

On the Job

Supporting a Masonry Chimney From the Bottom Up

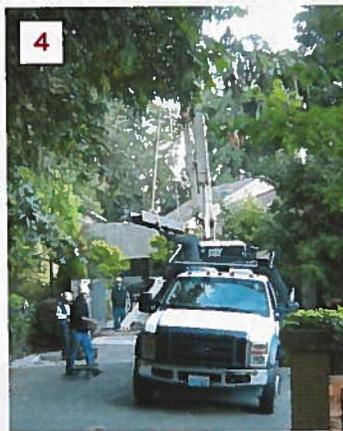
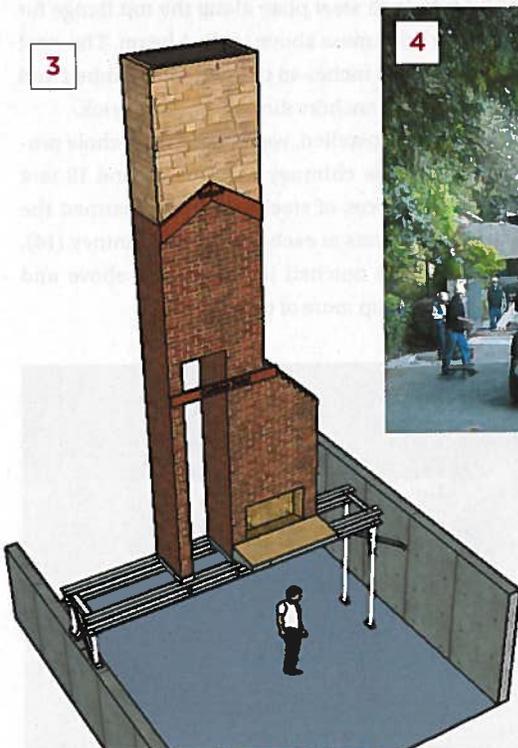
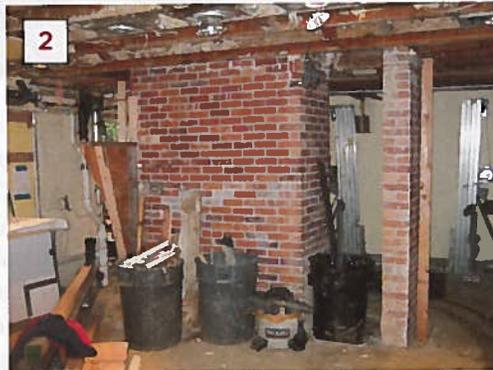
by Brad Hilse and Brad Hutt

The only thing standing in the way of the homeowners' plans to turn their partially finished daylight basement (1) into an open media room with a custom wine cellar was 32,000 pounds of brick — namely, the masonry mass containing the two flues for the wood-burning fireplaces on the upper floors (2). Our company, a framing and structural contractor, was called in to help

the GC remove the chimney — from its base at foundation level up to the first floor — while leaving the upper part intact and undamaged. The engineer's plan for supporting the chimney called for two 18-foot-long steel I-beams, along with a dozen other pieces of steel angle iron located both in the basement and the attic (3).

Our first logistical challenge was simply getting the beams into the basement, using our boom truck (4), some furniture dollies, and a pair of one-ton Genie lifts. A few days before the I-beams showed up, we did a test run with a full-length wood mockup to make sure we could get them where they needed to go. Fortunately, everything came off without a hitch on delivery day.

Once we had the beams in the basement, the welder had to do some fabrication — cutting to length, drilling holes for connections, and welding on web-stiffeners at various bearing points. Our brick mason had assured us that the brick chimney would behave monolithically, so that we could install the beams one side at a time without risking collapse. In preparation, we installed 3-inch tube supports at the end points, where they would be hidden in cabinets and wall framing, while the mason removed the brick to make way for the first beam (5).



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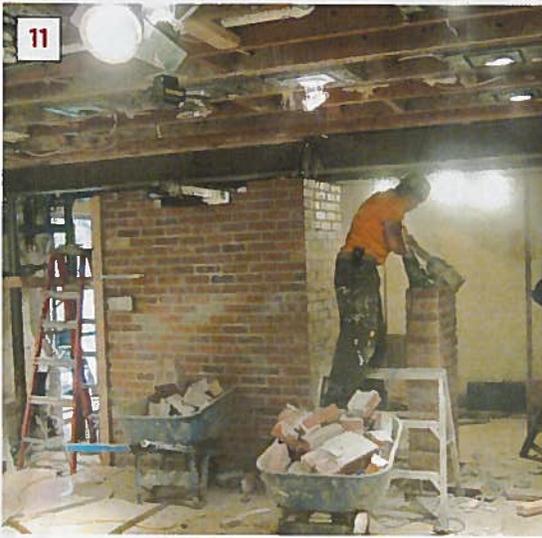
The channel created for the beam was about an inch too high (6), but the space would be filled later with stone shims and non-shrink grout. For now, it gave us the needed clearance to make the installation easier. We hoisted the first beam with our Genie lifts, positioned it (7), and bolted it to the post caps at each end while our temporary supports were still in place (8).

With the beam in place, the next step was to grout the empty spaces above it to ensure even bearing (9). We also welded a 5-foot length of 6-by- $\frac{1}{4}$ -inch steel plate along the top flange for securely attaching the brick mass above to the I-beam. The steel plate was predrilled every 8 inches so that we could embed and epoxy $\frac{5}{8}$ -inch threaded rod anchors directly into the brick.

Once the steel plate was installed, we repeated the whole process on the other side of the chimney with the second 18-foot beam. Next came some pieces of steel angle that spanned the 30 inches between the I-beams at each end of the chimney (10). These short members were notched into the brick above and grouted so that they picked up more of the load.

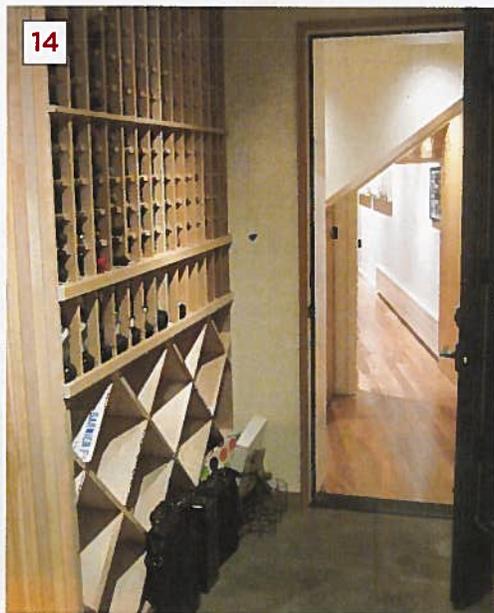


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At this point, we were able to begin removing the bottom part of the chimney (11). The engineer had warned us to expect as much as $\frac{3}{4}$ inch of deflection in the I-beams as they took the load. We gradually transferred the weight of the brick onto the steel by slowly lowering the 20-ton jacks we had used for temporary support. We worked our way around the chimney, first removing any loose shims, then removing loaded shims. When the final shims were removed, the beams had deflected about $\frac{3}{8}$ inch, causing no damage to the tile and drywall finishes upstairs.

With the brick out of the way, we added a couple of angles from underneath and grouted any remaining voids between the steel and brick (12), leaving that part of the basement open for construction (13). We finished our phase of the job by framing the walls for the wine cellar (14) and the media room (15), which were completed by the GC.



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