Replace a Rotten Lally Column

A proper footing and post add floor support that will never fail again

BY EMANUEL SILVA

As a restoration and remodeling carpenter in and around Boston, I get to work on a lot of old homes. The years have not been good to many of these old structures. Over the past 15 years, I've been called to address sagging floor joists and their support beams so often that shoring them up has almost become routine. Many of these older floor systems were supported by inferior, hollow Lally columns—steel pipes typically filled with concrete for increased durability and load-bearing capacity—temporary jack posts, and even tree trunks. To make matters worse, they were typically set atop equally inferior footings, or on no footing at all.

By temporarily supporting and jacking up the beam just enough to loosen the existing column, I can create enough workspace to install a proper footing and Lally column. I don't attempt to fix sagging or otherwise unlevel floors (sidebar p. 43). My goal is simply to prevent further settling.

The house shown here has moisture problems as well, thanks to surrounding properties that seem to channel all their rainwater toward its foundation. While the concrete Lally columns will likely survive occasional flooding, I decided to anchor them atop small piers for longevity. However, the process is roughly the same whether you want columns raised or set flush to the slab.

Emanuel Silva runs Silva Lightning Builders in North Andover, Mass. Photos by Rob Yagid.

BUILD CRIBBING TO SUPPORT TEMPORARY POSTS

When removing an existing column, it's imperative that the temporary supports are as strong as the new columns being installed. Because most of the homes I work on have slabs that are in poor condition, I try to spread the load by building cribbing. The cribbing serves as a strong, level base in which I can place screw jacks. With the jacks in place, I can use 4x4 pressure-treated posts to raise the beam safely. It's best to install these supports roughly 1½ ft. from the location of the new footing. This lends the support you need and allows comfortable working room.

Start level, stay straight. *Use small scraps of lumber to bring two 3-ft.-long 4x4 pieces of pressure-treated lumber to level. The next two pieces are stacked perpendicular to the first two. The top layer then is screwed to the bottom.*

Twist to lift. *Prior to cranking on the jacks, plumb the post, and secure it to the beam with toe-nailed screws. If someone accidentally bumps into a post, it will stay put. Raise the jacks to relieve enough pressure on the old posts so that they can be removed easily, but no higher.*

PUNCH A SQUARE HOLE IN THE OLD SLAB

This slab was in bad shape and, at 2½ in. thick, thinner than the slabs poured nowadays. From my experience, I knew that if a footing existed, it would be little more than stones thrown in a hole. I was right. Not all footings have to be rebuilt, though. Assess the condition of the slab, and look for signs that the home was built to high standards. When in complete doubt, dig.

Measure out, plumb down, and dig. *According to code, there must be a support column along this beam every 8 ft. Take measurements from the foundation wall, and mark them in the center of the beam. Then plumb down from each mark to locate the center of the footings. From this point on the slab, measure 1 ft. out in four directions. With a framing square, connect the points to create a 2-ft. by 2-ft. square. Use a cold chisel to score the perimeter line, and then use a jackhammer or a sledgehammer to break through the slab. Dig down 1 ft.*

Why shouldn't I level the beam?

Wood, drywall, and plaster are viscoelastic. (Think of Silly Putty as an extreme case.) They act elastically under short-duration loads and act plastically under sustained, long-term loads. As such, it is difficult to jack all of the sag out of a beam that has crept over the years unless it is done slowly over time.

Although it may be possible to bring a beam back to level, the question of whether sag should be jacked out of a beam is difficult to answer. It depends largely on the framing above the floor. If there are plaster or drywall walls above, then it may be possible to remove only a small amount of sag from the beam. Drywall and plaster creep over time and do not like to be moved. I have seen contractors literally jack a house off its foundation before getting any sag out of a beam.

If the beam is in an open expanse of floor, then raising it is an easier proposition. I have even recommended that contractors kerf stubborn beams in several locations. The beam, and subsequently the floor, then can be raised easily. The beam itself can be sistered up with additional lumber to restore its integrity.

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POUR A BOMBPROOF FOOTING

Because we wanted to elevate the new column's base above the slab, I incorporated a builder's tube into the footing to create a pier. I reinforced the pier with six pieces of #4 rebar. You can bypass this step if you'd like and install the posts so that they're flush with the slab. To do that, simply lay a grid of rebar 3 in. from the bottom of the footing, and install another grid 3 in. from the top of the footing.

Add concrete. *Make sure the soil is compacted. Then cover the bottom of the hole with 3 in. of concrete rated for 4000 psi. Place two pieces of rebar parallel to each other on top of the wet concrete and 6 in. from each wall of the hole.*

Create the pier support. *Into the wet concrete, set a 16-in.-long, 12-in.-wide builder's tube fitted with two pieces of rebar that protrude 6 in. from each side, and level it. The exposed rebar, which sits a few inches below the height of the slab surface, helps to tie the pier to the rest of the footing.*

Fill it up, and screed it away. *Pour concrete in and around the builder's tube until the concrete is slightly proud of the slab and the lip of the builder's tube. Push two 16-in.-long pieces of rebar into the pier—so that their top end is 2 in. to 3 in. below the finished concrete—prior to screeding off the excess concrete and feathering the surrounding concrete into the slab. During the pour, make sure you're maintaining center by checking the pier location with a plumb bob.*

TOOL TIP

Hang a retractable plumb bob, such as this one made by Tajima (www.tajimatool.com), from the beam to mark the center of the footing. It can be raised when it gets in the way and lowered regularly to check center.

INSTALL THE NEW COLUMN

I like to use 3½-in. concrete-filled Lally columns. Manufacturers say that the color—red or gray—is no indication of performance or application differences. A variety of cap and base plates is available. I use the standard plates that come with the columns from the lumberyard.

Tap it into place. *After cutting the column to length (be sure to consider the thickness of the plates when measuring for length), place the column on the bottom plate. Add the top plate to the column, and tap the assembly into place with a sledgehammer. Check to be sure the column is plumb.*

Secure the plates. *Drill pilot holes through the screw holes of the bottom plate, and secure the plate with 3-in. Tapcon screws or concrete anchors. Attach the top plate to the beam with 2½-in. lags, never with nails.*

Finish the pier. *Remove the exposed builder's tube by scoring it with a utility knife where it meets the slab. Masonry caulk, such as Quikrete Concrete Repair (www.quikrete.com), cleans up and protects the seam.*

TOOL TIP

You can cut a Lally column with a specialty column cutter. However, I find it easier to hold the column in place with a large pipe wrench and cut it with a pipe cutter that has the capacity to cut 4-in. pipe. I clean up the cut edge by chipping away any concrete with a cold chisel.