3.1 Types of Footings:

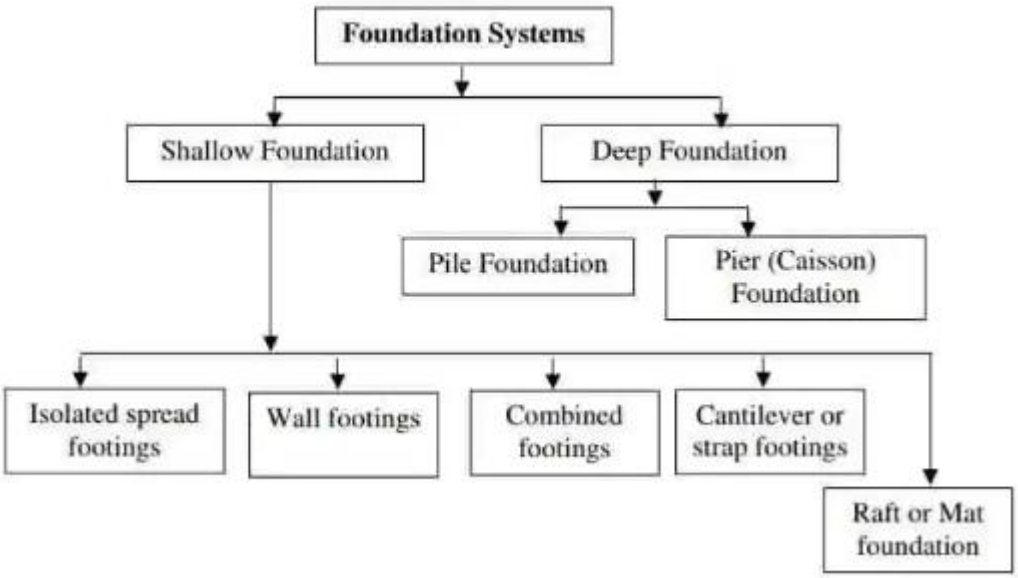

Fig 1Types of footing

[Fig1 https://civiconcepts.com/blog/types-of-foundation]

1. Types of Isolated Footings

There are various types of isolated footings such as spread footing, stepped footing, sloped footing etc. They are usually square, rectangular or circular in shape. Each type of footing is selected based on the soil condition and configuration of imposed loads. Isolated footings are one of the most economical types of footings and are used when columns are spaced at relatively long distances.

Isolated or single footings are structural elements used to transmit and distribute loads of single columns to the soil without exceeding its bearing capacity, in addition to preventing excessive settlement and providing adequate safety against sliding and overturning. Furthermore, they are used in the case of light column loads, when columns are not closely spaced and in the case of good homogeneous soil.

Use of Isolated Footing: Isolated footings are used as shallow foundation in order to transfer concentrated loads to the ground. To know the basic information, read Isolated footing.

Types of Isolated Footings

a. Flat, Pad, Plain, or Reinforced Isolated Footing

It is constructed under each column independently and is usually square, rectangular, or circular in shape. The thickness of flat isolated footing is uniform. It is provided so as to reduce the bending moments and shearing forces at their critical sections. It can be

constructed from plain concrete or reinforced concrete to increase the ultimate load carrying capacity.

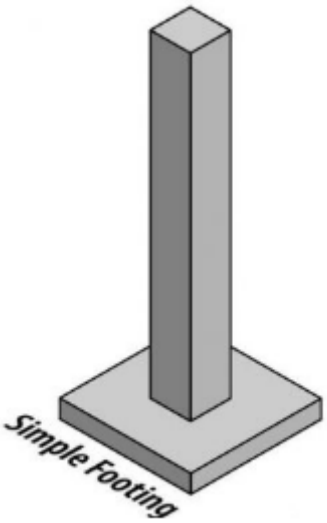

Fig. 2: Flat, Plain, or Reinforced Isolated Footing

[Fig 2 https://gharpedia.com/blog/various-types-of-footings-for-your-house/]

b. Sloped Isolated Footing

Sloped or trapezoidal footings are designed and executed with utmost attention to maintain a top slope of 45 degrees from all sides. The amount of reinforcement and concrete used in the sloped footing construction is less than that of plain isolated footing. Therefore, it decreases the utilization of concrete and reinforcement.

