Kurdistan Engineers Union

Name of report

Types of reinforced concrete foundation of building

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TYPES OF FOUNDATION REINFORCED CONCRETE BUIDING

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INTRODUCTION

Foundations: is the part of a structure that is usually placed below the surface of the ground to transmit the load from the superstructure to the underline soil or rock and spread the load over a sufficiently large area of that stratum to minimize the bearing pressure.

provide support for structures, transferring their load to layers of soil or rock that have sufficient bearing capacity and suitable settlement characteristics to support them.

Foundation is the interface between a building and supporting soils. Many issues must be considered when selecting a foundation system including site topography, soil condition, retaining requirement, loading from the building

Above, frost depth and termite and decay exposure.

FUNCTION OF FOUNDATION

- **Foundation is the part of a structure that is usually placed below the surface of the ground to transmit load from the structure to the underlying soil or rock.**

- **If soil of sufficient bearing capacity lies immediately below the structure then the load can be spread by footing .footings range from isolated pads supporting individual columns ,through strips supporting walls or closely spaced column ,to a raft footing supporting the whole structure.**

- **However, if the soil has insufficient bearing capacity then it is necessary to use deep foundation, such as piles to transmit the load to deeper, firmer strata.**

- **Prevent excessive settlement.**

- **Minimize differential settlement**

- **Provide adequate safety against overturning and sliding.**

TYPES OF FOUNDATION

Foundations are classified as shallow and deep foundations. Types of foundations under shallow and deep foundations for building construction and their uses are discussed.

It is advisable to know suitability of each types of foundation before their selection in any construction project.

Types of Foundation and their Uses

Following are different types of foundations used in construction:

١-Shallow foundation

- **Individual footing or isolated footing**
- **Combined footing**
- **wall footing**
- **cantilever or strap footings**
- **Raft or mat foundation**

٢-Deep Foundation

- **Pile foundation**
- **Drilled Shafts or caissons**

Types of Shallow Foundations

١. Individual Footing or Isolated Footing or Spread footings

Individual footing or an isolated footing is the most common type of foundation used for building construction. This foundation is constructed for single column and also called as pad foundation.

The shape of individual footing is square or rectangle and is used when loads from structure is carried by the columns. Size is calculated based on the load on the column and safe bearing capacity of soil.

Rectangular isolated footing is selected when the foundation experiences moments due to eccentricity of loads or due to horizontal force.

٢. Combined Footing:

Combined footing is constructed when two or more columns are close enough and their isolated footings overlap each other. It is a combination of isolated footings, but their structural design differs.

The shape of this footing is rectangle and is used when loads from structure is carried by the columns.

Combined c footing support two or more columns. These can be rectangular or trapezoidal pan.

٣. Wall footings

Wall footings are used for, walls where the bearing soil layer is within ٣m (١٠ feet) from the ground surface. Soil bearing capacity must be sufficient to support the weight of the structure over the base area of the structure.

These should not be used on soils where there is any possibility of ground flow of water above bearing layer of soil which may result in scour or liquefaction.

Wall footing is a continuous slab strip along the length of the wall

٤- Cantilever or strap footing:

These are similar to be combined footings, except that the footings under columns are built independently, and are joined by strap beam

٥. Raft or Mat Foundations

Raft or mat foundations are the types of foundation which are spread across the entire area of the building to support heavy structural loads from columns and walls.

Fig: Mat Foundation

The use of mat foundation is for columns and walls foundations where the loads from structure on columns and walls are very high. This is used to prevent differential settlement of individual footings, thus designed as a single mat (or combined footing) of all the load bearing elements of the structure.

It is suitable for expansive soils whose bearing capacity is less for suitability of spread footings and wall footings. Raft foundation is economical when one-half area of the structure is covered with individual footings and wall footings are provided.

These foundations should not be used where the groundwater table is above the bearing surface of the soil. Use of foundation in such conditions may lead to scour and liquefaction.

