

2.1 BEHAVIOUR AND TYPES OF STRUCTURAL COMPONENTS

Structural Behaviour of Precast structures

- a) The design load carrying structures advantages from the viewpoint of prefabrication.
- b) Principle of structural analysis
- c) Various specifications
- d) Dimensioning of joints
- e) Elimination of handling stresses
- f) Redistribution of stresses in jointed structures due to creep & shrinkage.
- g) Calculation of reinforced concrete structures co-operating with strengthening concrete layer cast in situ.
- h) Influence of the sequence and of the method of placing on the stress state of the structure
- i) Stability of precast structural members
- j) Quantity of materials used for precast reinforced concrete structures.

STRUCTURAL COMPONENTS

The following are the main components which are frequently used in building are

- ☐ Slab
- ☐ Joist
- ☐ Beams (main secondary)
- ☐ Wall panels
- ☐ Columns

The roofing/flooring system consists of R.C planks and joists. The planks are casted to a standard size and they are connected with R.C.C joist which are provided at a regular

interval. The loads from planks are transmitted to R.C joist and then to main beams.

The main beams are provided with channel sections 10 cm projections on the necessary sides with the spacing of joist. The joists are seated in the channels and bolted together.

The loads from slab to the main beam will loadings are analyzed. The foundation unit is the only unit which is going to cast in site.

Slab

The roofing slab/flooring slab system consists of planks, which is supported over R.C.C Joist. The planks can be made in any one of the following form with or without prestressing.

According to the span & loads.

1. Hollow core sections
2. Double tee section\Channel sections
3. Light weight concrete roofing slab
4. Solid rectangular planks

The usual widths of these types of slabs are 0.5 m & spanning to the requirement up to a maximum limit of 5 m without prestressing. The thicknesses of planks are casted in two steps with different mould in access invisible action with adjacent slab by putting necessary reinforcement & concreting site.

Joist

The joists are designed as a small beams loaded from planks. These joists transmit the loads to the main beams through the channels provided in the main beams in this joist, triangular shaped stirrups are provided to get the proper bonding or connection with the planks. The joists are casted partially in the factory the apex portion of the triangular stirrup will be projecting from the casted top surface. In this projecting a connecting rod will be inserted and additional base from planks also inserted. This will give monolithic action as well as the plank will act as a continuous slab over the joists.

Beams (Main & Secondary)

All the main and secondary beams are the same size of 300 x 300 mm varies reinforcements are provided at varies conditions according to the moments. The beams are casted for the clear distance between the columns. A square of 10 cm x 10 cm hole or a depth of 10 cm are provided on either side to achieve the connection with other beam reinforcement or column reinforcements by proper welding. After welding the concrete has to be done at the junction with proper care.

At the junction of columns and beams it is necessary or part site controlling for this purpose the top ends of the beams are trap pored properly. So that it with give access to site concrete and for needle vibrators to get proper compaction.

Wall Panels

The wall panels are casted with all fixing like door, ventilation, window frames. These wall panels are non load bearing wall. Therefore neglect solid rectangular cross section wall panel with R.C.C. from the view of thermal effects and safety the minimum of 150 mm is provided as wall thickness. This wall is a sandwich type. That is cellular concrete blocks of 75 mm thick is sandwiched by R.C.C. M25 grade concrete to a thickness of 37,5 mm on either face with minimum reinforcement since, the walls are in steel moulds there will be no used to plastering on either face of wall.

This is one of advantage of precast wall panels. The main design factor is the handling stresses in wall panels.

The infillings may be any light weight, low cost material like brick bats, bricks light weight concrete acquainted concrete etc. Since the preparation and availability of raw materials are easy in the case of cellular concrete we are adopting cellular concrete as infill's in walls.

Columns

Many type of columns available in prefabricated system. Grooves are provided on the required faces to keep the walls in position. These grooves will act as a part of columns and since the area of column has been increased due to nibs will give addition moment carrying as well as load carrying capacity of columns. At the same time this grooves give a mild ornamental look to our building.