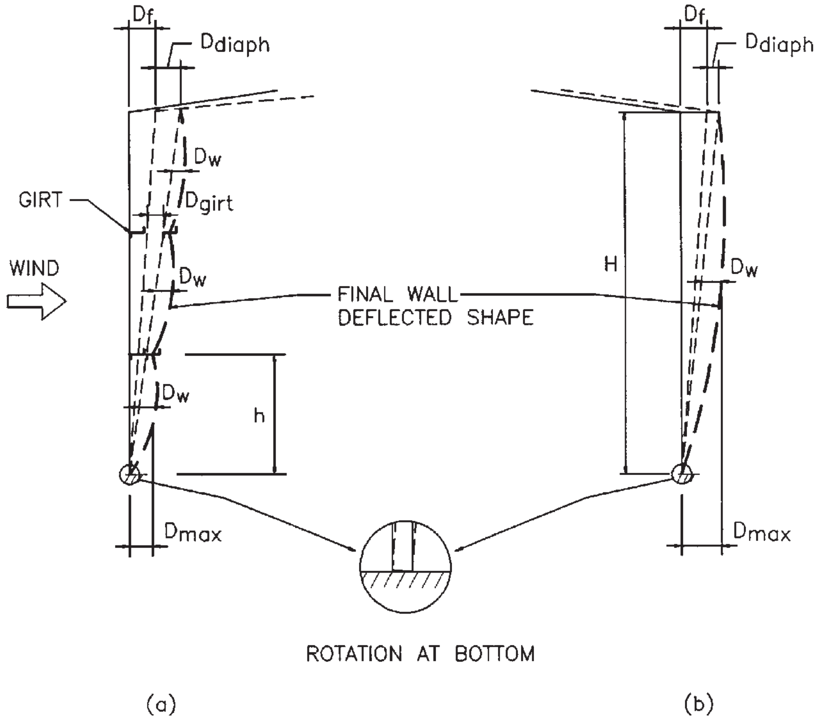

FIGURE 11.6 Components of total horizontal wall displacement: (*a*) with girts; (*b*) without girts.

not apply, and D_{max} must be taken as the maximum displacement. (The walls are rarely fixed at their tops, of course.) It is evident that the wall's vulnerability to cracking is influenced more by its own rigidity and by the details at the base than by the magnitude of the story drift.

But is it possible to make doweled CMU walls behave as simple beams? For reinforced CMU, AISC Guide no. 3 suggests that, instead of a common CMU base detail of Fig. 11.7*a,* a detail similar to that of Fig. 11.7*b* be used to facilitate end rotation. In Fig. 11.7*b,* a continuous through-the-wall sheet flashing installed at the base, with mastic around the vertical bars, is provided to introduce a plane of weakness in the wall and make end rotation possible. It seems, however, that CMU with vertical bars and dowels will still develop a substantial fixity moment at the base (Fig. 11.7*c*), which puts the whole theory of pinned-base CMU into question.

The base rotation may become possible if the dowels are omitted but the flashing kept. Unfortunately, such a detail is likely to produce a wall without enough "grip" on the foundation, a wall that could shift under lateral loading. In a better detail, the dowels are kept but the dowel length above the flashing is encased in a bond-breaking sleeve that allows the dowel to slide inside the wall (Fig. 11.7*d*). In this case, the dowels resist no tension but are able to transfer shear.

Another important issue in this discussion concerns building corners. A wall exposed to the wind, its top attached at the eave, will move with the frame, while the perpendicular wall will not (Fig. 11.8). By introducing a control joint in the wall near the corner, one hopes to avoid wall cracking. The joint, however, may not survive large wall rotations without failure—and leakage.

