

2.2.3 SERVICE CORES

2.2.3.1 FULL- AND HALF-STOREY

GENERAL DESCRIPTION

Precast concrete walls are used to construct lift shafts and other service ducts due to their simplicity, ease of construction and the reduced requirement for on-site labour. They are generally full, half or sometimes double floor-to-floor height walls, manufactured off-site, transported, lifted into position, and then attached to the unit below and to the floor slab. Horizontal joints need not occur at floor level.

The lifting capacity of the on-site crane is the most dominant issue in determining the size, shape and configuration of the units (see *Typical Layouts*).

Options for shapes and configurations include flat panels, flat panels with short return walls to aid stability during erection, or L-, U-, and box-shaped units.

Flat panels, whilst reducing crane loads, naturally require on-site connections, temporary propping and joint sealing.

Precast concrete core walls offer opportunities for the same range of surface finishes as available for precast building facades. Higher standards of quality control can be achieved readily off-site with precast than with on-site casting.

DESIGN CONSIDERATIONS

The design and detailing of a precast core should take into account whether or not the core is intended to resist lateral wind and earthquake actions. Each project has to be assessed individually as to the contribution of lateral action resistance by the precast cores.

Vertical prestressing, with high-tensile-steel bars connected with couplers at each joint, should also be considered when the lateral actions applied to the core become high or where the rotation of the horizontal joints is restricted.

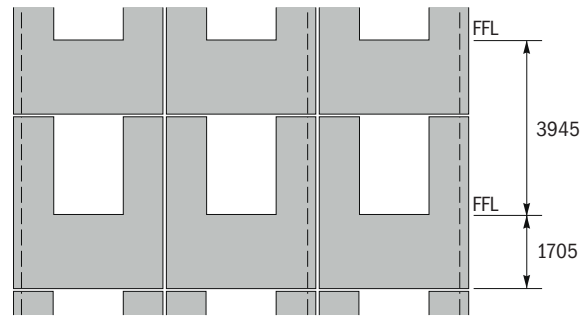
Whereas insitu core walls may have only horizontal joints between the floor slab and walls, precast core walls have additional horizontal and possibly vertical joints between units, their location being dictated by architectural, construction and structural requirements.

The number and position of vertical joints in a service core will generally be determined by:

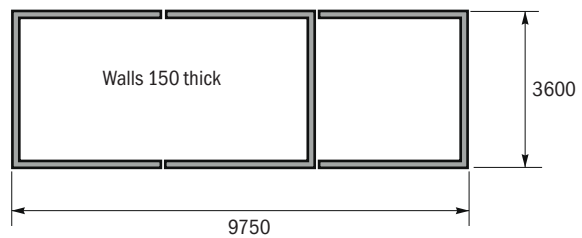
- the number of lift shafts;
- whether or not fire separation walls are required between lifts;
- weight limitations;
- stability of structure during erection;
- size and weight restrictions for transporting to site.

Should the horizontal joint require continuity, load transfer may be achieved by long dowels or welded/bolted steel plates across the joint.

TYPICAL LAYOUTS

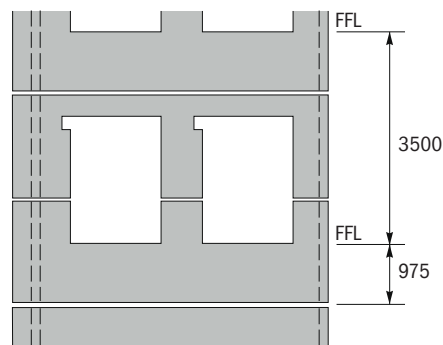


Elevation

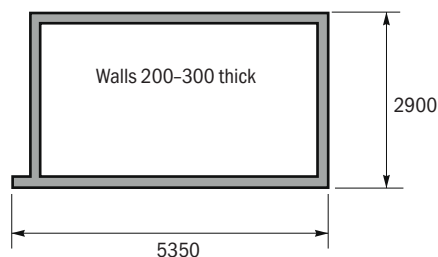


Plan

(a) FULL-STOREY UNITS



Elevation



Plan

(b) HALF-STOREY UNITS