

Lifting and Handling

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Lifting and Handling are of the utmost importance in planning the design and use of precast concrete. It is essential that all aspects of these operations are carefully considered and detailed at all times so that any subsequent activities can be carried out by others in the safest possible manner without risk of failure or accident.

It must be remembered that many lifting operations take place above the public and any mishap would have obvious implications. All lifting operations, particularly on site, should be carried out using proprietary lifting devices cast into the concrete. These are used in conjunction with appropriate purpose-made devices, which in turn have been tested and certificated. It is important that all lifting equipment is fully traceable from the manufacturer, and also via any subsequent testing and inspection.

When carrying out an initial assessment of lifting requirements, the following guidelines may be applied.

1 For demoulding a flat panel, four lifting points are normally detailed. This does not always mean that the weight of the unit is equally shared between the four points. In addition, factors have to be included to allow for the fact that the unit may stick to the mould, as well as dynamic crane effects. For demoulding a linear element, two lifting points might be used.

2 For turning (pitching), two lifting points is usual. Unless carefully agreed and monitored, it is normal that these two points will, at some time, lift the unit. Some precast factories use tilting tables to turn flat elements from horizontal to vertical.

3 For site lifting, two lifting points are usually specified. (These might not be the same two as used for pitching). Curved or angled units may require three lifting points. Site cranes usually impose more dynamic effects than cranes in the factory.

An Engineer normally finalises the size of lifter, either by specific design or by general guidance. The location of lifting points is usually initiated using these simple rules-of-thumb:

- a) The unit must be stable at all times during lifting/turning operations. For non-symmetrical units, the centre of gravity should be shown on unit drawings (this easily done via AutoCAD and helps the Engineers).
- b) For a flat (simple) panel, reinforcement is most efficient when lifting is at approx '1/5 points' (0.207 x length).
- c) Lifting points must be accessible at all times, particularly once it has been placed in a new position.
- d) Lifting inserts must be detailed so that there is no chance of their bursting out under load. Reinforcement around such inserts is particularly important and must be detailed so as to transfer forces into the body of the unit. Local holes/notches must be considered.

For many non-symmetrical units, there are also other factors to consider such as a tendency to suddenly 'topple' during turning, unequal loading of lifters during demoulding and lifting, and 'non-vertical' hanging during erection. All of these must be considered and dealt with at an early stage to prevent difficulties later on when it is too late!