Fixing Bouncy Floors

Three ways to stiffen floors to eliminate the bounce.

By Mac Wentz From The Family Handyman

Years ago, while working as a carpenter, I helped stiffen a bouncy floor by nailing a new 2x10 to each of the 2x10 joists that supported the floor. It was a complex, expensive job: Working in the unfinished basement below the bouncy floor, we had to remove the plumbing and electrical lines running through the joists and then rerun the lines after the new 2x10s were in place.

It worked. By doubling up the joists, we cut their "deflection" (the distance they would bend under weight) in half. The floor hardly bounced at all and the client was happy.

But I know now that we could have made that floor just as stiff—even stiffer—with a lot less trouble and expense.

This article will show you three better ways to take the bounce out of a floor. You can stiffen the floor in just one room, or in as many rooms as you like. The methods we'll cover make floors stiffer, but not necessarily stronger.

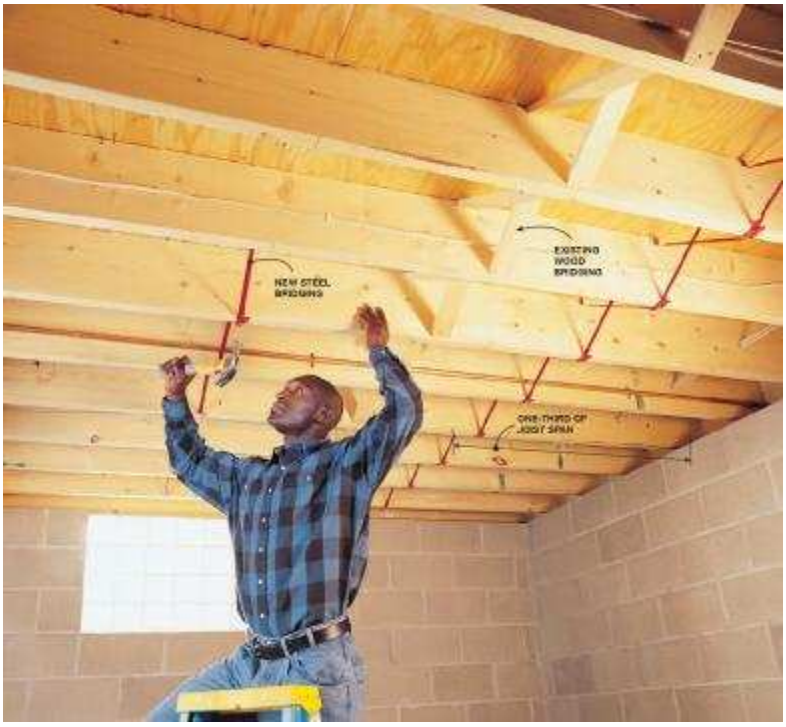
If your floors are bouncy and also noticeably sagging, they probably are too weak. You may need the help of a structural engineer to solve this problem, but begin with a call to your local building inspector, whose advice is free.

You don't need any special skills or tools to stiffen your floors, and all the materials are readily available at home centers. The fixes we'll show work for both solid wood joists and wood I-joists. But there is a catch: For two of the three fixes we show (Solutions A and B), you need access to the floor joists from below. That means having an unfinished basement, a basement with an easily removed suspended ceiling or an accessible crawlspace. Otherwise, you'll have to tear off the drywall or plaster. The third fix (Solution C) will work even if the ceiling is finished.

Test the Floor First
Joists, the primary structural member in a floor, rarely span the entire width of a house. Instead, a wall or beam usually supports them near the middle. And if you have a beam, you have to make sure that it's not too weak before you beef up the joists.

Here's a simple test: Go to the exterior wall opposite the beam. Stand on your tiptoes, then drop hard onto your heels. You should feel almost no bounce here. Next, stand about halfway between the exterior wall and the beam. The tiptoe-drop should cause the biggest bounce here. Finally, stand near the beam. Any bounce you can cause here should be small, similar to what you felt along the exterior wall. If the result is more like what you felt in the middle of the floor, the beam below is either undersized or not supported sufficiently by posts. Solve this problem first, by asking your local building inspector about correct beam sizing.

Solution A: Add Bridging
Easy To Do, And A Modest Improvement



Click image to enlarge.

Fasten metal bridging with 1-3/8 in. joist hanger nails. Each piece of bridging requires four nails, two at each end.

Bridging, or "X-bracing," allows joists to share weight. As a footstep falls on one joist, some of the force is transferred to neighboring joists. Even if your joists already have a row of bridging at the center of the span, adding a row on each side of the existing bridging will stiffen the floor.

