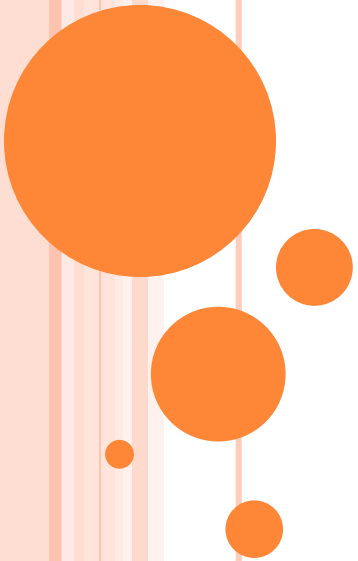
Foundation



Definition

- Foundation is the lower portion of the building, usually located below the ground level, which transmits the load of the super-structure to the sub-soil.
- Types of foundations:-
- Shallow foundation
- Deep foundation

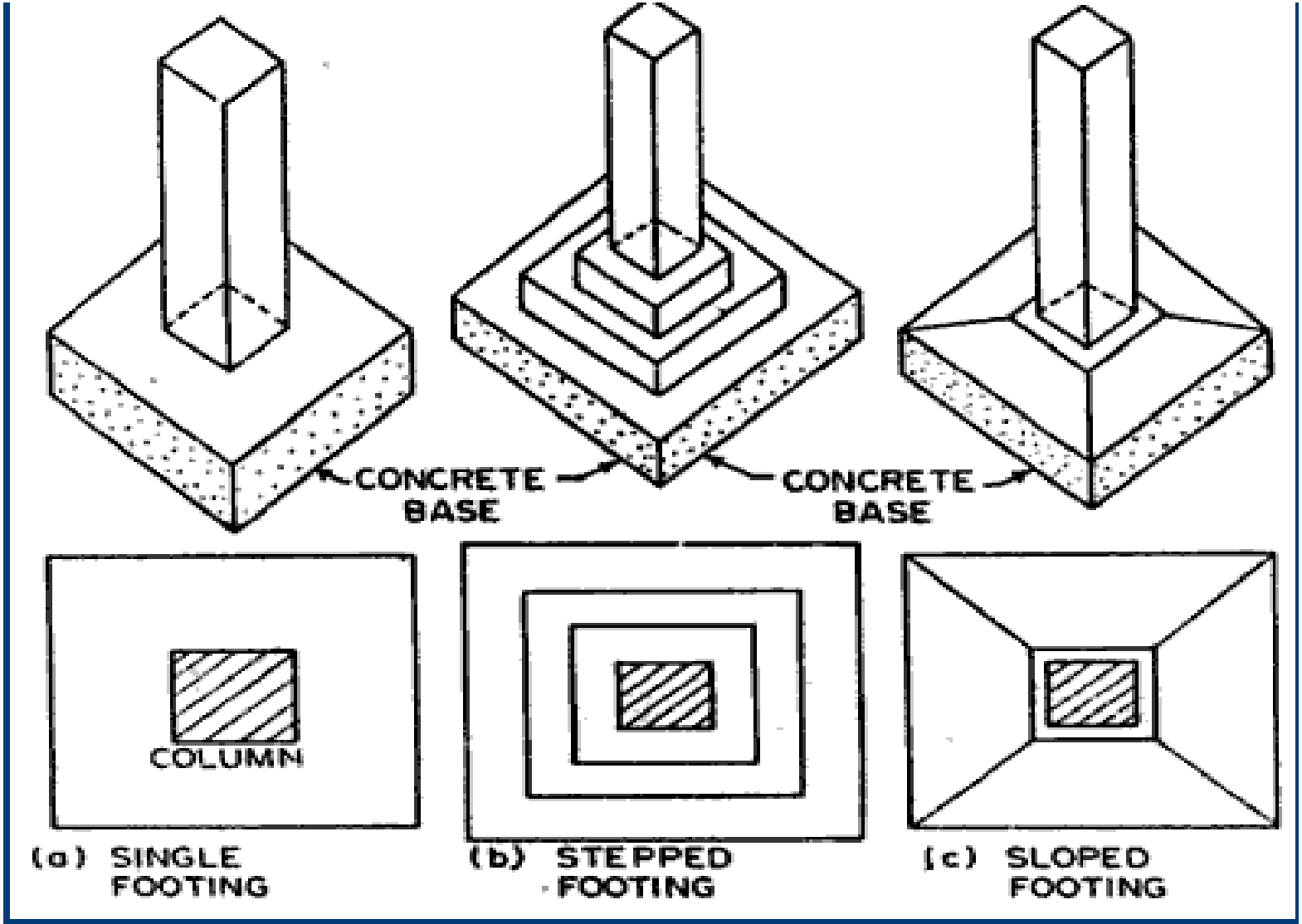
Shallow Foundation

- Shallow foundations are further classified into the following types:
- Spread footing
- Combined footing
- Strap footing
- Grillage foundations
- Raft foundations