Types of Deep Foundation

١. Pile Foundations

Pile foundation is a type of deep foundation which is used to transfer heavy loads from the structure to a hard rock strata much deep below the ground level.

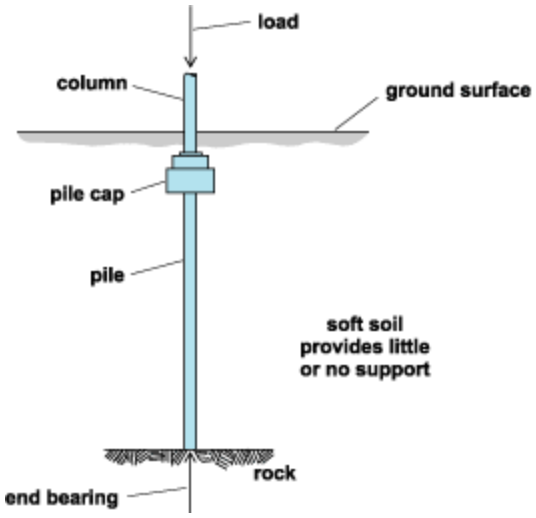

Fig: Pile Foundation

Pile foundations are used to transfer heavy loads of structures through columns to hard soil strata which are much below ground level where shallow foundations such as spread footings and mat footings cannot be used. This is also used to prevent uplift of structure due to lateral loads such as earthquake and wind forces.

Pile foundations are generally used for soils where soil conditions near the ground surface is not suitable for heavy loads. The depth of hard rock strata may be ٥m to ٥٠m deep from the ground surface.

Pile foundation resists the loads from structure by skin friction and by end bearing. Use of pile foundations also prevents differential settlement of foundations.

٢. Drilled Shafts or Caisson Foundation

Drilled shafts, also called as caissons, are a type of deep foundation and have action similar to pile foundations discussed above, but are high capacity cast-in-situ foundations. It resists loads from structure through shaft resistance, toe resistance and / or combination of both of these. The construction of drilled shafts or caissons is done using an auger.

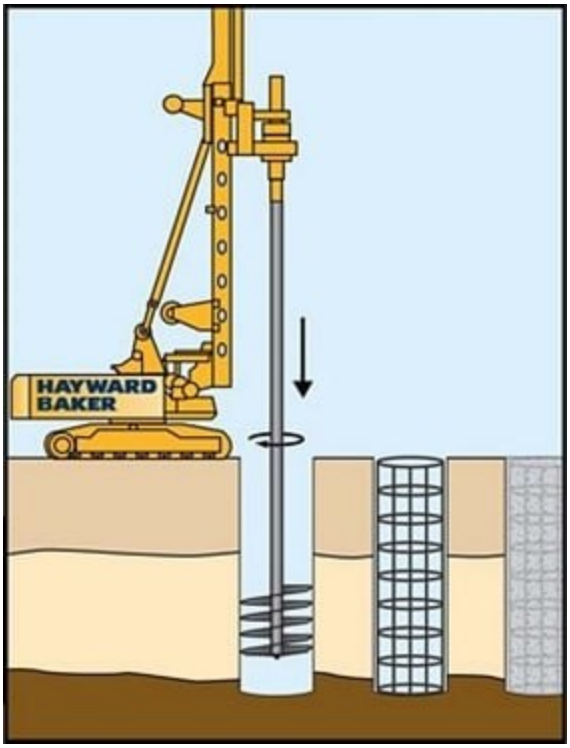

Fig: Drilled Shafts or Caisson Foundation

Drilled shafts can transfer column loads larger than pile foundations. It is used where depth of hard strata below ground level is location within ١٠m to ١٠٠m.

Drilled shafts or caisson foundation is not suitable when deep deposits of soft clays and loose, water-bearing granular soils exist. It is also not suitable for soils where caving formations are difficult to stabilize, soils made up of boulders, artesian aquifer exists.

REFRENCE:

- **Reinforced concrete foundation**
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