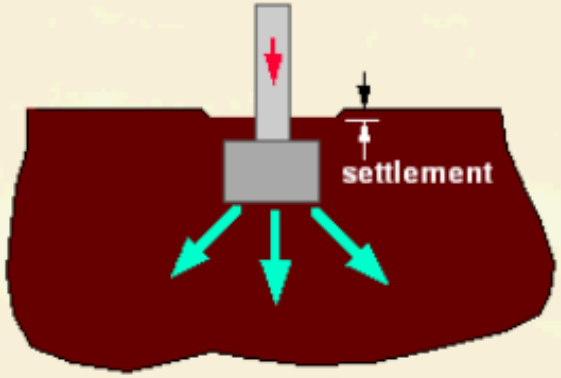
Working Drawing
Foundation

Lecturer : Working drawing Staff

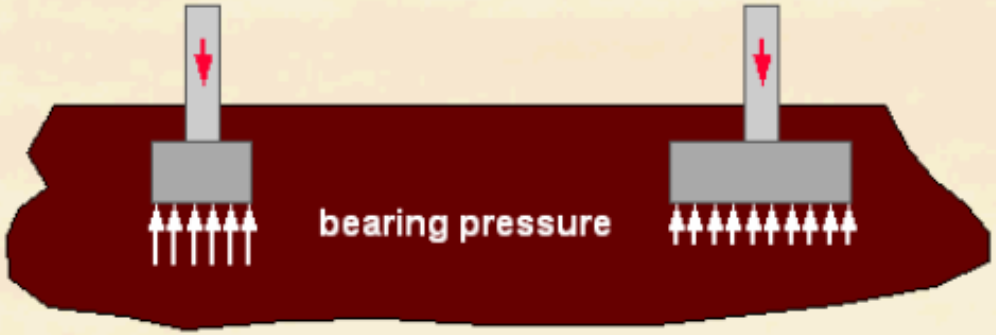
2022 - 2023

Foundation

- The substructure or foundation 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 underlying soil or rock.

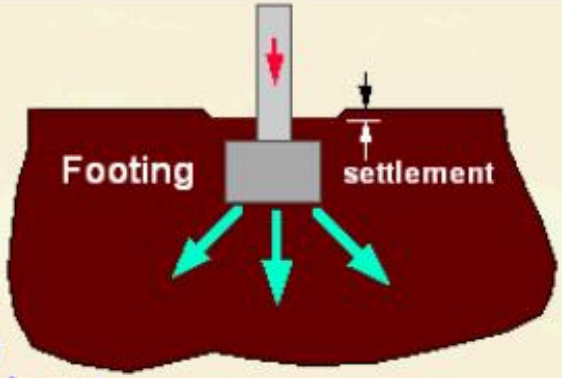


- All soils compress noticeably when loaded and cause the supported structure to settle.
- To limit settlement it is necessary to -
  - transmit the load of the structure to a soil stratum of sufficient strength, and
  - spread the load over a sufficiently large area of that stratum to minimise the bearing pressure.



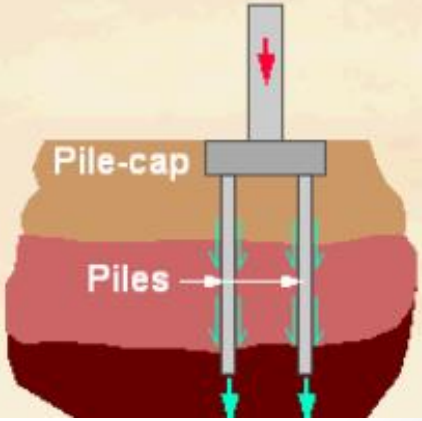
Function of foundation

- The substructure or foundation 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 underlying soil or rock.