Spread Footing

- The footing whose base is extended or spread to distribute the load of the structure over a large area of sub-soil is called spread footing.
- Types:-
- Single footing:- Suitable for light loaded column.
- Stepped footing:- For Heavily loaded column if single footing is provided, the footing may fail or crack in the cantilever portion hence to avoid this stepped footing is provided. It is used in load bearing structures.
- Slopped footing

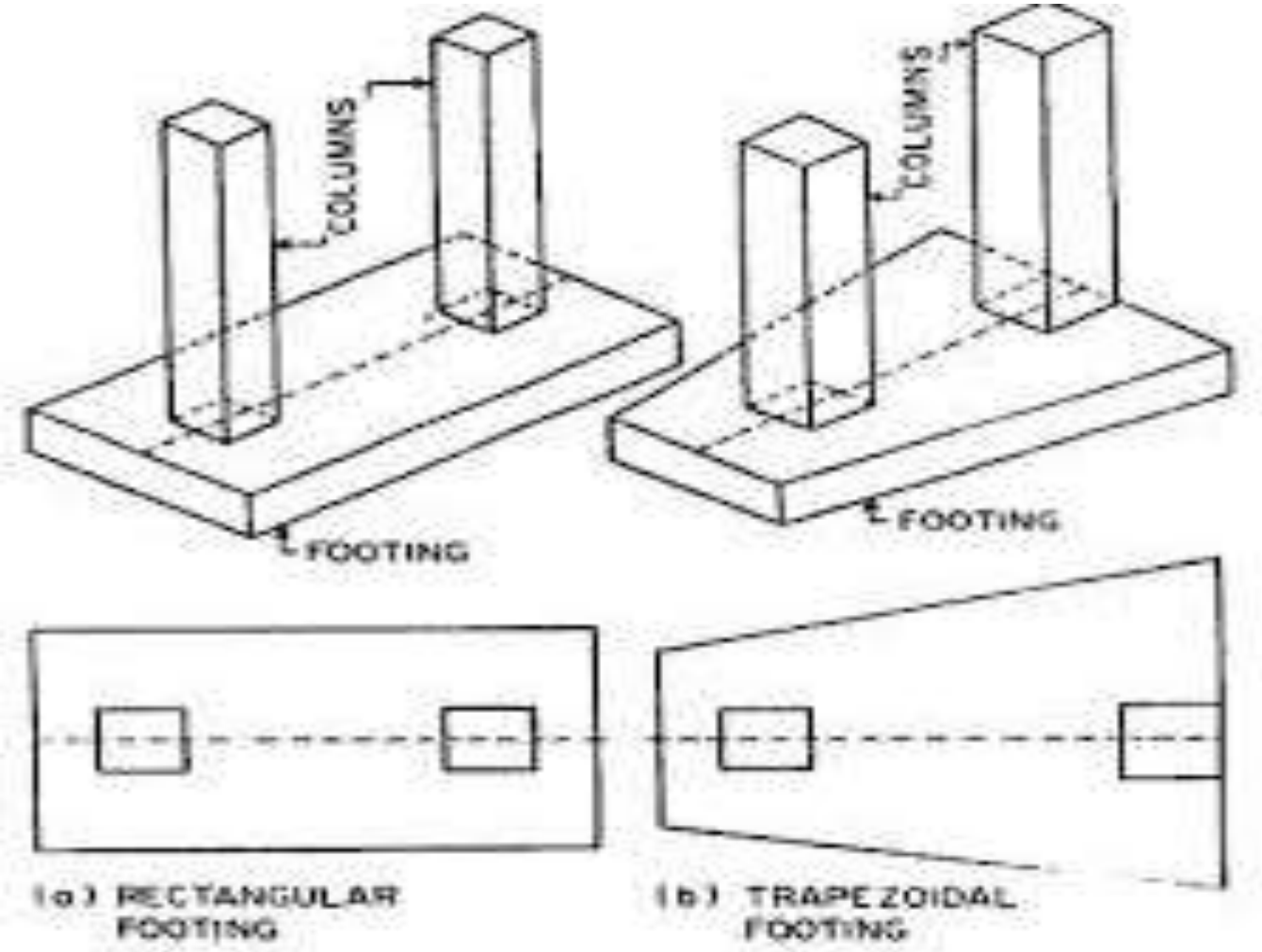
SPREAD FOOTING



Combined footing

- Sometimes two columns are located very near to each other in a structure. If separate footing under these columns are provided, they may interfere with other. Therefore, providing a combined footing, is essential.
- Types:-
- Rectangular:- when columns carry equal load
- Trapezoidal:- when columns carry unequal load

