19CET302- DESIGN OF RC STRUCTURAL ELEMENT
Question Bank
Unit 5

1. **Define punching shear. [N/D-16]**

The shear failure of column footing occurs either similar to that of footing for wall due to punching of column through the slab known as Punching shear. It occurs at a distance of half the effective depth of footing from the face of column.

2. **When is the combined footing provided?**

Combined footings are provided only when it is absolutely necessary, as When two columns are close together, causing overlap of adjacent isolated footings Where soil bearing capacity is low, causing overlap of adjacent isolated footings Proximity of building line or existing building or sewer, adjacent to a building column.

3. **What are the causes for failure of footing?**

The common causes for failure of footing are:
(i) Unequal settlement of sub soil
(ii) Shrinkage of soil below the foundation due to withdrawal of moisture
(iii) Lateral pressure causing over turning of structure
(iv) Lateral movement of soil close to the structure

4. **What is meant by proportioning of footing**?

The pressure on the soil from each square foot of the footings should be the same, where the soil is uniform, and at no place must the bearing power of the soil be exceeded. To secure the most satisfactory results, therefore, the footings must be proportioned to properly distribute the weight they are to carry over sufficient areas of ground, to secure uniform settlement in each case. If these conditions were always properly considered, there would be few cracks in the mason work, as such cracks are caused usually by unequal settlement. A uniform settlement even of an inch or more would in most buildings pass unnoticed.

5. **What is the necessity of providing combined footings?**

Combined footings are used when:
1) there are two isolated footings overlapping (when columns are too close to each other, like within 2m)
2) soil bearing capacity is inconsistent and low within an area
3) the footing is extending beyond your property

6. What is the main advantage of combined footing?

- combined footing is, it increases the load-bearing of soil (increases the strength of soil to hold the heavy building).
- combined footing is, it prevents the footing from overturning by connecting the footing to each other using a strap beam.
- combined footing is, it helps to make the centers of gravity of the column load and center of gravity of soil reaction remain in the same vertical line.
- combined footing is, if there is no space to spread the footing near the boundary line then in this type of situation the combined footing is used.

combined footing is, it helps to get the uniform load distribution under the footing.

7. Classify the different types of combined footing.

Rectangular combined footing

Trapezoidal combined footing
Raft combined footing
Strap combined footing

8**. Draw a neat sketch of a wall footing**.

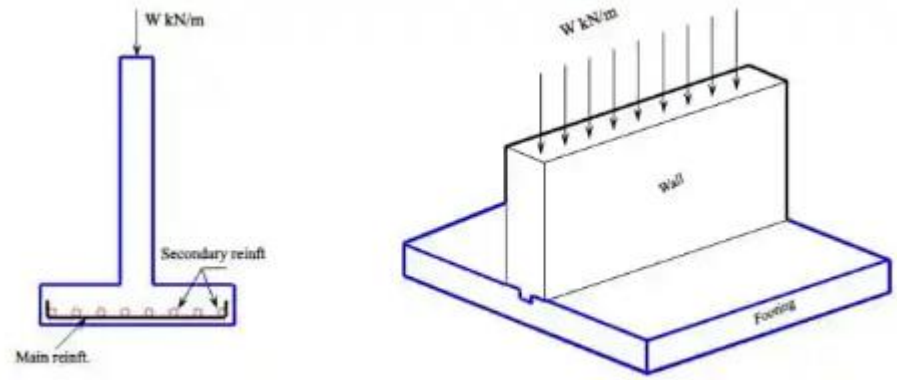
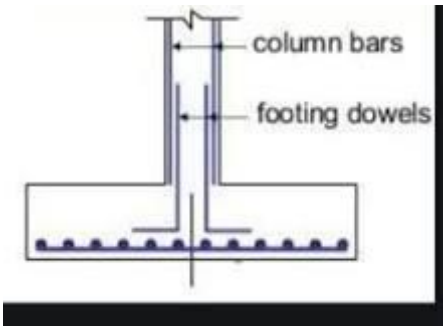


Fig. 3: Reinforced Concrete Wall Footing

9. Why dowel bars are provided in footing?

Dowel bars are provided in reinforced concrete footings to transfer the load from columns (e.g. isolated square column footing) to the footing.



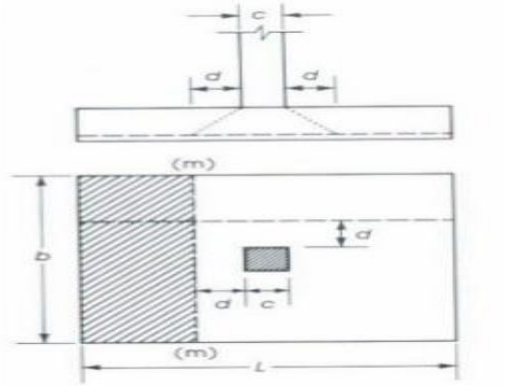
10**. List the circumstances a trapezoidal footing become necessary?**

Trapezoidal footing is provided when one column load is much more than the other. Hence, Trapezoidal combined footing are required when the space outside the exterior column is limited and the exterior column is heavier.

11. Compare one way and two way shear in footing.

One way shear -When the footing bend in one direction, critical section is located at a distance “d” from the face of column.

d= Effective depth of footing



Two way shear (Punching Shear)

When the footing bend in two direction, critical section is located at a distance "d/2" from the face of column.

d= Effective depth of footing