

Poor man's pry bar.
Used against the floor joists, a long 2x makes a great pry bar to help lift tongue-and-groove floor sheathing.

Fix a Failing Bathroom Floor



From demolition to installation, how to repair old, water-damaged floor joists

BY MIKE LOMBARDI

In a perfect world, there would never be a battle between framing and plumbing. The reality, though, is that bathrooms are often small, and there frequently is precious little space to fit all the incoming and outgoing plumbing necessary for the tub, shower, vanity, toilet, and other fixtures. Without forethought in the design phase, upfront communication between subcontractors in the rough-in phase, and a willingness to do the job right in remodels, sacrifices are often made.

These problems usually are found in the floor system: Joists are notched carelessly, cut through, or drilled incorrectly, sometimes directly under a bathtub or toilet, where there is an added load on the framing. In the bathroom shown here, water leaking from the joint between the tile floor and the tub apron had rotted the floor sheathing, the original joist below, and a new joist that had been sistered in place to rescue the original. To make matters worse, the adjacent joist had been notched almost two-thirds of the way through to accommodate the tub's waste line. These framing nightmares aren't uncommon, and though nobody likes to hear it, proper repair often means a full demolition of the bathroom.

The plans for this project included expanding the bathroom's footprint, so we had the luxury of removing the partition walls on both ends, which gave us lots of room to work. We had a full-height basement below the bathroom, which also made our work easier. Often, the ceiling below the bathroom has to be opened up or part of the rim joist removed so that new joists can be slid into place. The plans also called for a barrier-free shower, which meant lowering the floor so that the tilesetter could create a sloped mortar bed, a decision that has its own structural complications (see "Q&A," p. 84).

In the end, we elected to install doubled floor joists under the whole bathroom. Damaged joists were cut out and replaced with new lumber spanning from plate to carrying beam, and joists that were still in good condition were beefed up with new joists sistered alongside them. After notching the joists in place for the lowered floor, the whole assembly was tied together with 3/4-in. sub-floor sheathing.

Know the signs of trouble

The first signs of structural inadequacies in a bathroom floor usually show up in the form

OUT WITH THE OLD, PREP FOR THE NEW



Open the floor. Depending on the plans for the remodel, you can sometimes remove partition walls, which makes cutting the floor with a circular saw a quick task (photo left). Most of the time, the walls are staying in place, though, so use a reciprocating saw (photo right) to cut the flooring flush to the plates.



Make way for the new wood. With the old subfloor removed, it's time to remove all nails from the tops of the joists and to remove or reroute any plumbing, electrical wiring, or ductwork that will interfere with the installation of the new subfloor and joists.



Get the sag out. It's not uncommon for an old floor joist, especially one that's been notched deeply, to have sagged over time. Before sistering a new joist to the old, string a line between the joists' two bearing points (photo left), and use a piece of framing lumber and a small sledgehammer to lever the joist up until the sag has been removed (photo right).

of cracked grout joints in floor or wall tile, or even cracks in the tiles themselves. Most fixtures in the bathroom are heavy, are used frequently, and can shed or leak enough water over time not only to wet the floor below, but also to wet it repeatedly so that it doesn't dry out. That's the perfect recipe for rot. These problems most often occur near the toilet, the bathtub, and the shower stall.

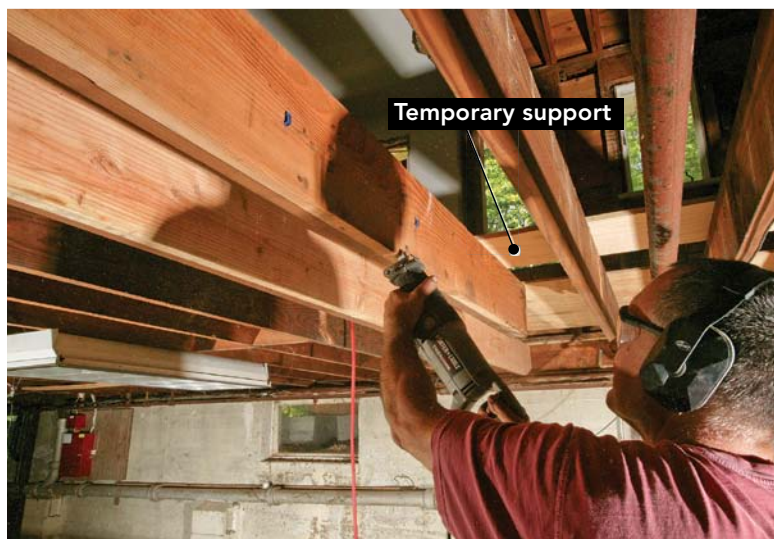
The toilet requires a large drainpipe connection (3 in. or 4 in. dia.), and in older homes, it was common for the plumber to notch the floor joists rather than to bore a clean hole through the framing to run the pipe. This notching can cause settling of the finished floor and can disturb the toilet flange's watertight connection. The damage in this case may be from a leak so small that