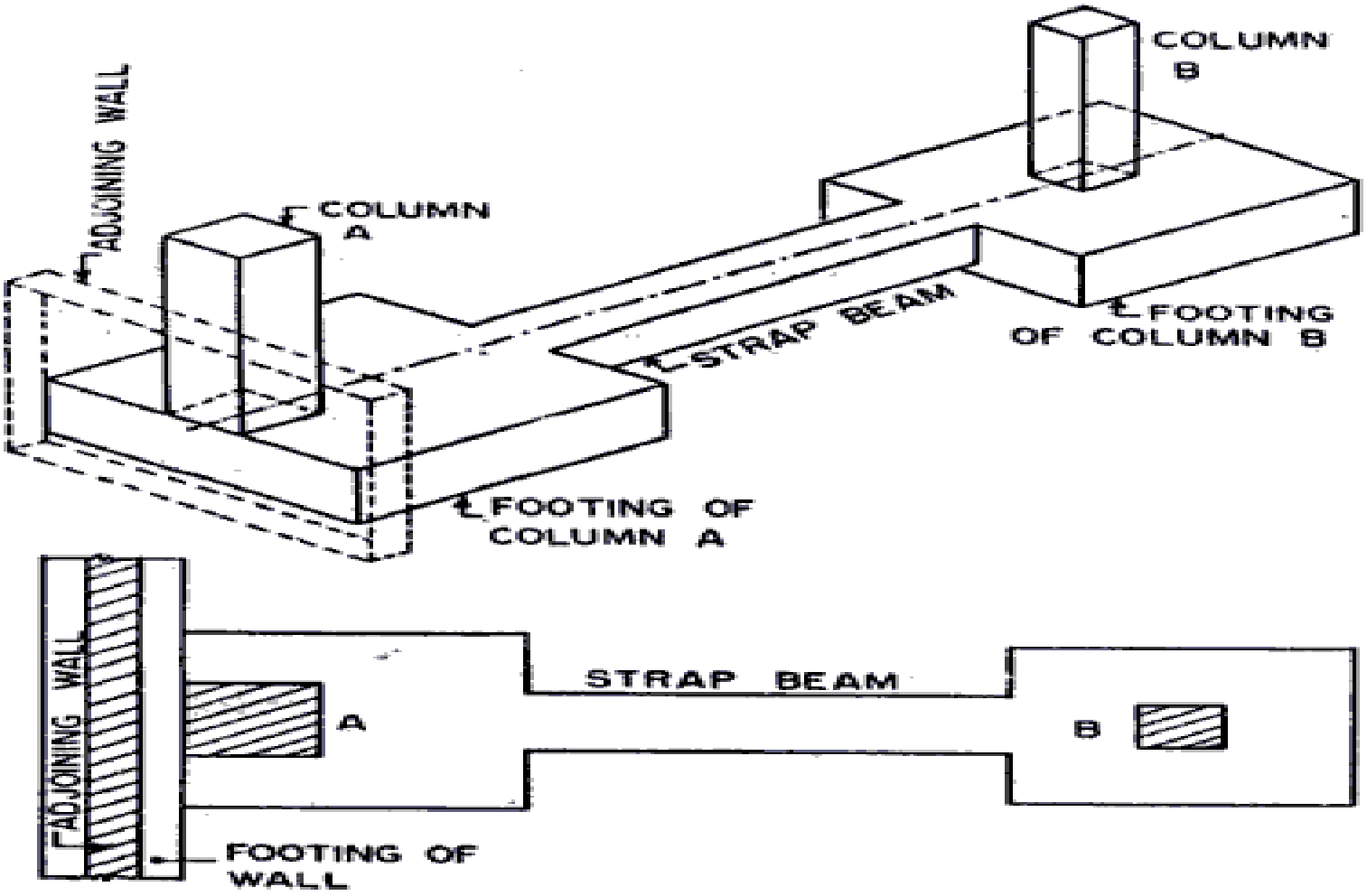
COMBINED FOOTING



Strap Footing

- If the independent footing of two columns are connected by a beam, is called a strap footing.
- It may be used where the distance between the columns is so great.
- Each column is provided with its independent footings & a beam is used to connect the two footing.