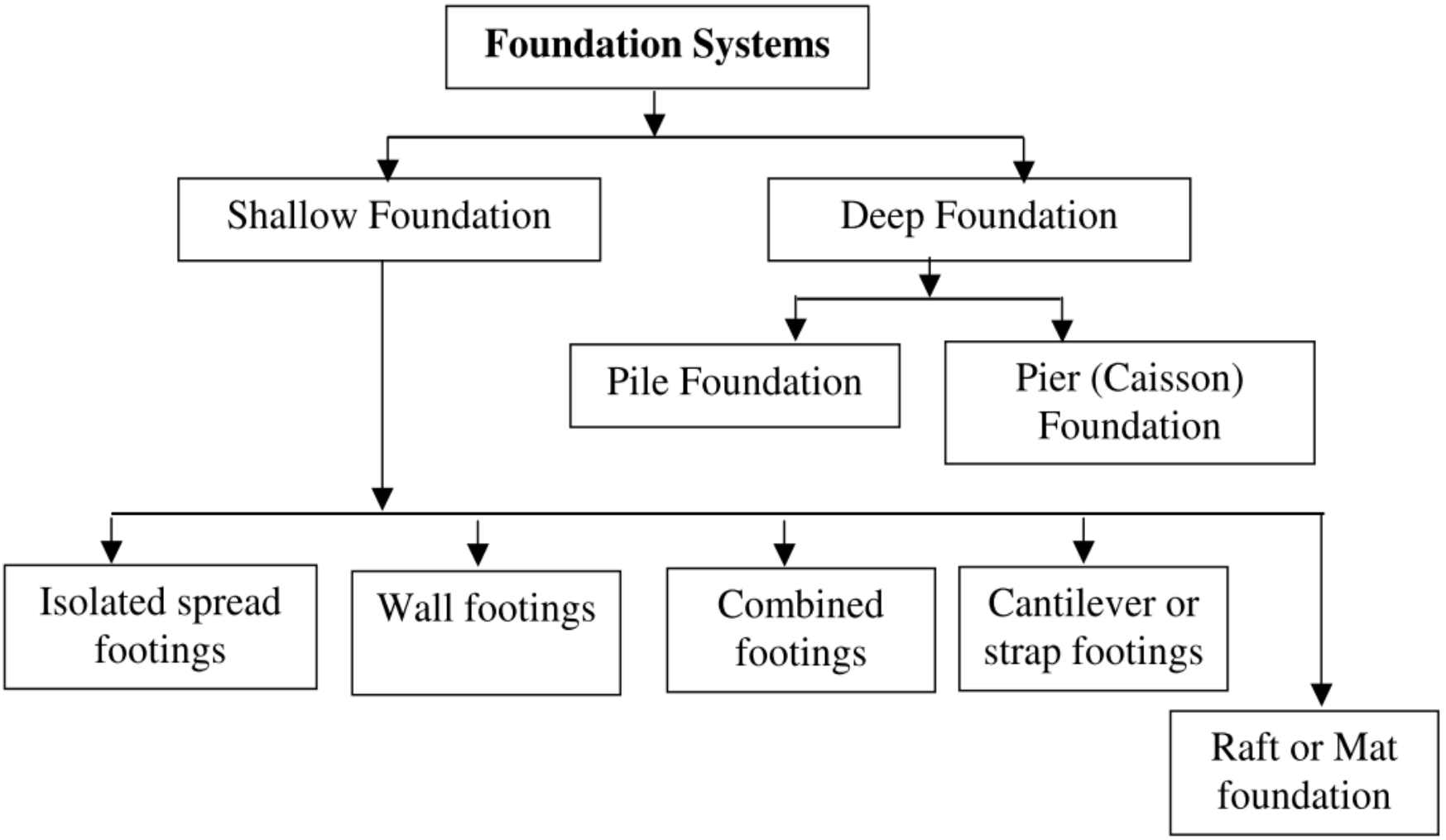


- If soil of sufficient bearing capacity lies immediately below the structure then the load can be spread by footings, as shown above.

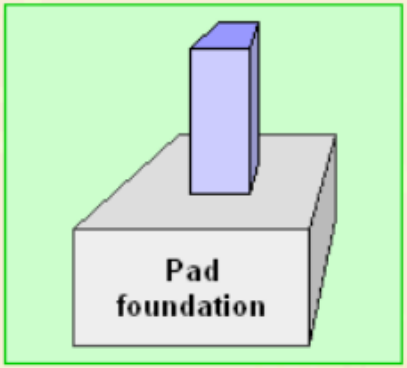
Footings range from isolated pads supporting individual columns, through strips supporting walls or closely spaced columns, to a raft footing supporting the whole structure.



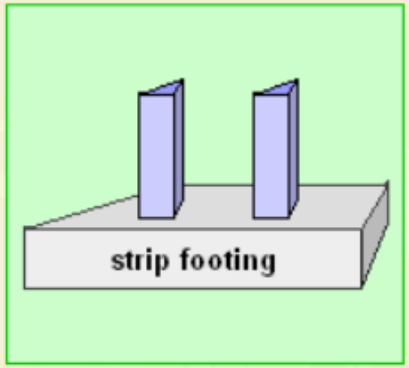
- However, if the soil has insufficient bearing capacity then it is necessary to use deep foundations, such as piles, to transmit the load to deeper, firmer strata.


