2.2 ROOF AND FLOOR SLABS

Behavior of roof and floor slabs:

- The roofing / flooring system consist of RC planks and joists.
- The planks are casted to a standard size and they are connected with RCC joists which are provided at a regular interval.
- The loads from planks are transmitted to RCC joists and then to main beams.
- The main beams are provided with channel sections 10cm projections on the necessary side with the spacing of joist.
- The joists are seated in the channel and bolted together.
- The loads from slabs to the main beam will come as point loads.
- The roofing / flooring slabs system consists of planks which are supported over RCC joist.
- The planks can be made in any one of the following form with or without prestressing. According to the span and loads.
- The usual width of these of slabs is 0.5m and spanning to the requirement up to a maximum limit of 5m without prestressing.
- The thicknesses of planks are casted in two steps with different mould to access monolithic action with adjacent slab by putting necessary reinforcement and concreting.

Methods Of Construction Of Roof And Floor Slab

In Floor and Roof:

- Structural floor / roof account for substantial cost of a building in normal situation. Therefore, any saving achieved in floor/roof considerably reduce the cost of building.
- Use of standardized and optimized roofing components where shuttering is avoided prove to be economical, fast and better in quality.

- Some of the prefabricated roofing/flooring components found suitable in many low-cost housing projects are
  - ❖ Precast RC planks
  - ❖ Prefabricated brick panels.
  - ❖ Precast RB curved panels.
  - ❖ Precast RC channel roofing.
  - ❖ L panel roofing.
  - ❖ Trapezon panel roofing
  - ❖ Unreinforced pyramidal brick roof.
  - ❖ Precast concrete panels.

Precast RC planks:

- This system consists of precast RC planks supporting over partially precast joist. RC planks are made with thickness party varying between 3 cm and 6 cm.
- There are haunches in the planks which are tapered.
- When the plank is put in between the joists, the space above 3 cm thickness is filled with in-situ concrete to get tee-beam effect of the joists.
- The planks are made in module width of 30 cm with maximum length of 150 cm and the maximum weight of the dry panel is 50 kg.
- Precast joists are rectangular in shape, 15 cm wide and the precast portion is 15cm deep.
- The main reinforcement of the overhang provided at the top in the in-situ concrete attains sufficient strength.
- The savings achieved in practical implementations compared with conventional RCC slab about 25%.

Prefabricated brick panel:

- The prefabricated brick panel roofing system consist of is made of first class brick reinforced with two MS bars of 6mm dia and joists filled with either 1:3 cement mortar or M15 concrete.

- A panel of 90cm length requires 16 bricks and a panel of 120cm requires 19 bricks.
- Partially precast joist it is a rectangular shaped joist 13cm wide and 10cm to 12.5cm deep.
- The overall depth of joist with in-situ concrete becomes 21cm to 23.5cm, it is designed as composite tee-beam with 3.5cm thick flange.
- The partially precast RC joist, is designed as simply supporting tee-beam with 3,5cm thick flange.

Precast curved brick arch panel:

- This roofing is same as RB panel roofing except that the panels do not have any reinforcement.
- A panel while casting is given a rise in the center and thus an arching action is created. An overall economy of 30% has been achieved in single storied building and 20% in two or three storied building.

Precast RC channel roofing:

- Precast panel channels are trough shaped with the outer side corrugated and grooved at the ends to provide shear key action and to transfer moments between adjacent units.
- The lengths of the units are adjusted to suit the span.
- The flange thickness is 30mm to 35mm.
- A savings of 14% has been achieved in actual implementation in various projects.

Precast hollow slabs roofing:

- Precast hollow slabs are panels in which voids are created by earthen kulars, without decreasing the stiffness or strength.
- These hollow slabs are lighter than solid slabs and thus save the cost of concrete, steel and the cost of walling and foundation too due to less weight.
- The width of the panel is 300mm and depth may vary from 100mm to 150mm as per the span.

- The outer sides are corrugated to provide transfer of shear between adjacent units.

L - Panel roofing:

- The precast full span RC panel is of section L.
- The L panels are supporting on parallel gable walls and are used for shaped roof of a building.
- L panel roofing is quite lighter in weight, economic in construction.
- It is panel sound performance and durability.

Trapezon panel roofing:

- Typical precast RC trapezon panel has trapezium section in orthogonal directions.
- The components are sound and can be manually handled with ease.
- These components are placed in position to from roof and haunch filling is done with in situ concrete to make a monolithic surface.

Unreinforced pyramidal brick roof:

- Unreinforced pyramidal brick roof construction system is suitable for low cost houses in cyclone affected and other coastal areas.
- Corrosion of reinforcement was found to be the major cause of failure of RCC structure in coastal area and a pyramidal roof with brick and cement concrete without reinforcement was therefore developed.
- The roofing is provided with peripheral RCC ring beam.