

Q.1 Two way slab

A two – way flat plate slab, its typical floor shown in the Fig.1, has the following given data:

- Columns are 400x500mm in dimension.
- Exterior Beams dimension are (width of column x 650 mm overall cross-section).
- Thickness of the slab is 250mm.
- Ultimate uniform distributed load = 14.7 kN/m^2 and load from partition wall to exterior beams 15 kN/m .
- Use $f_c' = 24 \text{ MPa}$ and $f_y = 420 \text{ MPa}$ for all types of reinforcement.

Answer one of the followings:

1. Design Typical interior panel according to ACI or Euro code.
2. Design critical Exterior beam according to ACI or Euro code.

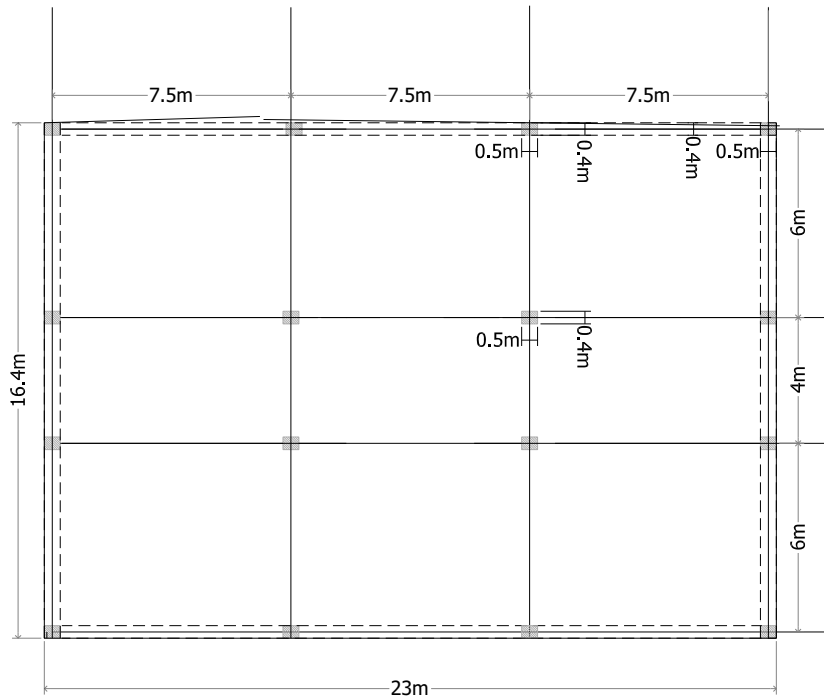


Fig.1 Typical floor plan

Q.2 Deep beam

A transfer girder supports two planted columns, each having a factored load of 1750 kN as shown in Fig.2. support width is 450 mm , $b=500 \text{ mm}$ and $h=2000 \text{ mm}$. Material properties are $f_c' = 24 \text{ MPa}$, $f_y=420 \text{ MPa}$ for all types of reinforcement.

Design the deep beam using Strut and Tie Model according to ACI Code.

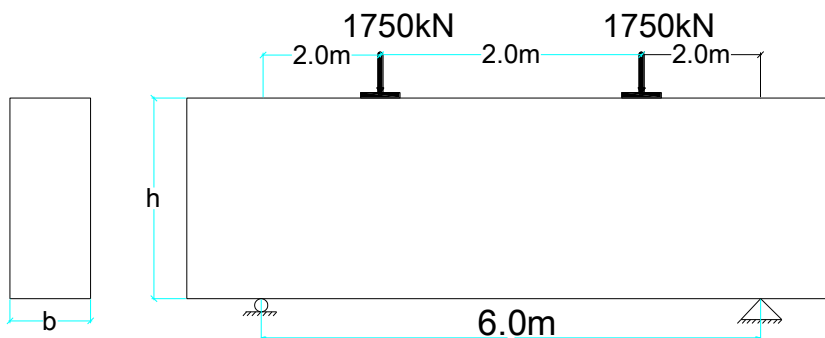


Fig.2 Deep beam

Q.3 Corbel

A reinforced concrete corbel shown in Fig.3. It has the following given data:

- $f_c' = 24\text{MPa}$ and $f_y = 420\text{MPa}$ for all types of reinforcement.
- Factored column load, $P_u = 1450\text{ kN}$.
- Factored beam reaction, $V_u = 240\text{ kN}$.
- Factored tensile force, $N_u = 0.233V_u$.
- Assume depth of corbel, $h = 700\text{mm}$, $d = 0.90h$, $b = 450\text{mm}$ and $k = 350\text{mm}$.

Design the corbel using provisions of the ACI or Euro Code.

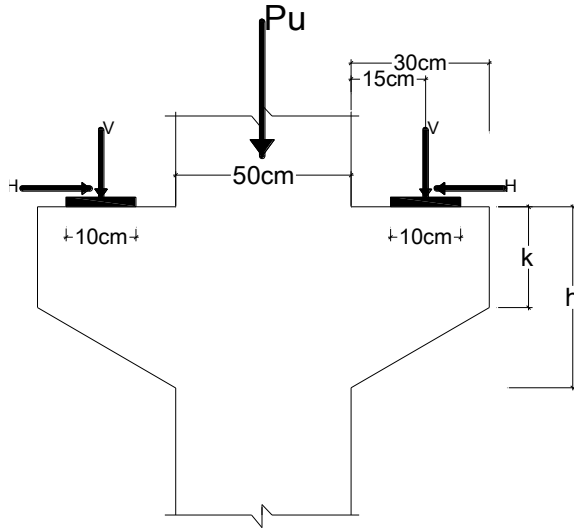


Fig 3 .R.C .Corbel

Q.4 Shell structure

A reinforced concrete Shell structure (Dom) has the following given data:

- Span of 15m, Radius = 8.5m and semi central angle is 62° .
- Ring beam around the Dom with dimensions 30x200cm above the slab.
- Height of the Dom from top of the tie beam to top of the Dom is 4.0m.
- Preliminary thickness at top of the Dom is 15cm.
- $f_c' = 24\text{MPa}$ and $f_y = 420\text{MPa}$ for all types of reinforcement.
- Live load is 100 kg/m^2 and assume super imposed dead load of 150 kg/m^2

Design the shell structure and draw section with reinforcement.

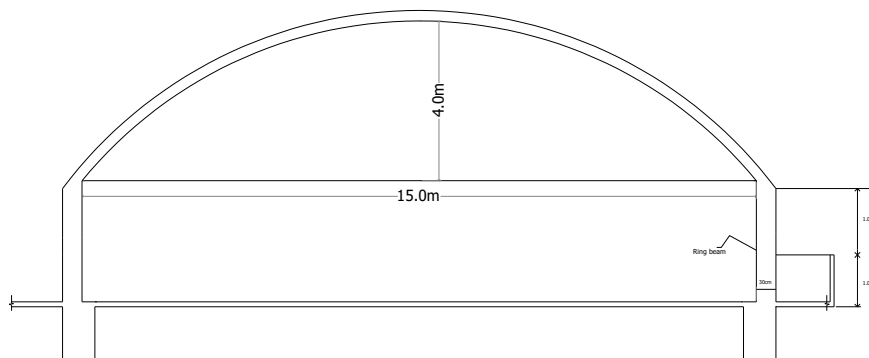


Fig 4 .Section of Dom