Foundation Systems
Shallow Foundation
Deep Foundation
Pile Foundation
Pier (Caisson) Foundation
Isolated spread footings
Wall footings
Combined footings
Cantilever or strap footings
Raft or Mat foundation

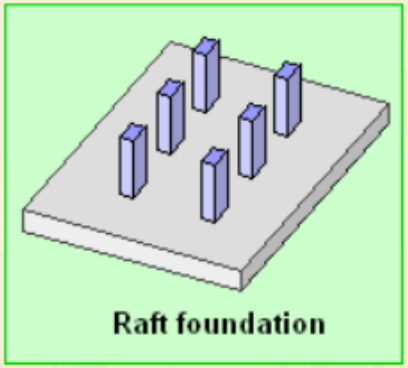
Use of different foundations



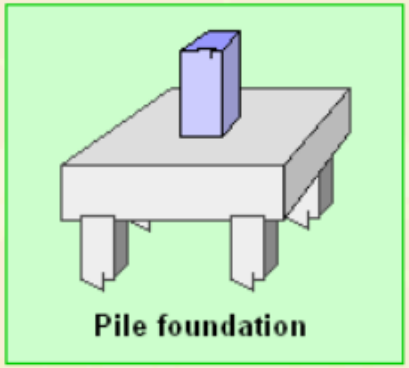
Where suitable bearing strata are at a shallow depth, mass concrete pad footings can be used. It is also the most economical choice for the ground conditions. The depth of the pad allows dispersion of the load without the need for reinforcement.



Strip footings are used if individual pad footings would be too closely spaced. Strip footings can also be used on weak ground to reduce the bearing pressure.



Where the ground conditions are poor and the depth to a strong bearing strata is excessive, raft foundations are used to distribute the load over a large area.



Piles are used where the bearing strata at the foundation level are too weak to support the superstructure.
Piles find support at a deeper, firmer level where the load is dispersed.

Types of foudations

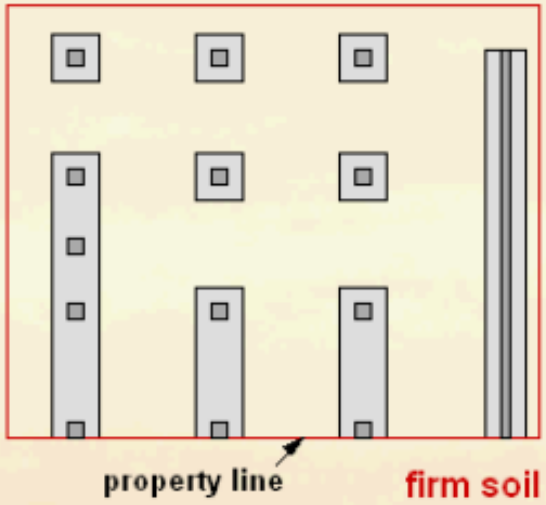
This is a plan of a 3 storey building showing the columns and wall at ground level. It will illustrate the use of each type of footing. The soil has good bearing capacity.

- The simplest and most economical type is an isolated pad footing positioned under each column .....

  But they cannot be used under external columns if property rights are infringed, and it is not good practice to have the column on the edge of an isolated pad .....

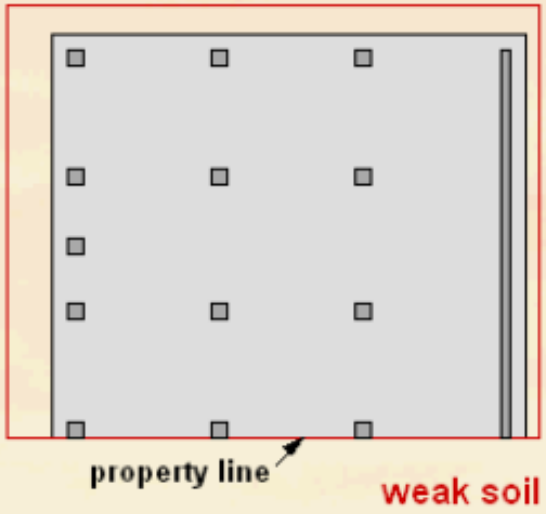
- so a combined footing is used .....
- a strip footing is used under a wall .....

  and can also be used under columns where the pads nearly or completely merge .....



