Clever Fix for a

A two-pronged approach to leveling a balloon-framed floor

BY ANDREW GRACE

Although we also build new homes, my company's bread and butter is updating and remodeling turn-of-the-century houses, most of which have balloon framing. Balloon framing was a transitional method of construction that came between timber framing, which was common until the late 19th century, and the modern platform framing that came into style in the post-WWII period. A balloon-framed house has studs running uninterrupted from the mudsill to the plate under the rafter tails. Second-floor joists are nailed to the bearing walls and supported by a piece of stock called a ribbon board—in this case 1x6 stock—let into the studs (see drawing, right). One of our recent whole-house balloon-frame remodeling projects had a floor so out of level that anyone sitting on the toilet in the future bathroom risked sliding off. Just walking on this part of the second floor was vertigo inducing, never mind trying to make tiled walls look right. The floor had to be leveled.

Take it easy, Jack

In a sloping-floor scenario like this, most remodelers immediately start jacking up the low point—but when a house has sagged this much and has been that way for decades, rarely can you correct the whole amount by jacking. If you try, you may end up breaking framing members or the roof or second floor will start lifting where you don't want it to.

Structural problems like this sagging floor often occur from foundation settlement or other structural deficiencies. Obviously these kinds of things must be corrected before you start leveling the floor. In this case, the 2x10 floor joists sagged because of their 22-ft. span without an intermediate beam or bearing wall, so a big part of fixing this floor was installing an LVL flush beam near midspan. Posts on both ends and another beam already in the crawlspace would continue the load path to the foundation and concrete footings under the crawlspace slab.

Without leveling the overspan floor, the planned bathroom above would have been 2½ in. out of level in a little over 10 ft., which is just too much to jack. The great part about balloon framing is that you don't have to jack the floor the whole way. You can raise the low point, usually at the center of the span, and lower the high point where the floor is attached to the wall. When I explain this process to clients and fellow contractors, they often surmise that lowering part of the floor must take a long time, but lowering one side of this floor, as shown here, only took about three hours. Compare that to jacking and installing the beam, which took close to a whole day. When we were done, the floor was perfect—and I'm sure our work saved many hours that would have been spent trying to make fixtures and finishes work in such an out-of-level space. It sure looks better, too. □

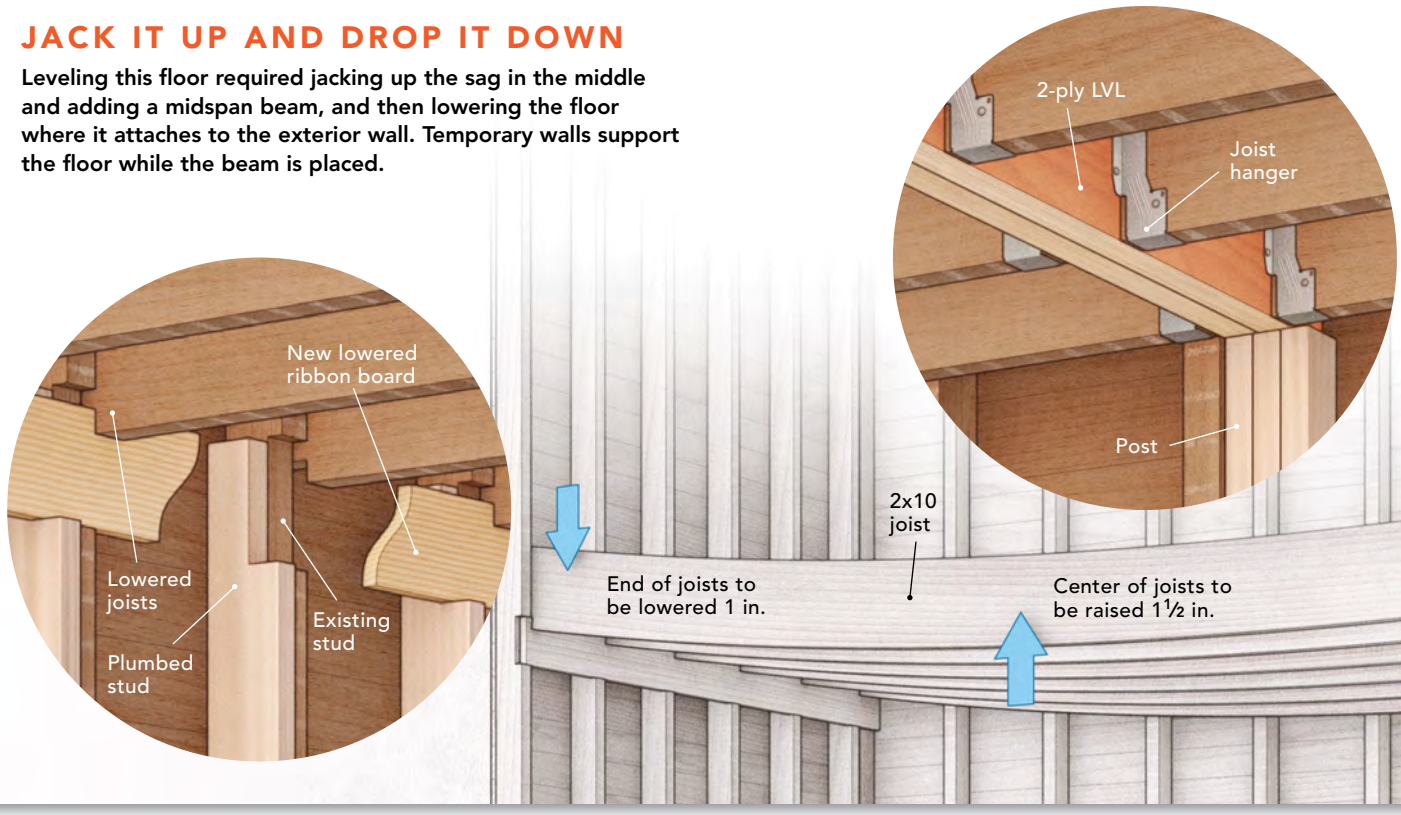
Andrew Grace is a remodeler in Ligonier, Pa. Photos by Patrick McCombe.

