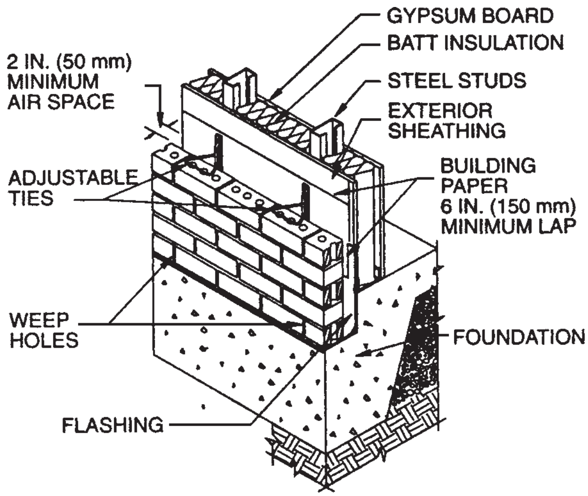

FIGURE 7.29 Brick veneer over steel-stud wall. (*Used with permission of the Brick Industry Association, Reston, VA, www.brickinfo.org.*)

rior face; the protruding point should form a drip by being bent at 45°.[17] Some architects loathe the look of the exposed flashing edge, yet flashing terminating within the brick invites water to travel under it back into the cavity, or worse—to freeze there. Flashing should be turned up and extended 6 to 9 in above the penetration point and be embedded into the sheathing or a reglet. It is important to turn up and seal the edges of flashing at the sides as well, to stop water from escaping sideways; prudent architects provide an isometric detail of this condition. The most durable flashing materials are stainless steel and lead-coated copper, but they are not easy to work with. Weep holes are located directly above the flashing at 16 to 24 in on centers.

The width of cavity needs to be at least 2 in, as mentioned above; anything less is difficult to keep free of mortar droppings that can carry water across the cavity. Why is this important? After all, is not water expected to get into the cavity anyway? The answer is yes, but the less water, the better, since water, or even moisture, lingering in the cavity attacks metal ties and their connections.

Adjustable ties anchor brick to steel studs and transfer lateral loads to them, acting as mini-columns. The ties are best made of thick ($^3/_{16}$-in) wire; those thin corrugated metal ties familiar to house builders are off limits in engineered construction. An adjustable tie is attached to the anchor connected to a steel stud; the anchor should permit a vertical adjustment of at least one-half height of a brick. Some common kinds of adjustable ties are shown in Fig. 7.30.

In zones of high seismicity, building codes may require that longitudinal wire reinforcement be embedded in masonry veneer and attached to the ties (Fig. 7.31). The wires improve ductility of the veneer and keep it in place should serious cracking develop under severe seismic shaking.

Most often, brick ties are attached to studs with self-drilling screws driven through sheathing. The screw-to-stud connection is a critical link holding up the veneer against the wind, which explains why moisture in the cavity is such a problem: Eventually, corrosion in this vital connection can lead to a brick-covered ground. The ties and studs might be made of galvanized steel, but the screws are normally protected only by a corrosion-resistant coating which can be easily damaged during installation. Stainless-steel fasteners offer a superior corrosion resistance of their own but can initiate corrosion when in contact with plain or galvanized steel.

At least one prominent engineer points out that all masonry contains some salt and laments that

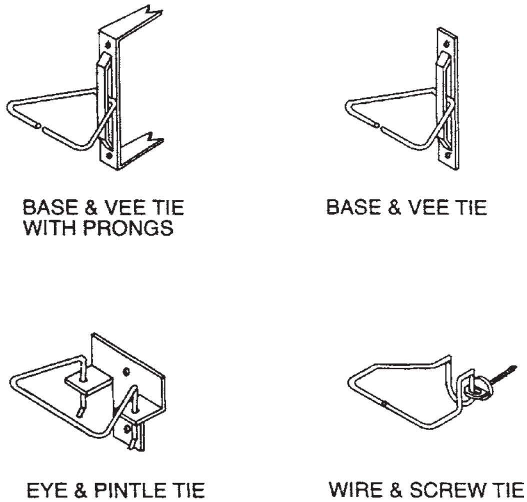

FIGURE 7.30 Brick-tie assemblies. (*Used with permission of the Brick Industry Association, Reston, VA, www.brickinfo.org.*)

the brick "is literally hanging on the building by a thread, and the fine thin arris of the unprotected thread of a steel screw may be periodically bathed in a salt solution."[18] While others take a less apocalyptic view of the situation, the threat is clearly there. The author's practice is to specify galvanized (coating designation G90) studs of at least 18 gage, regardless of strength requirements, simply to provide a larger thickness of metal at the connection. This practice is now endorsed by BIA.[16]

Many engineers, the author included, have sought ways to eliminate the screws from the anchors altogether. Unfortunately, the possible alternatives that use pop rivets or small bolts instead of screws would be much more labor intensive than the present practice. Also, one should think about special waterproofing requirements to prevent water penetration through the large resulting holes.

At present, the use of self-drilling screws and the anchors of the type shown in Fig. 7.30 is prevalent. A special baked-on copolymer coating such as Stalgard* has been found more effective in corrosion protection and abrasion resistance than cadmium or zinc plating. To further restrict access of water to the joint, Gumpertz and Bell[19] suggest installing a piece of compressible gasket, made of EPDM or similar material, behind the base anchor. In addition, the screw should have either a built-in neoprene washer or a separate rubber grommet.

As if the issues involving flashing and brick ties are not complicated enough, there is also a controversy involving lateral stiffness requirements. Recall that flexible steel studs are supposed to be a "structural" backup (lateral support) for "nonstructural" brittle brick veneer. The problem is, the brick may crack well before the flexible studs assume their deflected shape. An obvious solution is to stiffen the studs by using deeper sections made of thicker metal. But stiffen by how much?

BIA's Note 28B recommends that the maximum deflection of steel stud backup, when considered alone at full lateral service load, to be $L/600$. There are those who consider this limit not stringent enough, pointing out that the brick will crack at deflections less than one-third of that—$L/2000$.[18] Some in the steel-stud industry, on the other hand, might still cling to an old limit of $L/360$.[20]

To come to a solution, a rigorous analysis accounting for the stiffness of the veneer, steel

*Stalgard is a registered trademark of Elco Industries Inc.