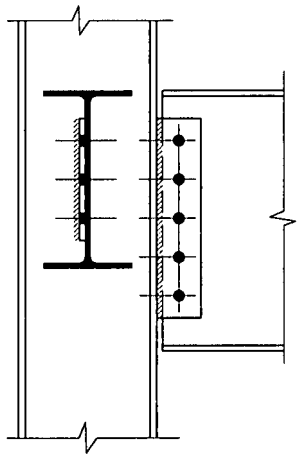


**Figure 3.6** *Fin plate connection*

### 3.4.2 Moment resisting beam to column connections

Standardisation has also been achieved for moment connections, despite the fact that there are many more possibilities than for simple connections. Moment connections are often subject to the added complexity of stiffeners. Capacities for recommended details are given in *Joints in steel construction - moment connections* [16], to which reference should be made for more information.

Typical bolted end plate beam to column moment connections are shown in Figure 3.7. In terms of erection this is no different from a flexible end plate connection, unless stiffeners, which may restrict access for bolting up, are present.

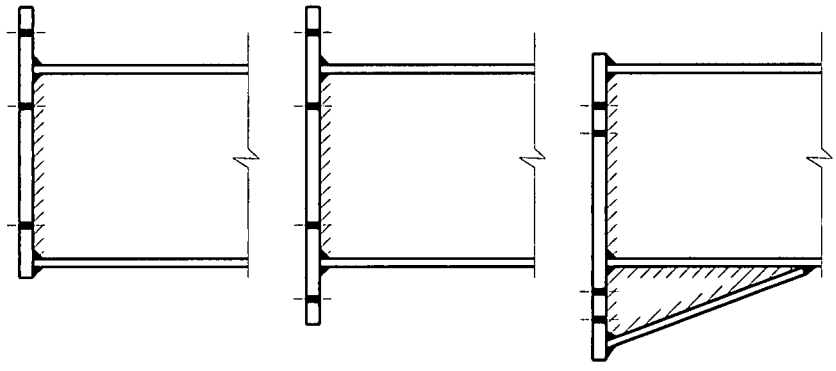
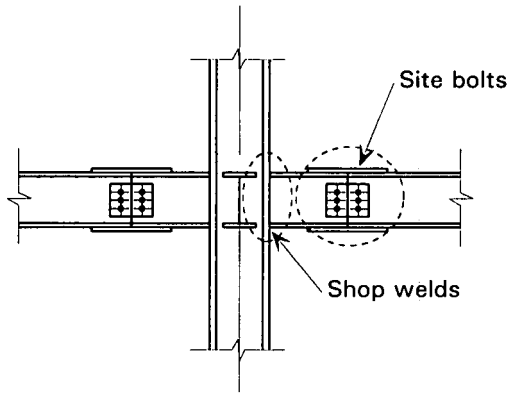


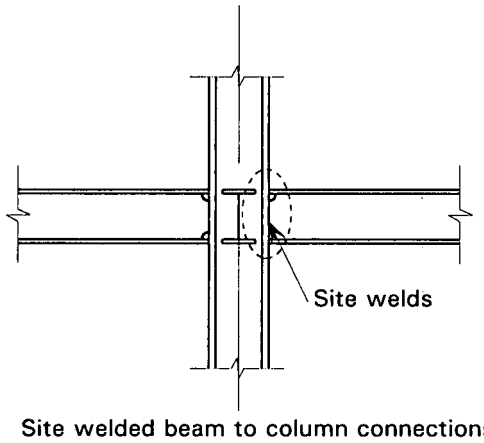
**Figure 3.7** *Typical end plate moment connections*

So-called wind moment connections are a special type of moment connection which use thin flush or extended end plates. 'Wind moment frames' are designed assuming the connections act as pins under gravity load but as rigid connections under lateral load. This type of connection is currently used in frames which are unbraced about the major-axis [17]. A similar connection can be used in braced frames to provide semi-continuity at the joints [18]. The thin end plate, which is limited in thickness to approximately 60% of the bolt diameter, ensures adequate ductility. Local stiffening of the column can normally be avoided because of the limited moment capacity of the connection. Erection details are as for any other end plate connection.

Beam to column connections may also be either shop welded or site welded. Typical examples of each are shown in Figure 3.8. With a shop welded detail, the main welds are made in a controlled factory environment. A straightforward bolted site splice then suffices to join the beam-stubs and beams. Because of the amount of work involved, this type of detail is generally more expensive than a straightforward bolted connection. Site welded moment connections are used extensively in the USA and Japan, where continuous unbraced frames are a popular choice for buildings in seismic zones. Site welded connections are currently little used in the UK. As well as a need to provide temporary brackets and bolts to hold members in position while they are welded, they require provision of access equipment and suitable weather protection during welding and inspection.




Shop welded beam to column connections




Site welded beam to column connections

**Figure 3.8** *Shop and site welded beam to column connections*

### 3.4.3 Structural integrity

All floor beam to column connections must be designed to resist a tying force of at least 75 kN according to BS 5950: Part 1[85] . This magnitude of force can be carried by the simplest of cleated connections[14]. However, for certain tall, multi-storey buildings it will be necessary to check connections for larger tying forces to satisfy the structural integrity requirements of BS 5950.

Generally the tying capacity of a web cleat connection is adequate, mainly because of its ability to undergo large deformations before failure. Procedures for calculating this capacity are available[14,15]. If a connection is unable to carry the necessary tying force, for some floor types (for example in-situ reinforced concrete) extra capacity can be achieved by considering the in-plane capacity of the slab. This may carry all or part of the tying force back to the steel frame.