

MASONRY



Opening Up a Masonry Wall

Have all the materials ready to go before shoring the wall

BY JAKE LEWANDOWSKI

Our company, Great Lakes Builders, was recently called in to widen a door opening in an exterior wall of a masonry home by 4 feet. The area outside the opening was to be roofed over and weathered in to expand a finished basement.

The walls of the house were concrete block with a brick veneer, and we had to support the wall before installing a new header beam for the expanded opening. To make matters worse, the floor of the house above the opening was supported by web trusses that we'd have to work around as we set up our shoring for the wall. With limited space in front of the opening, we'd have very little room once the shoring was in place. So we had to position the beam that would support the expanded opening on the concrete floor just outside the opening before we could set up the shoring.

To support the masonry wall, we began by installing four shoring towers, two on each side of the wall. The towers were outfitted

with adjustable-length U-heads that held pairs of short S5x10 beams running perpendicular to the wall. On top of those beams were a pair of W10x22 spanner beams, one on each side of the wall, which in turn supported six needle beams that we had inserted through openings cut through the masonry wall.

Using the adjustable heads on the shoring towers, we snugged the short beams up against the floor trusses inside the wall and raised the outside towers to the same level. Then we packed non-shrink grout between the needle beams and the masonry. When the grout cured, the wall was fully bearing on the shoring assembly, and we could begin expanding the opening.

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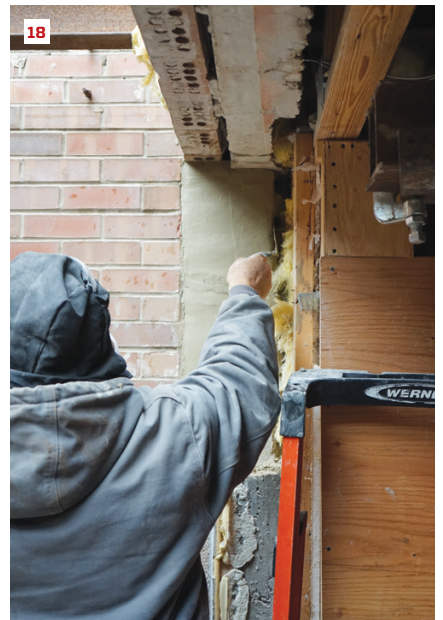
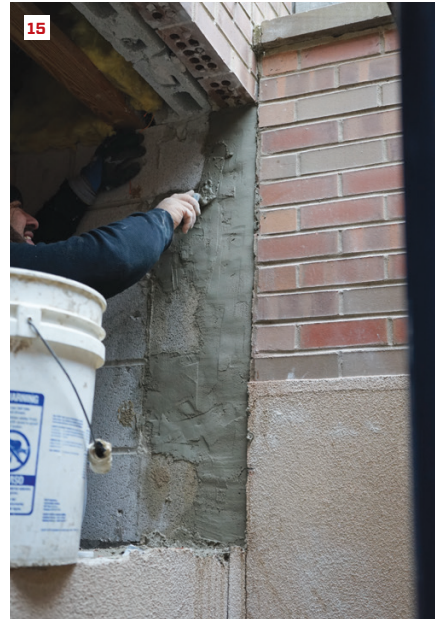
Working with engineered drawings, the crew cuts six openings through the brick veneer and the concrete block wall **(1)**. Then they set up four shoring towers (steel support scaffolding), two inside the wall and two outside, measuring to position each one exactly **(2)**. To the adjustable U-heads on each corner of the towers, they clamp a pair of short S5x10 beams perpendicular to the wall **(3)**. On top of those beams, they set W10x22 spanner beams parallel to the wall, bridging between the tops of the towers on both sides **(4)**. After threading six S5x10 needle beams through the holes in the wall, the crew raises the adjustable heads until the needle beams are level on the spanner beams **(5)**. Then they secure the needle beams with beam clamps **(6)**.



With the needle beams and spanner beams level (7), the crew packs the openings above the needle beams with non-shrink grout. To ensure good adhesion, they first spray water on the masonry (8), then they pack grout into the holes (9). The non-shrink grout has high compressive strength to provide support for the wall during the project.

