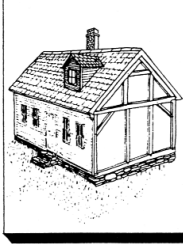


Brace Framing

by John Leeke



When replacing sills or foundations of timber-framed structures, the structural load must be supported during the work. Donald MacRae, from Cumberland, Ontario, writes to ask how the localized loads of timber framing could be handled during temporary bracing. This month I'll discuss how I supported the structure on a preservation project in Massachusetts.

Localized loads. In balloon framing, wall studs carry loads from above. The loads are evenly distributed along the sill. In timber-framed structures, loads from above are carried across the girt and down the posts. Studs in the wall between the posts carry just the weight of that wall, which includes the interior and exterior finishes (plaster, clapboards, win-

dows). This means there is relatively little loading on the sill between the posts. These concentrated loads at the posts must be taken into consideration when constructing temporary supports.

Case in Point

On the project in Massachusetts I had to support the 20-foot-wide end wall of a timber-framed house for sill work. The wall was framed with 8x8 corner posts spanned above by an 8x8 end girt. Between the posts, 3x4 studs supported interior plaster, which was decorated with early hand paintings. Special care was needed not to crack the plaster.

Ordinarily a sill replacement like this would be wrapped up by a crew of three within a week or so. But because of other framing

problems on this building, I had to leave the bracing in place for three months.

Supporting the load. After considering loads for the existing structure I thought about how they would combine with my temporary one. I knew I had to keep in mind what happens to the load once it enters the ground. If the load was too close to the building it might transfer to the fieldstone foundation, causing it to buckle into the cellar. If it was too far out, the jack might slide out from underneath.

My plan was to support the main loads at the corner posts and to provide some additional support between the posts to assure the interior plaster would not be stressed.

Girt band. First I installed a girt band. After removing three or four courses of clapboards over the girt, I lag-bolted a 2x8 to the girt (see illustration). I also bolted the band to the top of the studs. The studs were mortised into the girt, but I didn't want to take a chance they would work loose from the weight of the interior and exterior finish.

Lodge poles. The girt band takes the load from the girt and transfers it to lodge poles that carry the load away from the structure. In this case I used four 4x4 poles "lodged" against the girt band at the studs, one at each corner post and two in the middle. For lodge poles, be sure to select 4x4s with no defects (such as large knots, cross grain, or bowing) that would weaken them. I shaped the tops to fit the angles formed by the vertical wall and the bottom edge of the girt band and cut the bottoms off squarely. I tacked each pole with a nail to hold it in place until the bracing and jacks were in position.

Most of the load is taken by the poles at the corner posts. The ones in the middle are added to keep the girt from flexing, causing the studs to shift and cracking the plaster inside. If there had been no concern for the plaster I would have left out the middle poles.

Sleepers. Next I excavated a trench to hold the sleepers, which spread the load out evenly over the soil and provide a platform for the jacks. If the topsoil is loose, you should dig down to more compact subsoil. If the soil is an unstable clay or sand, use wider planks or cribbing to spread the load out over a larger area. The bottom of the trench should angle so the sleepers are perpendicular to the lodge poles. This is fairly easy to judge. I laid 2x10 sleepers first, then 2x6s on top (2x10 is the minimum size you should use for the bottom layer). I extended

the sleepers out three to four feet past the corner poles, since they're taking most of the load.

Jacks. Then I set the jacks in place. I use screw jacks since there is no chance they will slip over time. (I haven't had a lot of experience with hydraulic jacks, so I don't trust them for long-term loads.) Once they were in place I snugged the jacks up just enough to make the pole-and-jack assembly rigid. Buckling from over-tightening is the main way the pole-and-jack assembly can fail.

Jacks are the least stable link in the load-bearing system, so bracing is needed to secure them.

Bracing. For bracing I used full dimension 1x4 rough cut lumber. Along the bottom of the wall I removed several courses of clapboards and one sheathing board. This gave me access to the bottom of the posts and studs, where I fastened horizontal braces running to the bottom of the lodge poles.

Then I fastened a system of diagonal bracing between the lodge poles.

To fasten the bracing I begin with a few drywall screws, using just one per joint. Driven with a cordless drill they are handy for setting up and adjusting a complex structure like this. But they are not rated for shear loads like those expected in structural bracing, so I add nails to all the joints once everything is set up.

The result is a fairly stable structure able to safely transfer the load from the girt to the ground while leaving room to work on the sill.

Transferring Loads

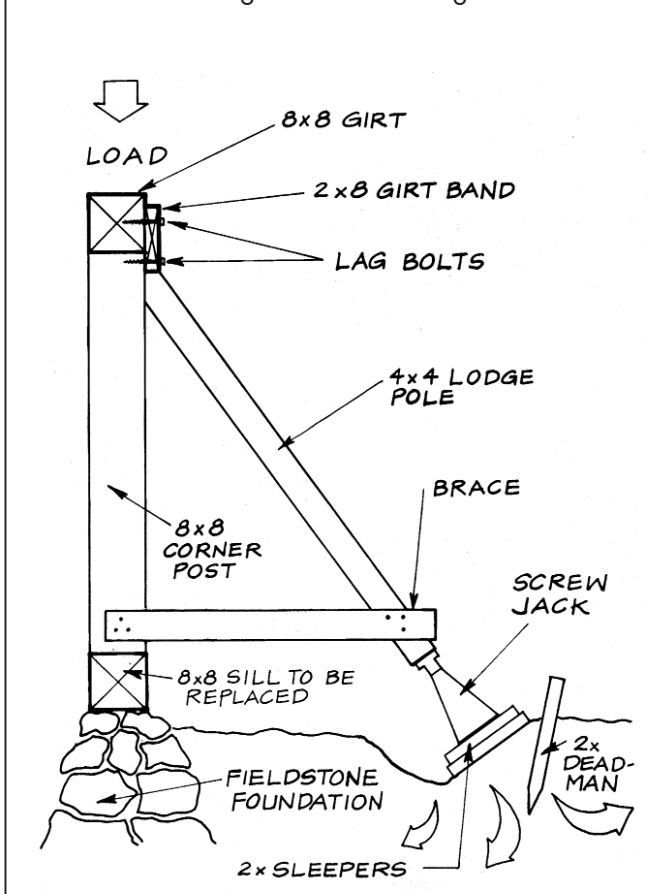
Gently over a day or two I crank up the jacks. This time allows for compaction of soil.

Monitor the loads during work. The soil under the sleepers could compact more under continuous loading. Rain storms could wash out the earth or change its load-bearing ability. Adjust jacks as needed to account for changing conditions.

General cautions. Remember that every job and situation is different. Before you get started make sure you understand how the loads are transferred down through the structure. Then proceed methodically and use common sense. ■

John Leeke, of Sanford, Maine, restores and maintains historic buildings. He also consults with contractors, architects, and owners working on older buildings. If you have questions on restoration topics, you can contact him c/o JLC, RR#2, Box 146, Richmond, VT 05477.

Transferring a Load with Lodge Poles



When replacing sills on timber-framed structures, transfer the loads from the corner posts to the ground with lodge poles.