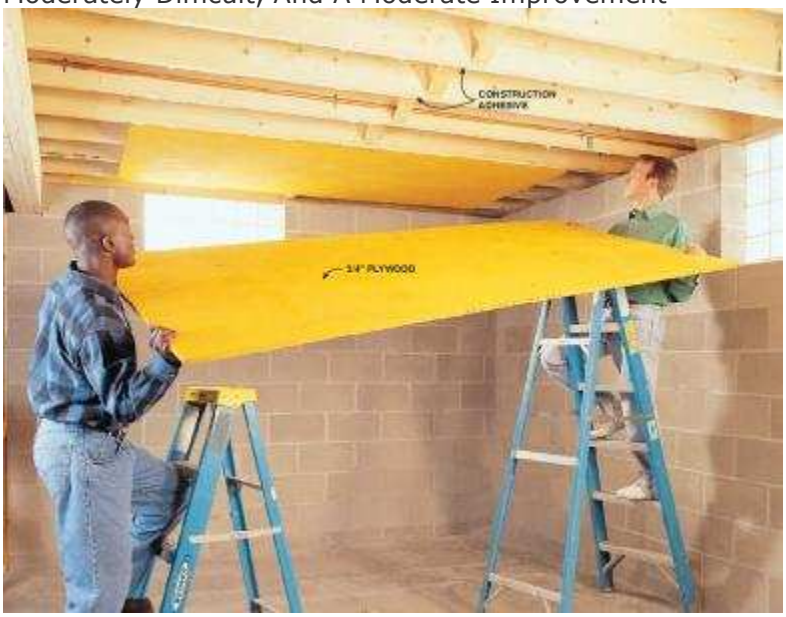
This solution doesn't make the floor as stiff as the other solutions, but since it's relatively easy and inexpensive, you might want to try it first. If you don't get the results you want, you can still try a different solution.

Begin by checking the original bridging. If any of it is loose, add some nails or screws to secure it. Add a row of new bridging at both of the one-third points of the span. If your joists span 12 ft., for example, place bridging 4 ft. and 8 ft. from the foundation wall. If there is no bridging in the center of the span, install a row there as well.

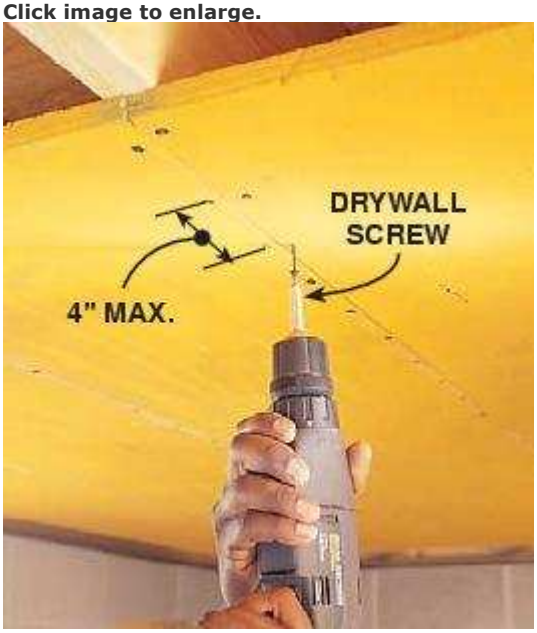
Metal bridging is available at home centers in lengths to fit between joists that are centered 16 in. or 24 in. apart.

In A Nutshell
Effect: Cuts "deflection" (how much the joists will flex) by about 50 percent.
Pros: Easy and inexpensive.
Cons: Not as effective as other solutions.
Cost: $1 per joist to add two rows of bridging.

Solution B: Add a Layer of Plywood
Moderately Difficult, And A Moderate Improvement



Click image to enlarge.



Drive 1-1/2 in. drywall screws through the plywood and into joists. The screws should be no more than 4 in. apart.

As a joist bends downward, the lower edge bends slightly to one side or the other. A layer of 3/4-in. plywood firmly fastened to the undersides of joists helps prevent this side-to-side bending and stiffens the floor.

But for this fix to work well, the upper edges of the joists must be solidly fastened to the subfloor above. Squeaks in a floor usually mean that the subfloor has loosened from the

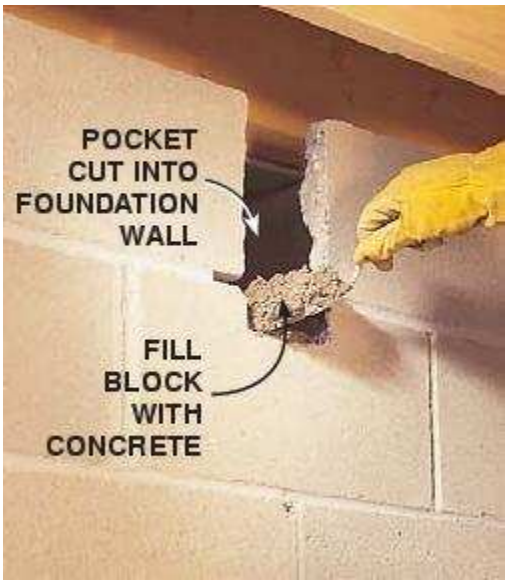
joists. If your subfloor is plywood and has few or no squeaks, you'll get excellent results. If your house is more than 30 years old, your subfloor is probably made from individual boards. You can still get good results with a subfloor like this if the boards fit tightly together. But if there are wide gaps between the boards or the floor is very squeaky, this fix will be less effective.

