Q&A

Reinforcing Mud-Bed Tile Floors

Q. *What's the right type of mesh to use in a mud-bed tile floor? Should I use a self-furring lath (like the type used in stucco work) so that it centers itself in the mud?*

A. *Michael Byrne, a tilesetter and industry consultant from Los Olivos, Calif., responds:* First, there are several mortar bed installation methods that require no reinforcing. These are typically for floors where you're putting a bonded mortar bed over an intact slab-on-grade. These methods, which are based on ANSI A108 specification standards, are described and illustrated in the *Handbook for Ceramic Tile Installation,* available from the Tile Council of America (864/646-8453, www.tileusa.com).

I'll assume you're talking about laying a mortar-bed tile floor over wood framing. The tile industry recognizes two methods for reinforcing mortar setting beds for floor tiles over wood-framed floors (F141 and F145 in the TCA *Handbook*). The difference in the two methods has to do with the thickness of the mortar.

For thick bed installations — from 1 1/4-inch minimum to 2-inch maximum thickness — the ANSI A108 specification, A-2.1.7, calls for one of the following welded wire fabrics:

2x2-inch x 16/16 wire
3x3-inch x 13/13 wire
1 1/2x2-inch x 16/13 wire
2x4-inch x 16/16 wire

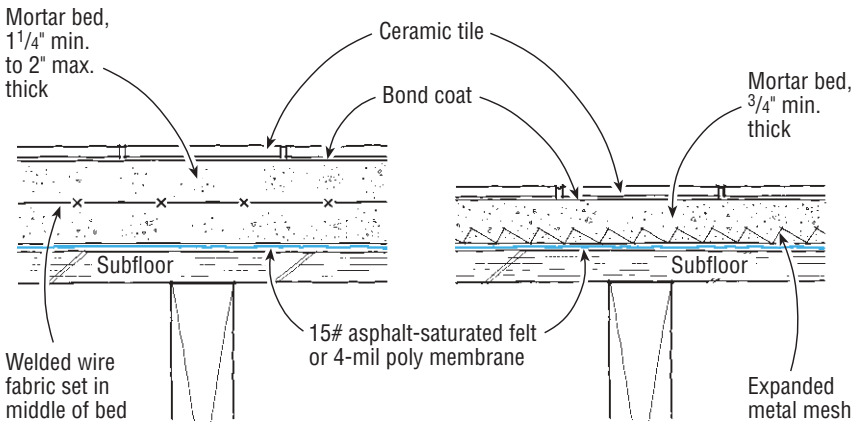
For this type installation, the thickness of the mortar requires that the reinforcing fabric be positioned somewhere in the middle of the mortar bed. When I set tile using this method, I'll dump about half the mortar on the floor, lay the wire mesh on top of that, then spread the rest of the mortar. This works fairly well with mud-bed mortar because it's fairly dry and will support the wire. It isn't necessary to use any other supports for the wire.

The thin mortar bed method (3/4-inch-minimum thickness) calls for flat, expanded metal mesh weighing not less than 2.5 pounds per square yard. Painted lath is allowed, but galvanized lath is preferred. The TCA F-145 detail shows the lath fastened snugly to the subfloor, with a cleavage membrane installed between the two.

In either method, a cleavage membrane, which can be 15-pound asphalt-saturated roofing felt or 4-mil poly, separates the mud from the wood floor and prevents the wood subflooring from drawing moisture out of the mix during the curing phase.

I prefer mortar beds for tile floor installation because they provide a smooth, flat surface for tilesetting, but they require specific detailing beyond the type of mesh to use. If you plan to use mortar setting beds, get a copy of the TCA *Handbook* for a review of all the details.

Mortar Bed Reinforcing



For thick mortar bed installations over wood floors (left), ANSI specs call for wire fabric reinforcing and a cleavage membrane between the subfloor and the mortar. For thin mortar beds (right), use expanded metal lath nailed or stapled to the subfloor.

Assessing Old Structural Timbers

Q. *I'm looking at a project to convert a 1920s-era three-story industrial building into residential lofts. Much of the heavy timber interior frame has been exposed to a lot of weather because of roof deterioration during years when the building was not maintained. How can I determine whether these wood framing members are still structurally sound? Is there any way to estimate how much strength the timbers may have lost?*

A. *Stephen Smulski, president of Wood Science Specialists in Shutesbury, Mass., responds:* It takes specialized knowledge, an experienced eye, and a mix of field and lab work to, first, determine whether timbers exposed to conditions favorable to wood-rotting fungi are still structurally sound, and, second, to estimate their load-carrying capacity.

An inspector first looks for timbers with obvious advanced rot, insect damage, and signs of structural distress. These are marked for replacement, and no more time is expended on them.

Most of an inspector's effort is devoted to the detailed examination of timbers that have no obvious problems, but that experience identifies as candidates for hidden problems such as incipient decay and concealed pockets of rot. Rot in its earliest, or incipient, stage is especially problematic because it's difficult to detect and can mean an appreciable strength loss. That's why inspection efforts are concentrated on natural water traps such as connections between timbers, bearing locations, hardware and fasteners, and where flooring, roof decking, and other members contact timbers. For this phase of the work, a moisture meter, awl, increment borer, and drill are used.

When timbers are visibly wet or discolored but otherwise look okay, their subsurface moisture content is measured with a moisture meter. If it's below 20%, there's no active decay present. If it's between 20% and 28%, it's wet enough for existing decay to continue. If it's over 28%, conditions are ripe for a new infection to get started or an established one to continue. Samples of wet wood are taken for later examination in the lab for incipient decay as well as species identification.

The pick test is useful for detecting incipient decay on the surfaces of timbers. The soundness of wood is judged from the way a large splinter breaks when pried away with an awl. Sound wood emits a sharp crack as the splinter is pried. The splinter is typically long, with one end still attached to the wood. A splinter pried from wood with incipient decay is short, lifts quietly from the surface, and almost always fails over the tool, with both ends still anchored to the wood. Beware: The pick test is highly subjective; natural characteristics of sound wood often give false positives.

To find concealed pockets of decay, a drill or an increment borer is used to bore into a timber. Discolored, wet, and musty drill turnings suggest incipient decay, as do changes in the force needed to advance the bit. Sometimes a special drill that records the resistance to advancement is used. This device is especially useful in mapping the size and shape of pockets of rot. The hollow leg of the T-shaped increment borer extracts a pencil-size cylinder of wood for later microscopic examination. Holes left behind are sprayed with preservative or plugged with a preservative-treated dowel. Internal decay can also be detected and mapped with a stress wave timer that measures the speed at which sound waves travel through wood. Subnormal velocity indicates rotted wood.

Once decay has been confirmed, there is no known way to estimate how much it has reduced a timber's strength. Remove as much of the decayed wood as is practical and economical. Cut back rotted timbers to sound wood, keeping in mind that difficult-to-detect incipient decay can extend well beyond visibly rotted areas. Treat infected but otherwise serviceable timbers that are left in place with a water-based borate preservative that will kill active fungi and guard against future infection as well. Let partially rotted timbers dry out before making repairs. Reinforce them with a sister anchored to sound wood.

Timbers are then visually graded in place. The grade, in conjunction with the wood species, is used to assign allowable design values.

Got a question?
Send it to Q&A, *JLC*, 186 Allen Brook Ln., Williston, VT 05495; or e-mail to jlc-editorial@hanley-wood.com.