details may be used to resist horizontal loads. A shear key might be welded to the underside of the baseplate, although this could interfere with the positioning of the column and impede the flow of grout under the plate. Alternatively, the column could be anchored to the base slab using a tie. The practice of running a tie across the full width of the frame to join the legs of a portal is not recommended. Such ties interfere with following work, for example the movement of a mobile elevated working platform (MEWP) used to erect the purlins.

KEY POINTS - Bedding

To ensure that the bedding behaves in accordance with the designer's assumptions, the designer and, particularly, the site team should respect the following recommendations:

- specify grout holes in large plates
- provide good access for the placement operation
- prepare, and adhere to, a method statement for placing
- mix the bedding material properly.

6.1.3 Post-drilled bolts

A variation on the holding-down bolt system described above is one where holes are drilled into the concrete and bolts are then fixed into these holes. Diamond drilling can be used to penetrate both the concrete and reinforcement. The consequences of cutting one or two of the reinforcing bars are not significant for a base slab. However, diamond drilling is a specialist operation which is time consuming and therefore expensive. To avoid diamond drilling, the slab reinforcement must be accurately fixed to avoid clashes with the bolt positions. Post-drilled bolts may prove less convenient than cast-in bolts in terms of the construction programme.

6.1.4 Cast-in columns

A third possibility for the column/foundation interface is to leave voids in the base slab into which the columns can be lowered. The columns are subsequently cast-in to the base. Practical difficulties associated with correctly positioning the columns using this method may outweigh its advantages.

ACTIONS - Foundations

The designer should endeavour to:

- keep the details simple
- provide a means of adjustment to accommodate different tolerance requirements for the foundation and steel frame
- consider all loading scenarios, including erection, to ensure that column stability can be maintained at all times
- manage the interface.

6.2 Concrete and masonry elements

When reinforced concrete or masonry elements are present in a building, the steelwork designer can profit by using these stiff elements to resist lateral loads. A typical example is a building with a reinforced concrete lift shaft, to which the steelwork can be attached. Similarly, masonry walls forming in-fill panels between steel columns can replace bracing members by providing in-plane stiffness.

The ideal position for a shear wall is on the line of the lateral loads, to avoid eccentric loading. Examples of structurally efficient and less efficient locations are shown in Figure 6.2. Clearly, there will be many other constraints on the position of a wall or lift shaft which may make eccentric loading unavoidable. In such cases the steel frame will require some additional bracing members to prevent torsional displacement of the building. The position of this additional bracing for the particular examples is shown in the figure. The mechanism by which the bracing resists torsion is also indicated for one of the examples.

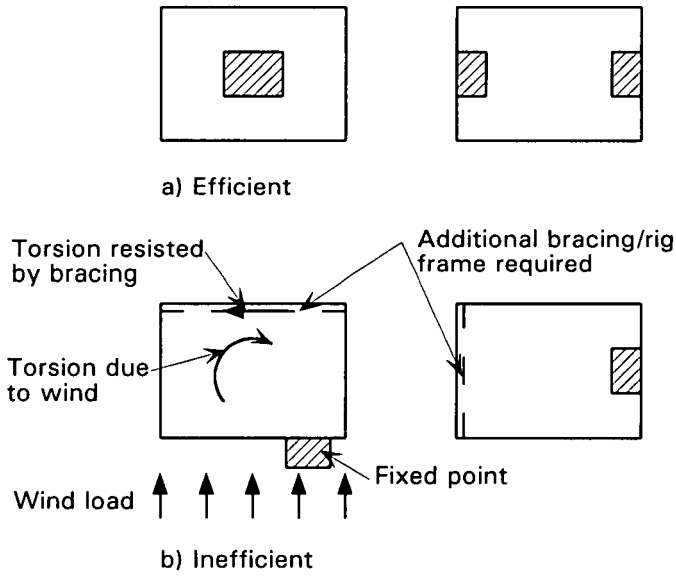

Figure 6.2 *Examples of shear wall location*

6.2.1 Points to consider

A number of points must be considered when using reinforced concrete or masonry elements structurally in a steel framed building.

Even with careful programming, the speed of building construction may be compromised, because the speed of construction of concrete or masonry elements is significantly less than that of the steel frame. If the concrete or masonry elements are not constructed prior to erection of the steelwork, temporary bracing will be needed to stabilise the frame.

Responsibility at the interface must be clearly defined. Although the steelwork designer knows the magnitude of forces to be resisted, he may not be, or may not wish to be, responsible for the design of concrete or masonry elements.

Tolerances for concrete and masonry elements are less onerous than those for the steelwork; according to NSSS requirements, a wall face should be within ±25 mm,