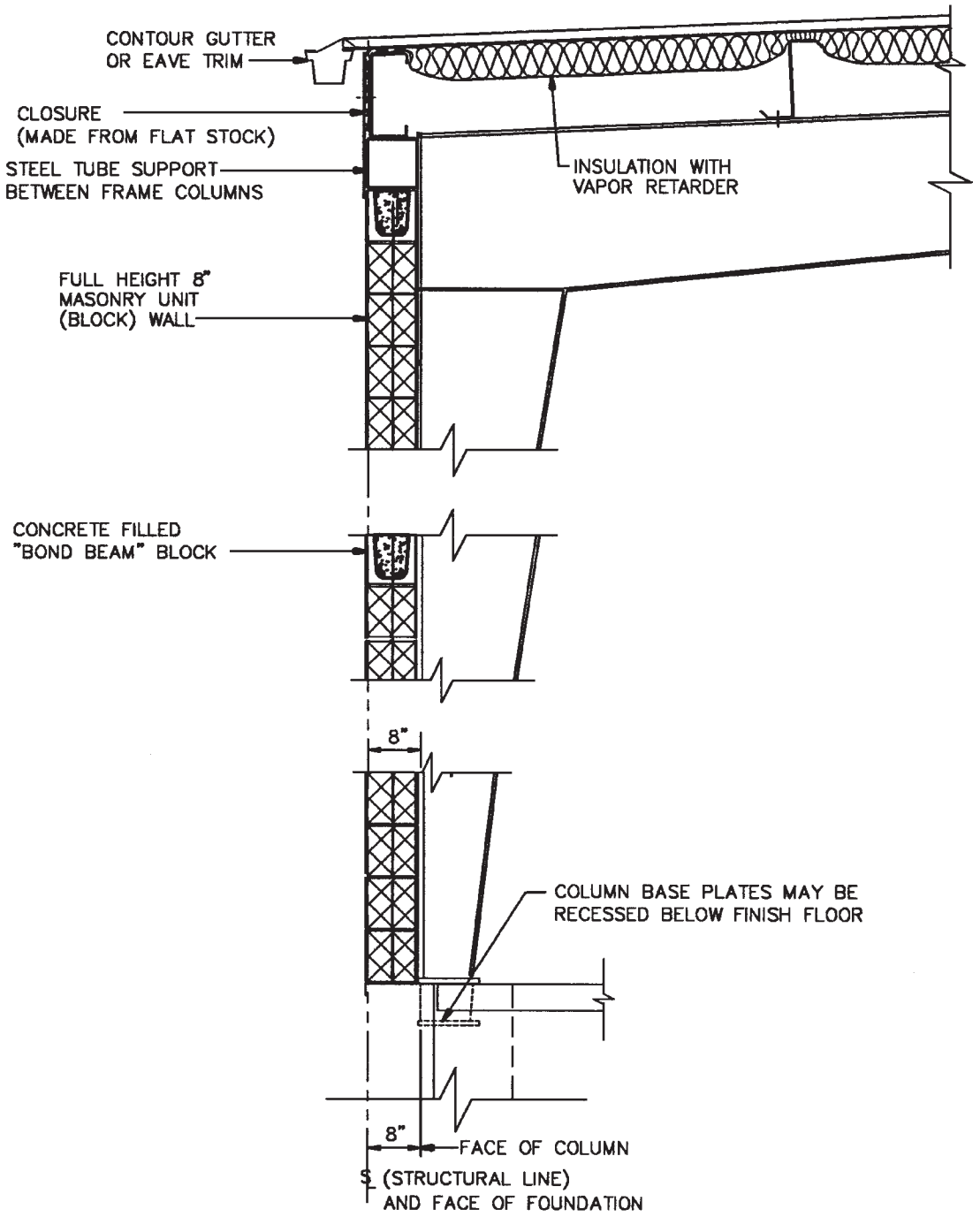

FIGURE 7.21 A tubular member at the top provides lateral support for vertically spanning full-height single-leaf exterior CMU wall. (*After a drawing by Butler Manufacturing Co.*)

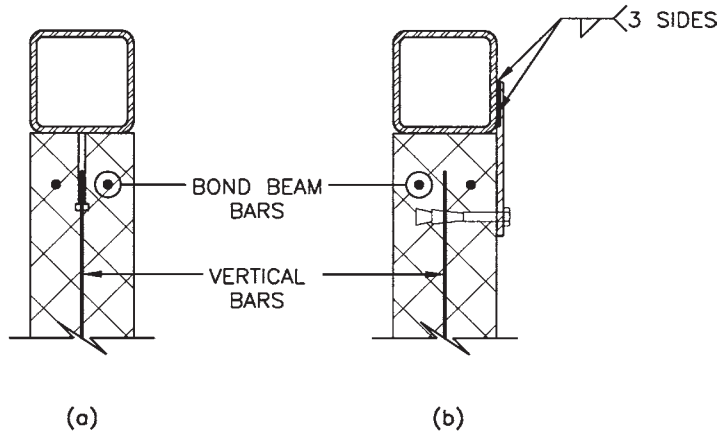

FIGURE 7.22 Two details of tubular girt attachment to CMU wall: (*a*) by welded studs; (*b*) by post-installed bolts.

A different connection detail demands less jobsite coordination but involves a bit more work. The hard wall is fully erected first, then the tube with shop-welded plates is placed on top, and finally the plates are bolted to the grouted bond beam from the side (Fig. 7.22*b*).

With both details of tube attachment, the size and spacing of fasteners and connectors are determined by analysis. If the wall bypasses primary framing, as in Fig. 7.21, the tubes can be attached to the exterior column flange in a manner that effectively resists the applied horizontal forces and torsion. This typically requires angle or plate connections at the top and bottom flanges of the tubular girt.

The second design solution is to place a wide-flange girt spanning from column to column behind the wall, as shown in Fig. 7.23 for both masonry and concrete walls. The primary difference between using CMU and concrete in this detail lies in the wall connections: it is easier to use cast-in plates in concrete than in CMU. In this design, the wall extends to the bottom of the metal roofing. Note the welded bracket for the rod diaphragm connection.

The main advantage of this solution is material economy, because the wide-flange girt can be made as deep as needed rather than being constrained by the wall thickness. The difficulties include the girt's connection to the frame: it must be made to a thin web, rather than to a relatively thick flange to which the top-of-the-wall tube could be attached. Another complication is that, unlike a tubular section, the wide-flange girt requires flange bracing (Fig. 7.23) to be effective, increasing field labor costs.

7.3.7 Column Flange Bracing with Hard Walls

Cold-formed steel girts to which the column flange bracing is normally attached (see Chap. 4) may not be present in hard walls. What happens to the flange bracing when masonry or concrete walls are used? It is possible to design the columns without any flange bracing, but a more economical solution is to attach flange bracing to the walls. The flange bracing details for hard walls are somewhat more complex than those for metal-sheathed walls, mainly because *both* column flanges must now be braced.

The exterior column flange can be connected to the wall with post-installed anchors. The anchors can be drilled either directly through the flange (Fig. 7.24*a*), or through short clip angles attached to the column (Fig. 7.24*b*). The clip-angle version is used when the column depth or