ACTIONS - Services

The structural designer must remember that, depending on the building specification, the cost of the services may be considerably greater than that of the structure. With this in mind, he should;

- design the frame to allow easy installation of the services. One way of doing this is to choose a floor system which releases the greatest space for services
- communicate and cooperate from an early stage with the services engineer, to avoid the need for modifications, possibly on site.

7.2 Lift installation

Lift details have been standardised by all the major manufacturers in the UK([63]). The structural designer does not therefore need to know the make of lift before commencing the frame design, although involvement of the lift manufacturer as early as possible is still recommended.

The most common type of lift shaft walls in modern steel framed buildings comprise a light, dry lining system. Alternatives are reinforced concrete or masonry walls, but these both suffer from being wet trades, which interfere with the progress of other work. Dry walls are formed from multi-layer plasterboard, or fire resistant board. They facilitate construction because they can be fixed from outside the lift shaft, thus avoiding the use of temporary access platforms. Because the boards cannot carry load, lift installations must be supported from either the floor slabs or the main steel members, possibly via secondary steelwork. The choice of shaft wall therefore affects the loading applied to the frame, as well as the steelwork detailing around the shaft.

There are three interfaces between the lift installation and the building frame:

- guide rails
- door supports
- thresholds (which locate the bottom edge of the doors).

A typical detail for each interface is shown in Figure 7.1. Rails, supports and thresholds are normally designed by the lift manufacturer, with the responsibility of the structural designer being limited to any secondary members which are needed to support these elements.

Vertical guide rails are fixed to brackets which allow horizontal movement. To avoid complications on site, this movement must be sufficient to accommodate any allowed deviation of the steel frame, and keep the rails within tolerance limits. The brackets should not be subjected to vertical loading. Typically, rails span 3 m to 4.5 m vertically for low and medium speed lifts. The section size of the rails should be such that the number of connections is minimal, and if possible all connections should be at floor levels.

Doors must be supported from the steelwork when dry walls are used. The structural designer should keep secondary steelwork as simple as possible, for example by using a U-frame suspended from the floor above (Figure 7.1), rather than an H-frame spanning between floors. Differential movements in service must be accommodated - floor deflections under live load must not prevent the lift doors from opening!

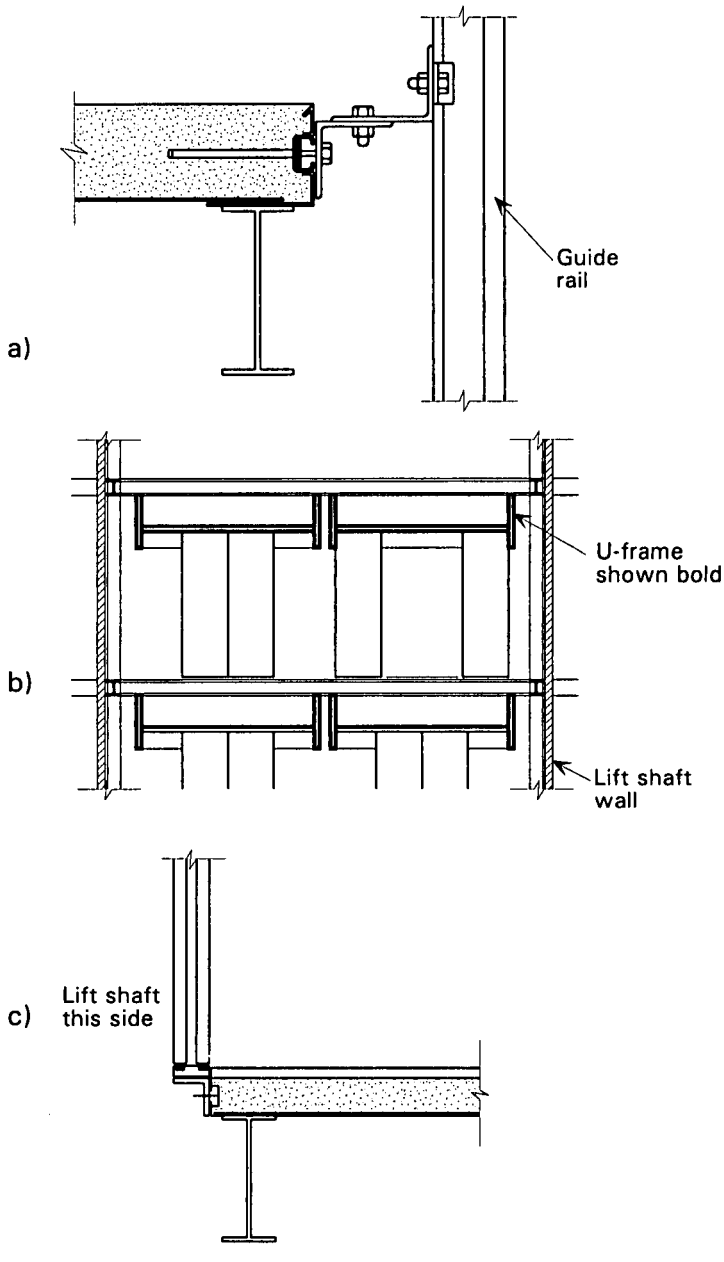

Figure 7.1 *Lift installation connection details, (a) guide rail connection to slab edge, (b) suspended door support steelwork, (c) threshold*

Threshold support steelwork may be cast-in to the floor edge, making due provision for tolerances, or attached to a trimmer beam. Care must be taken to ensure that the ability of the floor to act as a fire barrier is not compromised([63]).