After stuffing the rest of the needle-beam holes with insulation, the crew removes the masonry across the width of the opening (10). A crew member cuts the original lintel beam in half to make it easier to remove (11). With the entire width opened up, the crew can prepare the masonry on both sides before lifting the new support beam into place (12).

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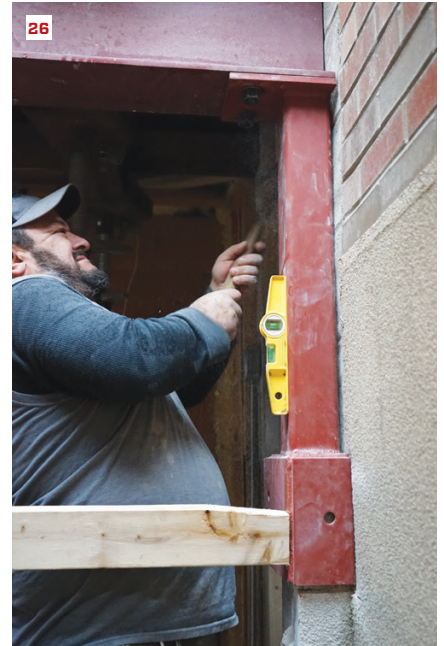


The existing masonry details differed between the sides of the original opening; the right side had a stem wall, and the brick veneer extended farther down than on the left side. The crew removes the concrete block down to the brick-veneer line (13). Note the vertical saw cut for the concrete section that will remain in place to support a column on that side. Next, they cut back the end of the old brick veneer as well (14). They then parge the entire surface with mortar (15). On the other side of the opening, removal of the lintel beam left a void in the masonry that had to be supported structurally (16). The crew begins by parging the masonry below the void with non-shrink grout. Then they layer flat concrete blocks into the void (17) and finish coating the infill masonry with grout (18). The repair ensures that the masonry wall will be structurally sound on both sides of the new support beam.



The crew had placed the W12x35 beam that would support the new opening on blocks inside the shoring towers before shoring up the wall and preparing the opening. When ready, they use a crane lift on rollers to raise the beam (19). They roll the beam into position directly under the masonry wall (20), and then raise it the final distance (21). The crew supports the beam in the opening using a shoring tower with the ends spread farther apart (22). This time, wooden cribbing blocks span between the U-shaped heads for the beam to rest on while the crew installs support columns. The crew levels the beam in the opening despite the out-of-level brick courses (as seen in the ever-widening gap over the left end of the beam). That gap was filled with structural mortar before the supports were removed. With the beam in place and properly supported, the crew removes the rest of the masonry stem wall over to the saw cut (23).

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After preparing the masonry on each side, the crew installs specially fabricated steel columns to support the beam. On the right side of the opening, a sleeve on the column base fits over the section of concrete wall that was left in place. A crew member slides the column into place and checks the fit **(24)**. To allow the column to fit tight against the wall, he removes a section of the stucco coating **(25)**. He then inserts the column under the beam, tapping it level with a hammer **(26)**. To hold the column in place while it is being attached, the crew braces it back to the shoring tower with a length of 2x4. While the column is held stationary, a crew member uses a tuck pointer trowel to push structural mortar into the void between the column base and the masonry support **(27)**. On the left side of the opening, the column base wraps over the masonry support below **(28)**. As with the column on the opposite side, a 2x4 brace keeps the column plumb and stationary while the structural mortar under the base cures.



Once the structural mortar cures, the crew drills holes for $\frac{5}{8}$ -inch attachment bolts, which are epoxied in place per the engineer's specifications **(29)**. After the epoxy cures, the crew threads nuts onto the bolts and cuts the ends with a grinder **(30)**. Three bolts secure the right-side base **(31)**, and hardened steel bolts attach the tops of the columns to the support beam **(32)**.



When the crew finishes installing the columns with the weight of the masonry wall loaded onto the new beam, they dismantle the shoring that supported the beam and wall. After removing the beam clamps, they back off the adjustment screws on the shoring towers **(33)**. With the area cleaned, the space is ready to be roofed and weathered in to expand the basement living space **(34)**.