond the Belt," on Spotify.