A rock-solid bond between the new plywood and the undersides of the joists is crucial; you'll use lots of screws and construction adhesive. Begin by sanding the underside of each joist with coarse sandpaper (60 to 80 grit). Two or three passes with the sandpaper are enough to leave a rough, clean surface for the adhesive. Then glue and screw the plywood to the joists. The plywood runs parallel to the joists, not across them. The 8-ft. long sheets are centered on the span, leaving the ends of the joists exposed. So if you want to attach drywall to the ceiling later, you'll have to install strips of 3/4-in. plywood or 1x4 to the undersides of the exposed joist ends. You can use CDX plywood (about $20 for a 4 x 8-ft. sheet) or BC plywood (about $25), which has one smooth side. Be sure the construction adhesive you use is recommended for subfloors.

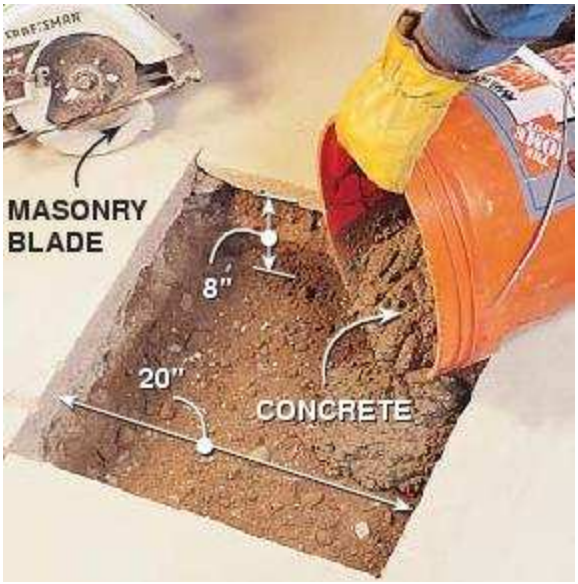
In A Nutshell
Effect: Cuts deflection by about 80 percent.
Pros: Makes the floor very stiff without creating obstructions in the basement, as Solution C does.
Cons: Expensive; won't work if plumbing or electrical lines are mounted on the underside of joists.
Cost: $8 to $12 per joist.

Solution C: Add a Wall or Beam
More Difficult, But A Great Improvement

Click image to enlarge.



Cut a "pocket" into the foundation wall to support the end of the beam. Begin with a circular saw, then do the rest with a cold chisel. This is dusty, slow work if the wall is solid concrete. It's easier if the wall is hollow concrete block, but you have to fill the block that the beam will rest upon with concrete (first stuff newspaper into the wall to keep the wet concrete from running through the block). To avoid all this hassle, you can place a post next to the foundation wall instead—no need for a footing, because the post will rest on the wall's footing.



Pour a footing for each post by first cutting a 20 x 20-in. hole through the concrete floor using a circular saw and masonry blade. Wear eye protection and a dust mask when cutting concrete. Then dig the hole 8 in. deep and fill it with concrete.

The longer the distance a joist spans without support, the more it will flex. By building a wall under joists, you divide the span. The floor above will be stiffest if you place the wall in the middle of the joists.

If you build a wall to support joists, be sure to place a stud directly and tightly under each joist. If the wall will have a doorway, place a double 2x6 header above the door's rough opening.

A beam will leave your basement wider open, but installing a beam means a lot of work. A beam made from two 2x12s should be supported by adjustable metal posts or 4x4 wood

posts every 10 ft., and you'll have to pour footings for these posts to rest on.

If you have I-joists, be sure to add a 2x4 block between the wall or beam and the subfloor at each joist.

In a Nutshell
Effect: Cuts deflection by about 98 percent with the beam or wall in the middle of the joist. With the beam or wall at one-third of the span, the deflection is cut by about 90 percent.
Pros: Makes the floor extremely stiff.
Cons: Creates obstacles (a wall or posts) in a space you may prefer to leave open. Bigger job than the others.
Cost: For a wall, about $3 per joist, not including drywall. For a beam like the one shown here, about $5 per joist.

Comments :

By mdodgethomas, 04/19/2009, 12:31 PM EDT
"A beam made from two 2x12s should be supported by adjustable metal posts or 4x4 wood posts every 10 ft." No "adjustable column" of the type with sliding sections locked in place by pins as illustrated in the photograph above is listed for permanent use in the United States. see for example:
http://www.octoberhome.com/articles/adjustcolumn/adjustcolumn.html Those need to be a correct type of adjustable column, and properly and secured the beam at the top and the footing at the base.