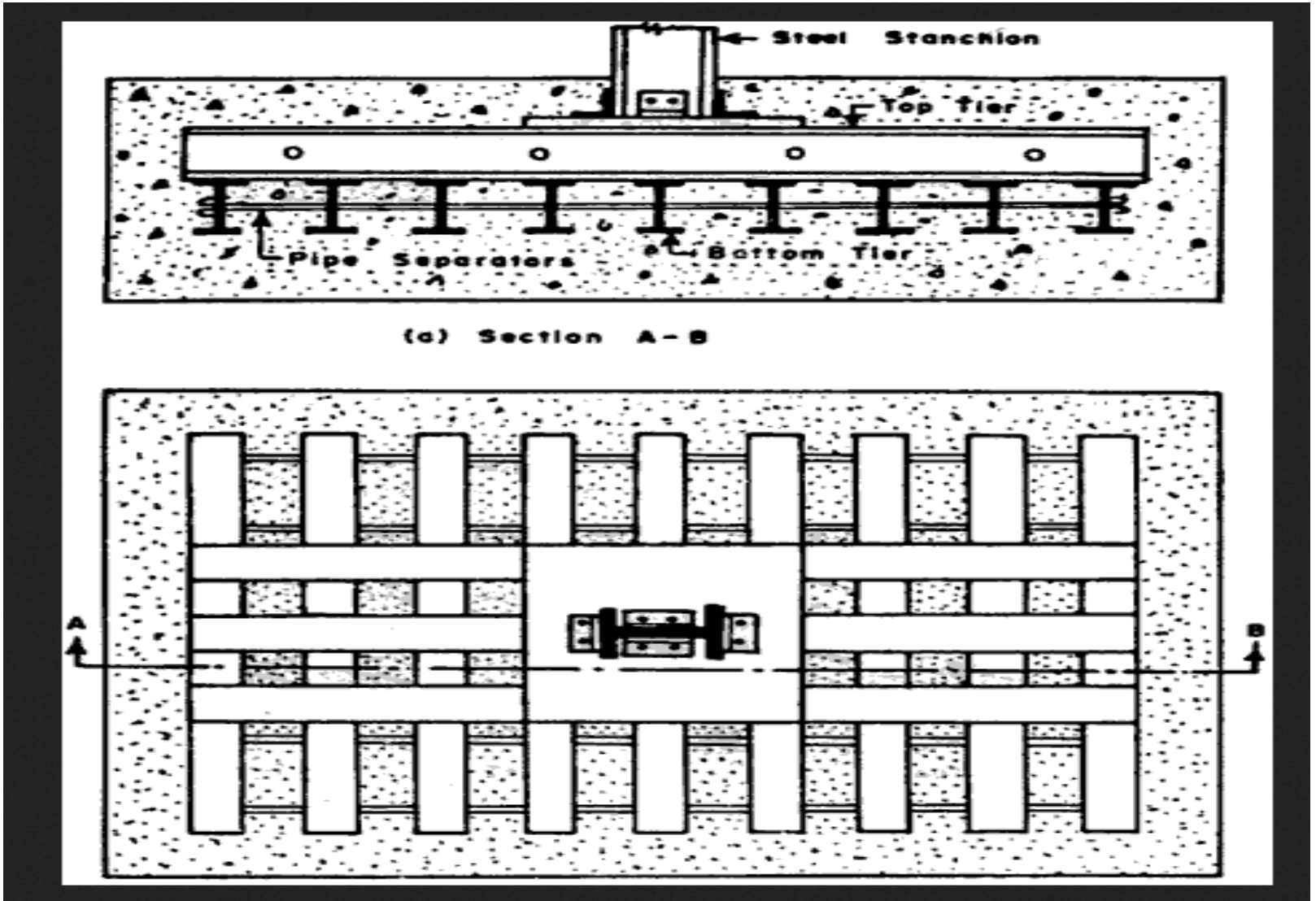
STRAP FOOTING



Grillage Foundation

- It is a special type of isolated footing generally provided for these locations where bearing capacity of soil is poor.
- The depth of such a foundation is limited to 1 to 1.5 m.
- The load of the column is distributed or spread to a very large area by means of two or more layers of rolled steel joists, each layer being laid at right angle to the layer bellow it.
- Both the tiers of the joists are then embedded in cement concrete to keep the joists in position and to prevent their corrosion.

