Q Can I install new tile over old tile for a bathroom floor?

A Tom Meehan, a second-generation tile installer and co-author of *Working with Tile* who lives and works in Harwich, Mass., responds: Putting new tile over old is possible if the work is done properly and if the condition of the existing floor—both the tile itself and the subfloor below—is in good enough shape for a successful installation. You also need to consider that adding another layer of tile will increase the height of the floor, which can create complications with bathroom fixtures, thresholds, and doors that swing in.

The first and most important question is whether the existing tile floor is structurally sound with no loose tile or major cracks. A visual inspection for cracked or missing grout is a good initial check for possible loose tile. Another way to check is by tapping on the surface of the tile with a small hammer. Hollow sounds can be an indication that tiles may be loose. If I find one loose tile, it usually means that others are loose, so in that case I typically remove all of the existing tile rather than risking problems with an added tile layer. Grout missing or large cracks in the middle of the floor can also indicate loose tile, but a little grout missing near the edges of the floor usually means that the floor is OK to tile over.

Cracks running through the tile can also indicate excess deflection in the subfloor. The Tile Council of North America (TCNA) offers strict guidelines for deflection in its handbook. But if the bathroom is over a basement, I'll often inspect the floor framing from below to look for cracked or broken floor joists or improper joist spacing. When in doubt, I sister in new joists to the old to beef up the framing.

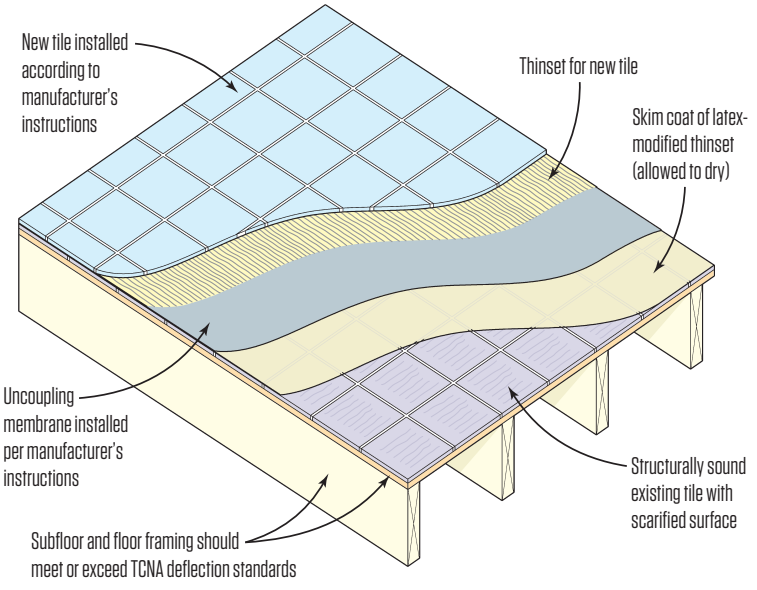
To install the new tile over the old, I have one of two approaches, depending on the condition of the tile. For both approaches, I start by scarifying or abrading the surface of the old tile with a grinder outfitted with an aggressive diamond blade. This removes most of the glazed surface from the tile and gives the thinset a better chance of adhering. Then I vacuum and sponge off the surface of the tile.

When the floor is dry, I apply a tight (1/16 to 1/8 inch thick) skim coat of high-quality latex-modified thinset, such as Laticrete 254 Platinum, and let this skim coat sit overnight. If the floor is solid with no cracks or missing grout, the next day I install the new tile over the prepared floor the same way I would tile any other floor, using a high-quality modified thinset, which adheres best in these applications.

If the floor has hairline (nonstructural) cracks in the tile or grout, I install an uncoupling membrane, such as Schluter's Ditra, over the skim coat of thinset. The membrane bridges any cracks, preventing them from telegraphing up through the surface of the new tile layer. I install the membrane over the dried skim coat that I had applied to the scarified tile, using the thinset recommended by the membrane's manufacturer. After letting the membrane set overnight, I install the tile the next day.

If you have any doubts about the integrity of the old floor or your ability to assess the floor's condition, I'd go with the membrane approach. The little bit of extra work and expense is cheap insurance that the new tile floor will not develop any problems in the future.

New Tile Over Old



When new tile is installed over a structurally sound tile floor, an uncoupling membrane limits differential movement and keeps the tile from loosening.

Illustration by Tim Healey

Q Can I-joists be used as headers in walls?

A Jim Anderson, P.E., with the Product Engineering, Codes and Standards group at Weyerhaeuser, responds: With careful design, detailing, and installation, I-joists could possibly be used for headers, but the practice is not recommended. I-joists are commonly used in floor systems today. They are strong, stable, and available in long lengths, and they produce stable floors. They are specifically designed to efficiently support typical floor loads. At first glance, I-joists may look attractive as low-cost, lightweight, stable members that could replace dimension lumber in wall-header applications. However, special detailing, design, and connections may make using them more laborious and expensive than using a sawn lumber or structural composite lumber (SCL) header.

The unique cross section of an I-joist utilizes LVL or Machine Stress Rated (MSR) lumber flanges to resist high bending forces that occur in the middle of the span (for uniform loads). At the ends of the member, reaction forces need to be transferred into the support through an OSB web. I-joists work well for the transfer of reaction loads in typical floors, but they are not designed to support heavy point loads from a roof girder truss above. In addition, the reaction capacities for I-joists were developed and tested with a minimum 1 3/4-inch end bearing length. This minimum required bearing length exceeds a typical 1 1/2-inch-thick jack stud used to support wall headers. Therefore, if an I-joist were used as a header, each end would require a minimum of two jack studs, which may not be desirable.

I-joists, which typically support a uniform load, can also support point loads from above, such as a truss reaction; however, if the load is too high, the flange may crush the web. There are published provisions that if point loads are 1,500 pounds or more, web stiffeners are required to reinforce the top flange. Accurate placement of web stiffeners could prove difficult if truss placement locations are unknown or if they are different from what was assumed.

Under most conditions for wall headers, multiple-ply I-joists would be required to support the load. Having two or more members support the load will increase capacity, but special detailing would be needed to connect the two I-joists together, increasing construction costs. The detail would require filler blocks between the webs of each of the I-joists. Depending on the series of I-joist (different width of flanges), the filler may be a 2-by or a combination of a 2-by and sheathing. The filler would have to be the full length of the joist and be properly nailed together. If the multiple header is flush to the exterior sheathing or to the drywall inside, you may need to install an additional filler to flush out the surface for gypsum attachment.

End connections would be difficult as well. Typical prescriptive nailing for the end of a header to a stud is four nails. It would not be possible to get this quantity of fasteners into the end of an I-joist. Finally, lateral stability (buckling to the side under load) of the top edge needs to be addressed. This is true of all structural members, but I-joists typically require more frequent bracing than a solid piece of wood. Typically, in a floor system, this is achieved with the floor sheathing attached every 6 to 12 inches.

Because of the lower capacities, bearing length requirements, web stiffener requirement at point loads, and connection of multiple pieces, premade loading charts are not usually available for this application. If you are looking for the benefits of engineered lumber, using shallower (less than 9 1/2 inches) structural composite lumber is easier to design and install for wall headers. If you still desire to use I-joists in a header application in a wall, I would contact the manufacturer or a design professional for assistance.