

FIGURE 4.22 Endwall framing viewed from inside the building. (Star Building Systems.)

Endwall columns are commonly spaced 20 ft on centers, a distance governed mostly by the girt spanning capacities. The column layout may start from a center column at the ridge line. Where no center column is provided, two endwall columns straddle the ridge line.

In nonexpandable endwalls, a connection between the endwall column and the rafter may consist of simply bolting the column flange to the rafter web (Fig. 4.2) and connecting the purlin to the

rafter—not to the column—with a clip angle (Fig. 4.23a). Or, the column may be attached to the rafter by small endwall connection channels (Fig. 4.22). In either case, a rake angle is needed at the top of the purlins to support the wall siding.

In expandable endwalls, the column-to-rafter connection requires an additional bracket or clip angle between the column and the frame rafter (Fig. 4.24a) and between the endwall girt and the frame column (Fig. 4.24b).

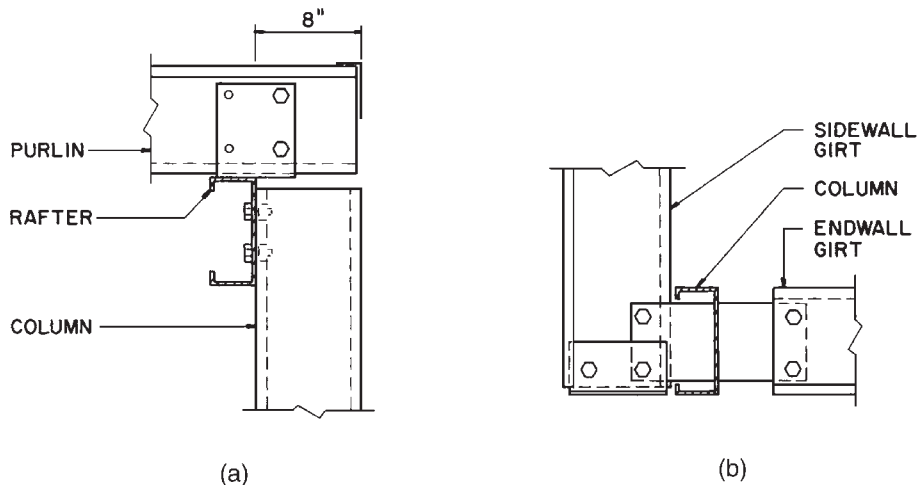
The endwall girts may have either a *flush* or *bypass inset* (these terms are explained in the next chapter, and more details are provided there). Flush girts are designed as simple-span members framing into the webs of the endwall columns (Figs. 4.22 and 4.23). Bypass girts are designed as continuous members; at the corners, they may be connected to the columns or to intersecting sidewall girts with special girt brackets (Fig. 4.24).

In some buildings with masonry, glass, or concrete walls, the curtain-wall structure can span directly from foundation to the roof. There, the endwall framing may consist only of a clear-spanning rigid frame, similar to the case of expandable endwalls but without any endwall girts and columns.

## 4.12 SOME CONTENTIOUS ISSUES OF DESIGN AND FABRICATION

### 4.12.1 Single-Sided Welding

As already noted, primary frames in metal building systems are typically made of welded plates and bars. The welding between the flanges and the web is normally done by automatic welding equipment and only on one side (some manufacturers even use intermittent welds). Typically, fillet welds are used, except that thicker plates (1 to 1.5 in) may require partial-penetration welds. There are engineers who consider such single-sided welds structurally deficient.<sup>6</sup> This distrust is perhaps understandable, but there is no overt prohibition of single-sided welding either in AISC or AWS



**FIGURE 4.23** Endwall framing details for nonexpandable endwalls. (a) Connection between endwall column and purlin; (b) plan at corner. (*Metallic Building Systems.*)