GET A GOOD FIT WITHOUT A STRUGGLE

Custom sizing. If you're spanning between a mudsill and a carrying beam, you often can leave the joist long, sliding one end over the carrying beam while the opposite end is lifted into position. If you're spanning between two walls or rim joists, the joists must be shorter to maneuver them into place. The old joists may not be the same height as new lumber, but you can notch the bottom edge if needed (photo far right).



Roll 'em upright. Slide one end of the joist over the top of the carrying beam so that the other end can be lifted and slid toward the rim joist. Start with the lower edge of the joist roughly in position, then roll the joist into place and persuade it into its final upright position with a small sledgehammer. The joist may need to be raised slightly to ensure that it's carrying the load from the wall above. Use a pry bar to create space between the mudsill and joist, and then slide in opposing shims (photo right).



A helping hand

Demolition should be an orderly operation, so rather than randomly cutting the joists and letting them fall, work carefully. Cut the damaged joists into 3-ft. to 4-ft. sections, making them easier to uninstall and carry out. To keep the unsupported ends of a damaged joist from falling as you make cuts, screw a scrap of wood to the top of the joist at a point just beyond where you will make the cut.

it does not immediately show up, even when you're looking at the ceiling below the bathroom, but continuously wets the subfloor and framing to a point of decay and rot. Condensation also can contribute to floor and wall damage near the toilet. A toilet that is continuously running, especially during hot, humid conditions, will cause condensation to form on the tank, bowl, and cold-water supply piping. Although usually in small amounts, the constant drip of water causes damage to nearby subflooring, wooden trim, and eventually framing.

A bathtub uses a smaller drainpipe connection than a toilet, but the tub drain assembly (the trip waste and overflow) and the trap can interfere with the floor framing. A cast-iron tub is heavy. Add in 40 gal. to 80 gal. of water, and it's not hard to imagine the stresses being placed on the joists. The weakened floor can cause the tub to settle, which leads to cracked tile and fractured grout joints that allow water to wick into the subfloor below. I've also seen floors deflect enough that water from the showerhead has begun following the inclined tub rim into the grout joint fissure or onto the floor.

The demo phase informs the rebuild

When planning for a bathroom remodel, good preparation helps to prevent the possibility of future water damage. The demolition phase of the project usually reveals the areas that have been affected by moisture penetration and guides what needs to be corrected during the rebuild. Take pictures, make notes, and pay attention to details. Each job is different, but experience has taught me to focus on a few key areas.

First, know where your fixtures will go and how they will be installed. You may have to fur out walls, box out floor framing, adjust joist layouts, or even tweak the position of a

fixture to avoid problems. Also, remember that solid, reinforced floor framing under the tub and toilet guarantees sturdy, level installations. It also pays to explore all fixture options. Often, you can find a tub or toilet with different rough-in requirements that may fit better with your floor framing.

Second, don't just seal around the fixtures after they're in place. Waterproofing should start with the subfloor and underlayment. Apply a good-quality silicone sealant where the tub apron meets the subfloor, where the tile

backerboard meets the tub rim, and around all the shower faucet/fixture penetrations before, during, and after the tile is installed. The toilet flange should be sealed where it meets the finished floor, and the toilet bowl should be caulked or grouted to the floor. Toilet tanks can be purchased with an insulated liner that helps to prevent condensation from forming, an option that I always recommend when the bathroom has a history of water damage from condensation. □

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Prep for a mortar bed



The plans for this bathroom include a barrier-free shower, so the floor had to be lowered in preparation for a sloped mortar bed. A plywood cleat screwed to the side of the joist serves as a guide for the circular saw. At each end, an oscillating multitool or reciprocating saw finishes the cut.



A solid subfloor seals the deal. With the notches complete, the floor is tied together with 3/4-in. tongue-and-groove subfloor sheathing laid in a bead of construction adhesive and fastened with screws or ring-shank nails.