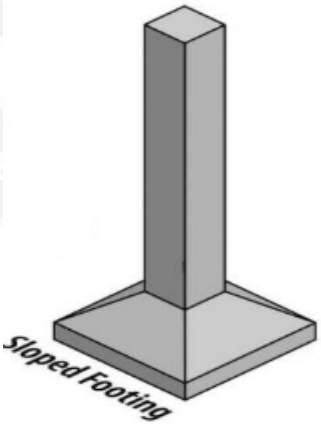

Fig. 3: Sloped Isolated Footing

[Fig 3https://gharpedia.com/blog/various-types-of-footings-for-your-house/]

c. Stepped isolated Footing

Previously, the construction of this type of isolated footing was popular, but its application has declined nowadays. It is generally used in the construction of residential

buildings. Stepped footings are stacked upon one another as steps. By and large, three concrete cross-sections are stacked upon each other to create steps.

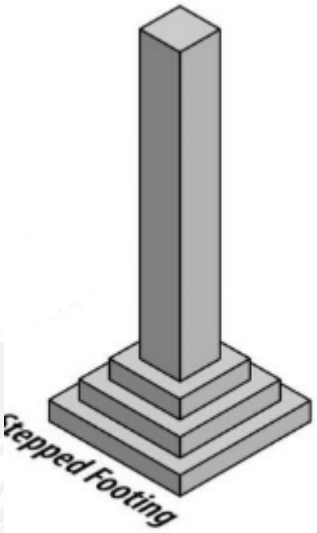

Fig. 4: Stepped Isolated Footing

[Fig 4 https://gharpedia.com/blog/various-types-of-footings-for-your-house/]

d. Shoe or eccentric footing

Shoe footing is the half cut-out from the original footing and it has a shape of shoe. They are constructed on property boundary, where there is no provision of setback area. It is constructed at the corner of the plot when the exterior column is close to the boundary or property line and hence there is no scope to project footing much beyond the column face. Column is provided or loaded at the edges of shoe footing. Shoe footings are constructed when the soil bearing capacity is 24KN/m^2

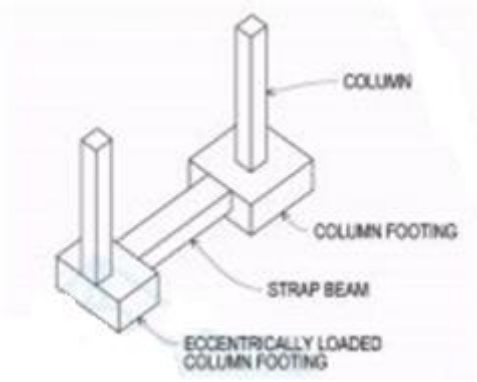

Fig5 Shoe or eccentric footing

[Fig 5https://civilread.com/different-types-footings/]

2. Continuous Wall Footing:

The footing which supports a long masonry or RCC wall is known as a continuous footing. It can be either simple or stepped.

Generally, width of the footing should be at least equal to twice the width of wall that is rested on it. In this case, the width of the footing is smaller than the length of the footing, offering continuous vertical support to the structure. Basically, it runs throughout the length of the wall. This type of footing is not economical.

Use of Continuous Wall Footing: Continuous wall footings are used to support the foundation walls and load-bearing walls.