A problem with excessive deflections of the exterior walls normal to the direction of lateral loads is important, but so is *racking* of walls parallel to the load (Fig. 11.9). Racking affects, for example, interior drywall partitions attached at their tops to main building framing. A drywall partition can undergo significant deflections normal to its surface but is vulnerable to displacements along its plane. While it is possible to overcome this problem with special "sliding" connections at the top of

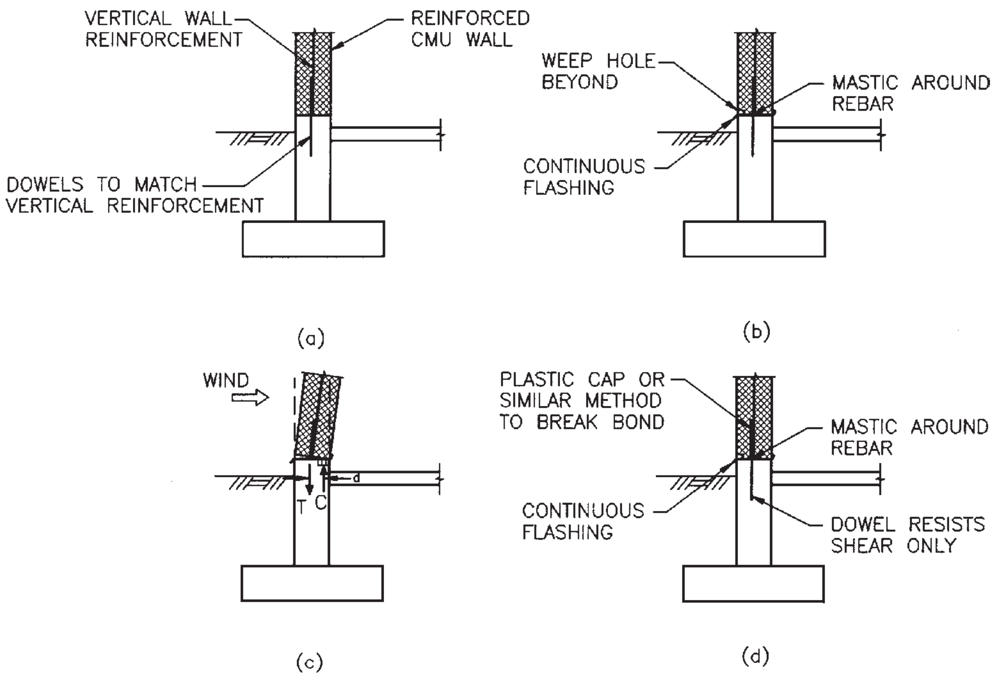

FIGURE 11.7 Overcoming fixity at the bottom of doweled masonry wall: (*a*) a common construction detail; (*b*) introducing a plane of weakness to facilitate rotation; (*c*) forces resisting rotation and providing fixity; (*d*) a possible detail of true "pin" connection.

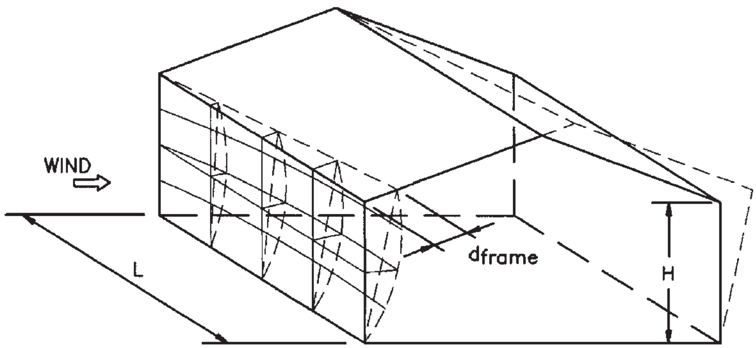

FIGURE 11.8 Deflected shape of the wall near building corner.

the partition, such connections are best designed by structural engineers who, regrettably, are rarely involved with architectural details.

Exterior masonry and concrete walls in metal buildings also experience racking. These "hard" walls are much more rigid than any wall bracing that might be located along the same column line; they tend to act as shear walls, rendering the bracing ineffective. Unless completely separated from the frame movement—a rare scenario—these walls should be intentionally designed and reinforced as shear walls in lieu of wall bracing.