Grillage Foundation



Types

- Depending upon the material used in construction, grillage foundations are further classified into two types.
- Steel Grillage Foundation
- Timber Grillage Foundation

Steel Grillage Foundation- Method of construction

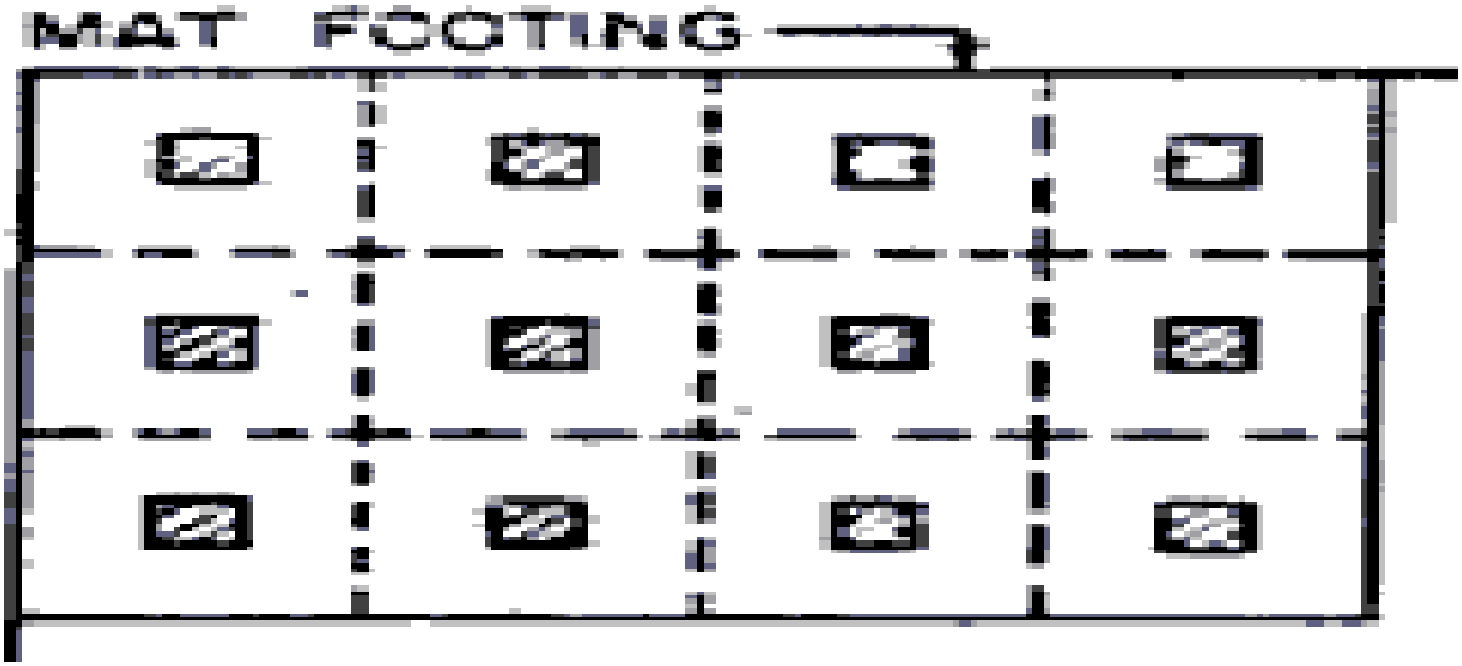
- For constructing steel grillage foundation, a trench is excavated to the calculated width and about 1 m – 1.50 m deep. Bottom of the trench is rammed and levelled.
- Then a layer of lean cement concrete (1: 8 : 16), about 30cm thick, is laid and compacted.
- After this, a layer of rich cement concrete (1: 2 :4), about 15cm thick is spread and compacted to form a concrete bed.
- Over the concrete bed thus prepared, the bottom tier consisting of a number of steel I – beams of designed dimensions are placed at specified distance apart, using spacer bars. The space in between and around the steel beams is then filled with cement concrete.
- On this bottom tier, a second layer of steel I – beam is placed, if required.
- The entire space is then filled with cement concrete 1: 2 : 4. On the grillage bed thus prepared, the structure in the form of a steel stanchion, column is built.

SUITABILITY

- Steel grillage foundations are useful for structures like columns, piers, stanchions subjected to heavy concentrated loads and hence are employed for foundations of the buildings such as theatres, factories, town, halls etc.
- Timber grillage foundations re usually provided for timber columns subjected to heavy concentrated loads.
- Timber grillage foundation can also be safely used for light buildings where the soil encountered is soft and is permanently water-logged.

Raft or mat Foundation

- The foundation consisting of a thick R.C.C slab covering the whole area of a mat is known as raft foundation.



Suitability

- This type of foundation is useful for public buildings, office buildings, school buildings, residential quarters etc, where the ground conditions are very poor and bearing power of the soil is so low that individual spread footing cannot be provided.