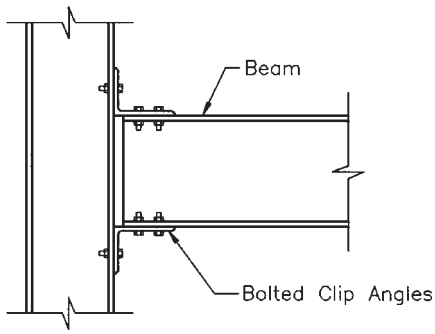

FIGURE 4.4 Conventional semi-rigid connection.

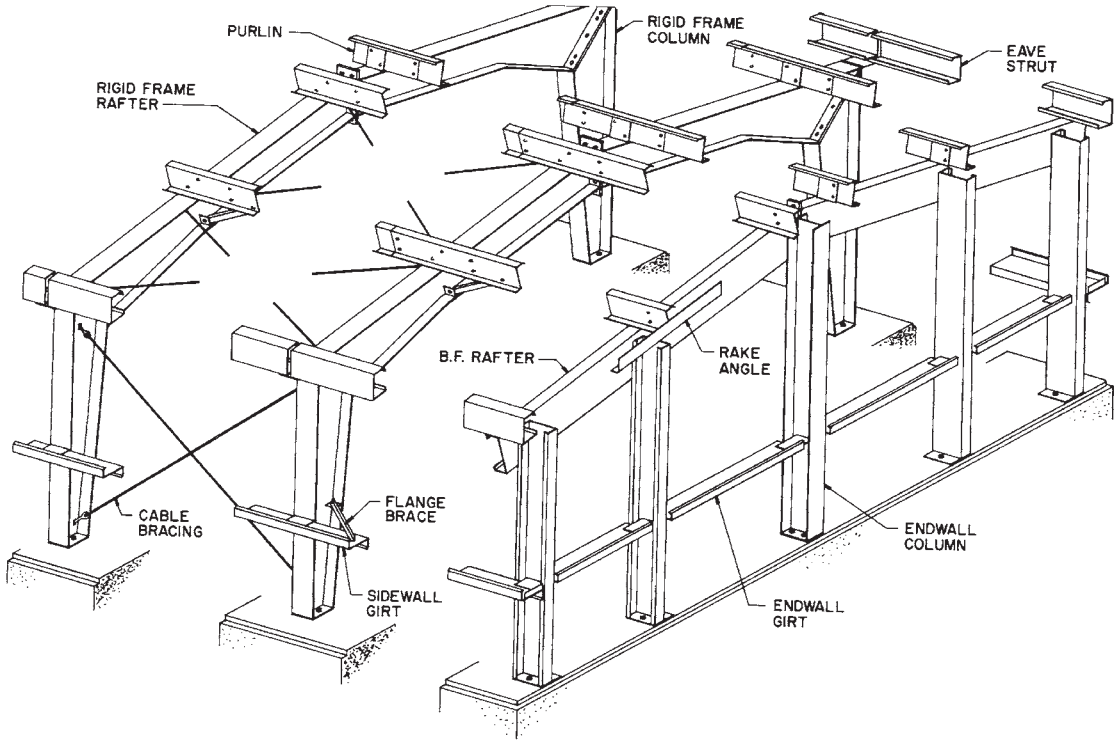

FIGURE 4.5 Details of single-span rigid frame. (Metallic Building Systems.)

4.5 MULTISPAN RIGID FRAME

Multispan rigid frame, also known as continuous-beam, post-and-beam, or modular frame (Fig. 4.1*d*), utilizes the same design principles as single-span rigid frame. The multiplicity of spans allows for a theoretically unlimited building size, although in reality a buildup of thermal stresses requires that expansion joints be used for buildings wider than 300 ft.

Multispan rigid frames may have straight or tapered columns, the latter usually at the exterior. The rafters are normally tapered. The construction details are similar to single-span rigid frames save

PRIMARY FRAMING

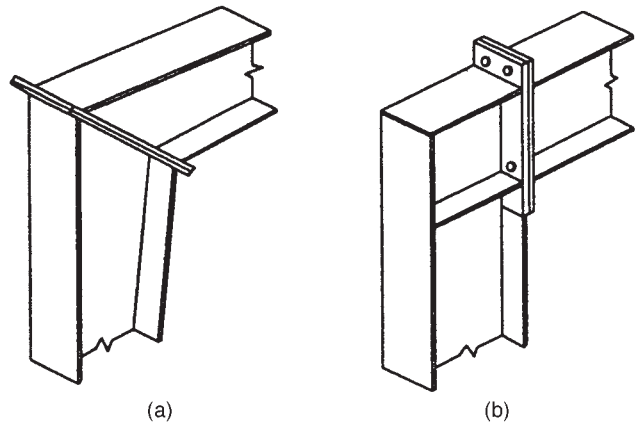

FIGURE 4.6 Two methods of column to rafter connection at the knee of a rigid frame. (a) Diagonal; (b) vertical. (Steelox Systems Inc.)

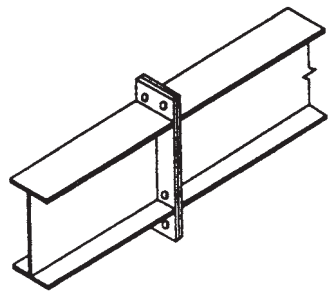

FIGURE 4.7 End-plate rafter splice. (*Steelox Systems Inc.*)

for the additional interior columns. Some typical framing dimensions are shown in Fig. 4.12. The attachments between the interior columns and the rafters are usually assumed as pinned, rather than full moment connections, and the columns are designed as members with purely axial loads. The relatively high shear stresses in the rafters above the columns often require web stiffeners (Fig. 4.13).

Multispan rigid frames are often the only solution for the largest of buildings, such as warehouses, distribution centers, factories, and resource recovery facilities. Multispan rigid frames utilize continuous framing and are normally more economical than their single-span cousins. The disadvantages of continuous construction include susceptibility to differential settlement of supports, as noted in Chap. 3. Soil conditions at the site should be carefully evaluated before this system is specified. Also, the interior column locations are difficult to change in the future, should that be required because of a new equipment layout.

4.6 SINGLE-SPAN AND CONTINUOUS TRUSSES

Single-span (Fig. 4.1*e*) and continuous trusses (Fig. 4.1*f*) are similar in function to single-span and multispan rigid frames. The crucial difference between the frames and the trusses lies in the construction of the rafter's web—open for trusses and solid for frames. An open web allows for passage of pipes and ducts and thus permits the eave height in a truss building to be lower, which results in