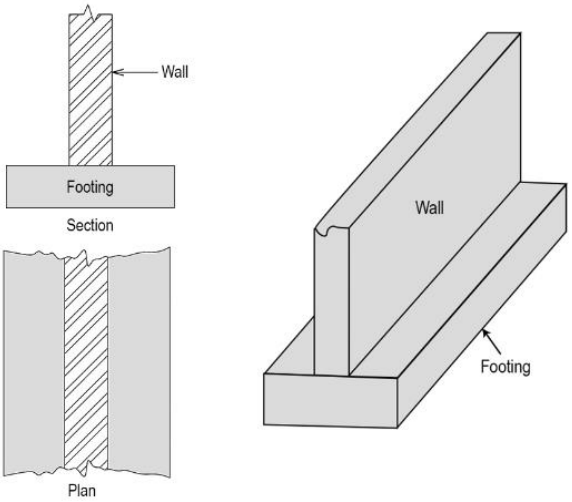

Fig 6 Continuous Wall Footing

[Fig 6 https://gharpedia.com/blog/various-types-of-footings-for-your-house/]

3. Combined footing: -

A footing which has more than one column is called as combined footing. This kind of footing is adopted when there is a limited space. Due to lack of space we cannot cast individual footing, therefore footings are combined in one footing. They are classified into two types based on their shape:

Use of Combined Footing: Combined footings are used to transfer loads of closely spaced column to the ground or when the column face the boundary of plot.

Rectangular combined footing: This rectangular footing is provided under two columns where the column is equal load.

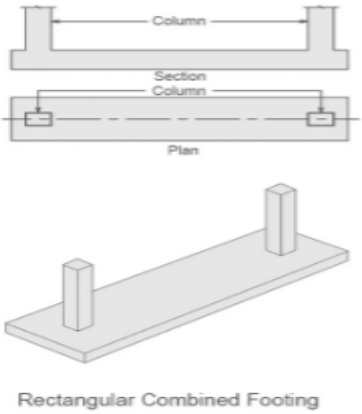

Fig7 Rectangular combined footing

[Fig 7 https://gharpedia.com/blog/various-types-of-footings-for-your-house/]

Trapezoidal combined footing: This trapezoidal footing are provided when the two columns are unevenly loaded.

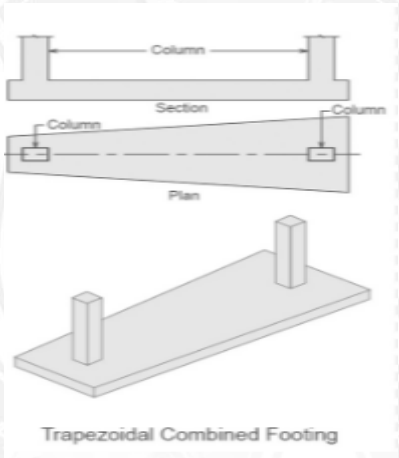

Fig8 Trapezoidal combined footing

[Fig8 https://gharpedia.com/blog/various-types-of-footings-for-your-house/]

4.Strap or Beam Combined Footing:

When a distance between the two columns supported on combined footing becomes large, the cost increases rapidly. The strap footing is an economical option in such cases.

Use of Strap Footing: Generally, strap footings are used in conjunction with columns of adjoining property.

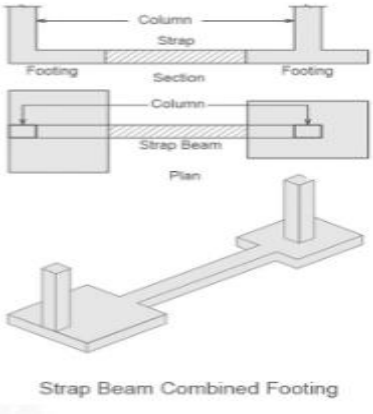

Fig 9 Strap beam combined footing

[Fig9 https://gharpedia.com/blog/various-types-of-footings-for-your-house/]

5.Raft footing

If loads transmitted by the columns in a structure are heavy and the allowable soil pressure is small, then footing requires more area. In such a case, it may be better to provide continuous footing under all columns and walls. Such kind of footing is called a Raft Footing.

Use of raft footing: It is widely used when soil has low load bearing capacity. To know more, read the basic information of raft foundation and also know the various types of raft foundation.