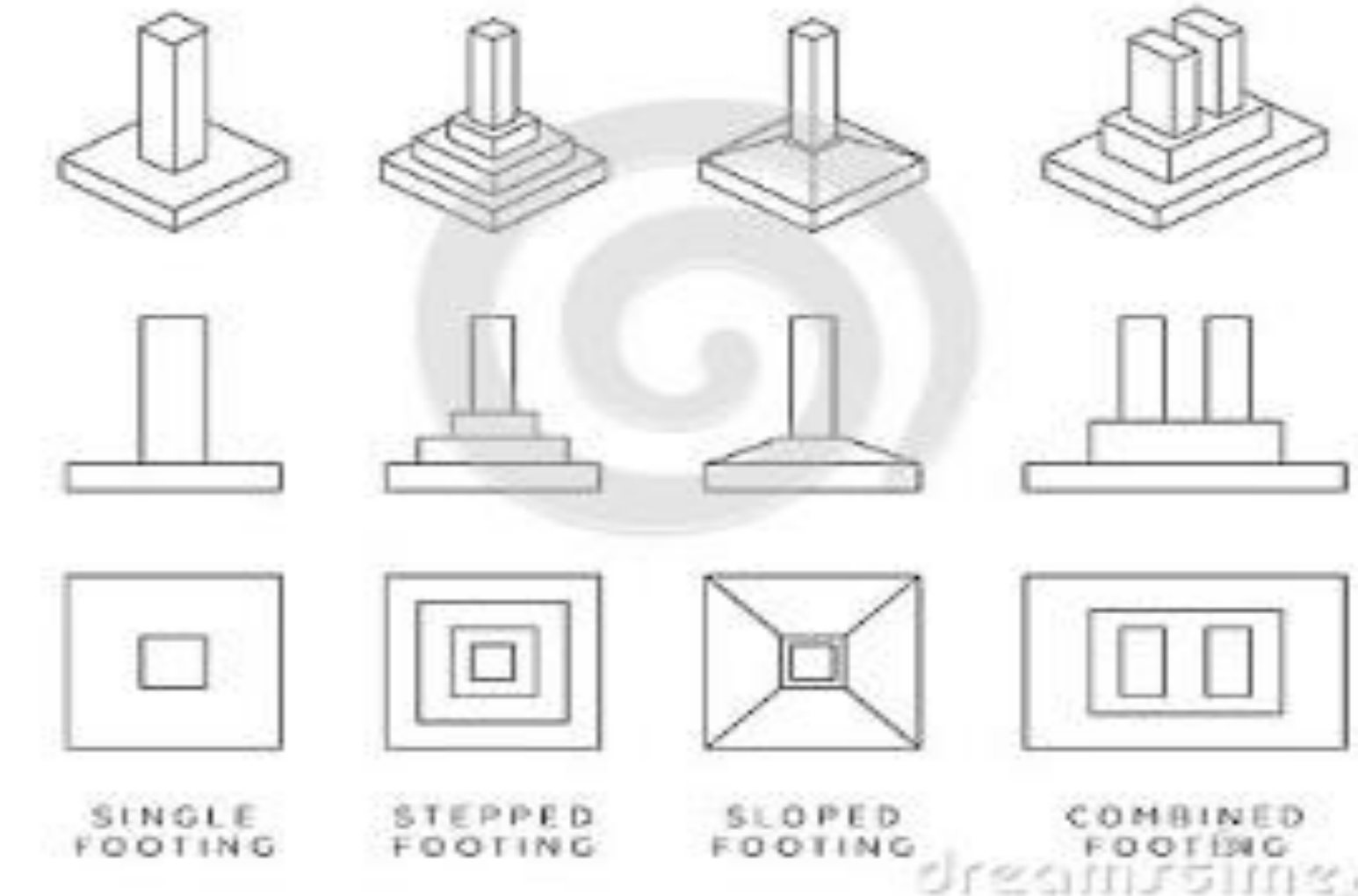
If the loads are now increased significantly, or the same building is to be supported by much weaker soil, then the area of the pad footings would be excessive.

- Strip footings in both directions may be sufficient to spread the load and reduce bearing pressures to acceptable levels.
- If not, a raft foundation may give suitable bearing pressures.
- If the bearing pressures are still excessive, a deep basement at a firmer soil level, or piled foundations must be used.