Drawing: Christopher Mills

Sagging Floor

JACK IT UP AND DROP IT DOWN

Leveling this floor required jacking up the sag in the middle and adding a midspan beam, and then lowering the floor where it attaches to the exterior wall. Temporary walls support the floor while the beam is placed.



FREE THE FLOOR

With the midspan beam in place and the low point jacked to the maximum, the next step is to lower the high side of the floor. The joists are already nailed to the studs, which is enough to safely hold the floor in place while the old ribbon board is replaced.

Provide support. *Temporary walls support the floor on both sides of the beam until the joist hangers are attached and the beam's ends are supported with posts. The studs are scribed and cut individually to ensure a tight fit. Leaving off the top plate provides an additional 1½ in. so the studs can be used for partitions later.*

Make a level line. *Use a pole-mounted compact laser to project a level line below the floor. Measure up from the laser line to the low point of the floor near the new beam. This shows how much you need to lower the end of the floor—about 1 in. in this case.*

Mark new notches. *Before we began work on the floor, we added headers and cripple studs above windows and doors. Using the laser, we then marked all studs for the lowered ribbon-board notches.*

Cut new notches. *Cut the bottom of the new notches with an oscillating multitool and then remove the waste with a chisel. Both the new studs around the window and the old ones in other parts of the wall can be cut in the same way.*

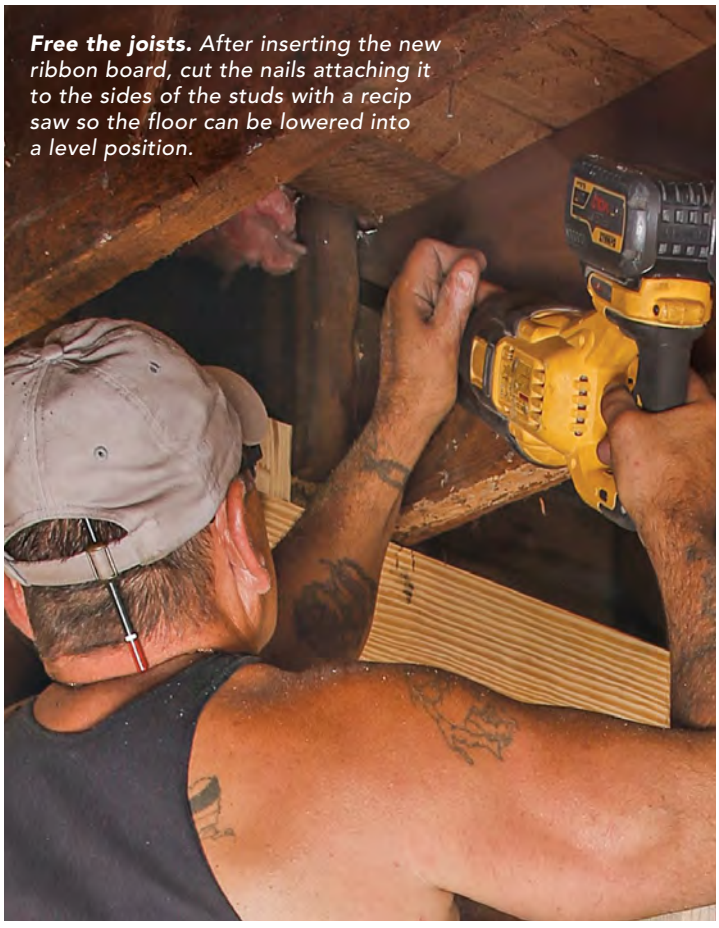
Cut the ribbon. *Use a reciprocating saw to cut the old ribbon board on both ends and then use a cat's paw to remove the nails that hold it to the studs.*

PREPARE FOR LANDING

With the old ribbon board removed, a new one can be fit into the lowered notches, and the floor lowered to rest on it.

Nail up new studs. *To make it easier to hang the drywall later, we fastened new notched 2x6 studs next to the existing studs, which were 3 in. out of plumb top to bottom. We nailed the top, plumbed the stud, and then nailed the bottom into the plate.*

Stair-tread stock is ideal. *The new ribbon board is ripped from 5/4 clear vertical-grain yellow pine stair-tread stock—a perfect match for the ribbon board's original thickness. Once fit, tack it in place with a couple of nails, but don't fully fasten it yet.*



Free the joists. *After inserting the new ribbon board, cut the nails attaching it to the sides of the studs with a recip saw so the floor can be lowered into a level position.*

Fine-tune the notch. *The joists all have notches of varying depth to accommodate the joists' slightly different dimensions. We don't change the depth of the notch, which keeps the floor in a single plane. But we do make the notch slightly wider so the floor joists easily slip past the new ribbon.*

Gentle readjustment. *A pair of heavyweight coworkers walking around or a board and sledgehammer lowers the ends of the floor joists, bringing them into contact with the ribbon board and making it level across the span.*

Attach the joists. *When the floor is settled onto the new lower ribbon board, nail the joists to the sides of the studs.*

Fasten the ribbon. *Once the floor is lowered, the ribbon board, which was only tacked in place, is fully nailed using 2½-in. ring-shank framing nails.*

Leveled out. *With the center of the span jacked 1½ in. and the end of the span lowered 1 in., the floor is now level, making the installation of bathroom tile and fixtures much easier.*