

# FOUNDATION

The foundation is the lower portion of the building, usually located below the ground level, which transmits the load of super structure to sub soil

## Functions of foundation

- Reduction of load intensity
- Even distribution of load
- Provision of level surface
- Lateral stability
- Safety against undermining
- Protection against soil movements

## Types of foundation

- Shallow foundation
- Deep foundation

## Shallow foundation

If the depth of foundation is less than or equal to width of foundation it is called as shallow foundation

## Types of shallow foundation

- Spread footing
- Combined footing
- Strap footing
- Mat foundation

## Spread footing

Spread footing is those which spread the super imposed load to of a wall or column over the large area

Spread footing support either a column or a wall

It has the following types

- Single footing
- Stepped footing
- Sloped footing
- Wall footing with out step
- Stepped footing for wall
- Grillage foundation

### **Combined footing**

A spread footing which supports two or more columns is termed as combined footing

It has the following types

- Rectangular combined footing
- Trapezoidal combined footing
- Combined column wall footing

### **Trapezoidal footing**

If the independent footings of two columns are connected by a beam it is called as strap footing

A strap footing may be used where the distance between the columns is so great that a combined trapezoidal footing becomes quite narrow

The strap beam does not remain in contact with soil and thus does not transfer any pressure to the soil

### **Mat foundation**

A raft or mat is a combined footing that covers the entire area beneath a structure and supports all walls and columns

It is used when the allowable soil pressure is low and the building loads are heavy

It is used to reduce the settlement above highly compressible soil

Rafts may be divided into three types

- Solid slab system
- Beam slab system
- Cellular system

### **Deep foundation**

If the depth of foundation is equal to or more than the width of the foundation is called deep foundation

#### **Types**

- Deep strip rectangular or square footing
- Pile foundation
- Pier foundation or drilled caisson foundation
- Well foundation or caissons

#### **Deep strip footing**

Whenever the depth of strip footing is more than the width it is called as deep strip footing

#### **Pile foundation**

It is a type of deep foundation in which the loads are taken to a low level by means of vertical members which may be timber or concrete or steel

Types of pile foundation

- End bearing pile
- Friction pile
- Combined end bearing and friction pile
- Compaction pile

#### **End bearing piles**

End bearing piles are used to transfer load through water or soft soil to a suitable bearing stratum

Such piles are used to carry heavy loads to hard strata

Multi storied buildings are invariably founded on end bearing piles, so that the settlements are minimized

### **Friction piles**

Friction piles are used to transfer loads to a depth of a friction load carrying material by means of skin friction along the length of the pile

These piles mostly used in granular soil

### **Combined end bearing and friction pile**

These are the piles which transfer the super imposed load both through side friction as well as end bearing

Such piles are more common, especially the end bearing piles are passed through granular soil

### **Compaction piles**

These piles are used to compact loose soil thus increasing their bearing capacity

The pile tube driven to compact the soil is gradually taken out and sand is filled in its place thus forming the sand pile

### **Pier foundation**

A pier foundation consists of a cylindrical column of large diameter to support transfer large super imposed loads to the firm strata below

Generally pier foundation is shallower in depth than the pile foundation

It has two types

- Masonry
- concrete pier

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