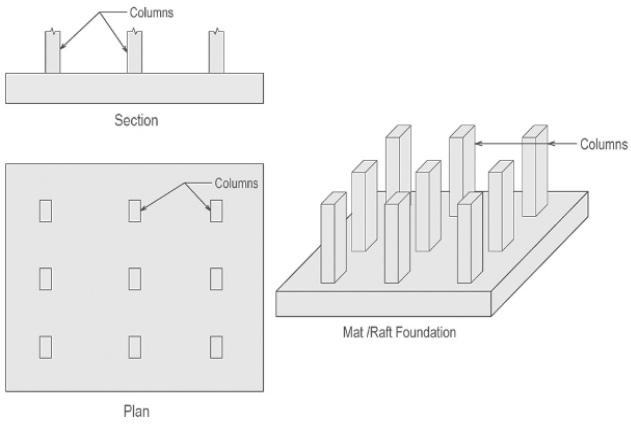

Fig 10 Raft footing

[Fig 10 https://gharpedia.com/blog/various-types-of-footings-for-your-house/]

When the soil has a low bearing capacity or the ground water level is high, pile footings are applied. Piles are common while building foundation for bridges, dam etc. in walls.

Use of Pile Footing: Piles are used as deep foundation where the soil is very week and has higher groundwater table.

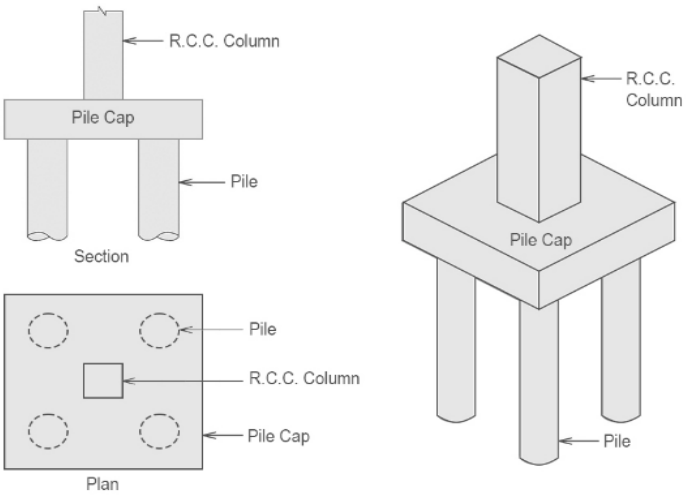

Fig 11 Pile Footing

[Fig 11 https://gharpedia.com/blog/various-types-of-footings-for-your-house/]

Drilled Shafts or Caisson Foundation:

Drilled shafts, also called as caissons, is a type of deep foundation and has an 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 are done using an auger.

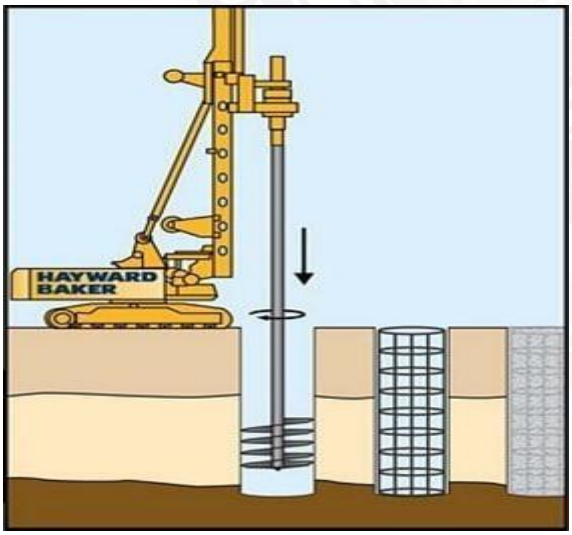

Fig:12 Drilled Shafts or Caisson Foundation (Source: Hayward Baker)

[Fig12https://theconstructor.org/geotechnical/soil-foundation-contact-pressure-distribution/5647/]

Drilled shafts can transfer column loads larger than pile foundations. It is used where the depth of hard strata below ground level is located within 10m to 100m (25 feet to 300 feet).

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.