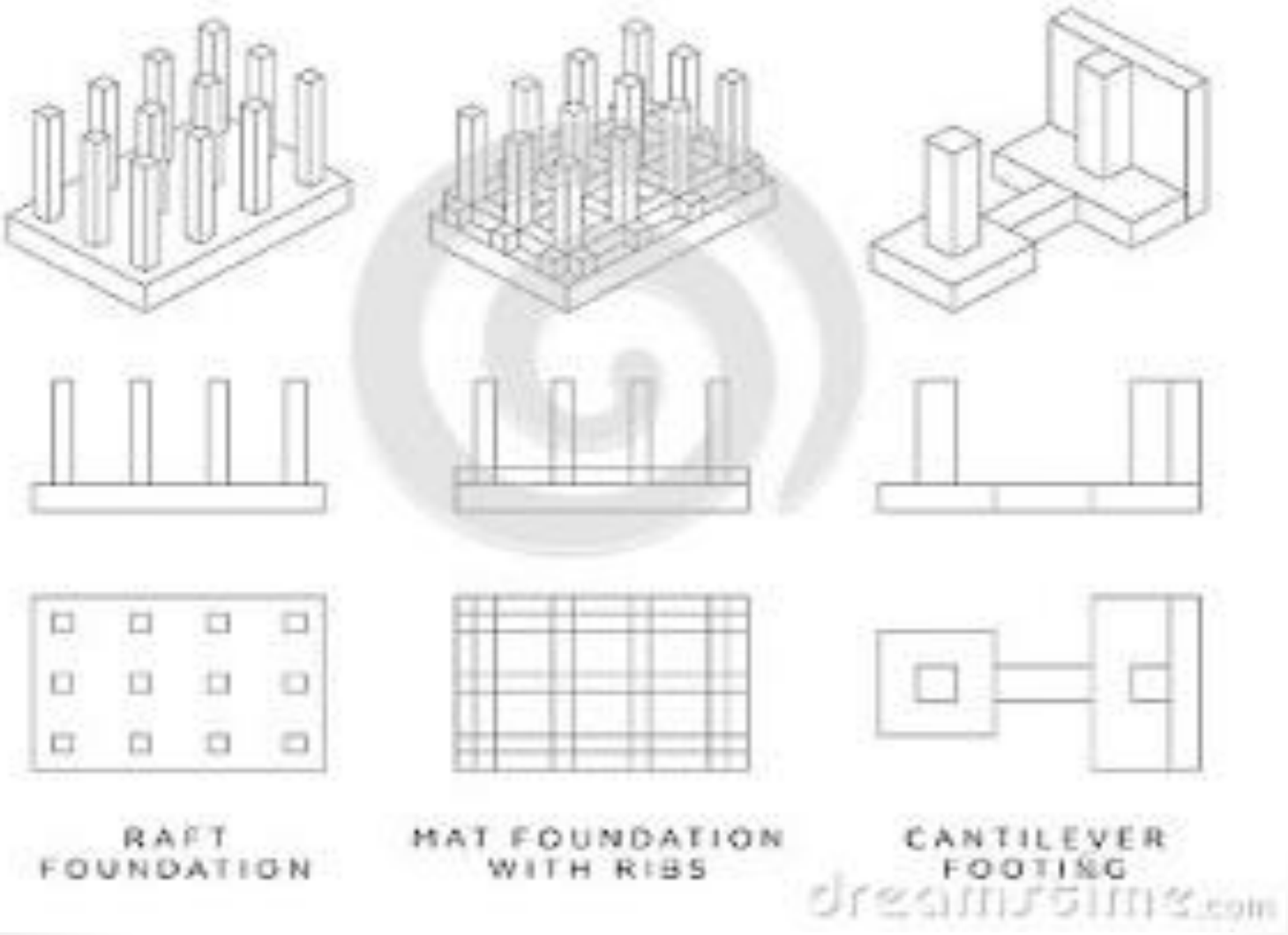
TYPES OF FOUNDATIONS

SET 1: SHALLOW FOUNDATIONS, COLUMN FOOTINGS



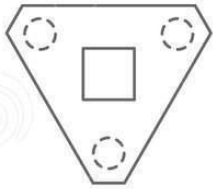
TYPES OF FOUNDATIONS

SET 3: SPREAD FOOTINGS

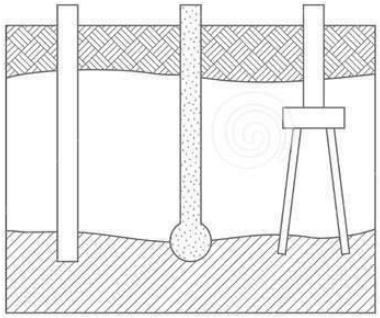


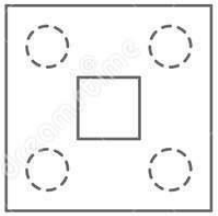
TYPES OF FOUNDATIONS

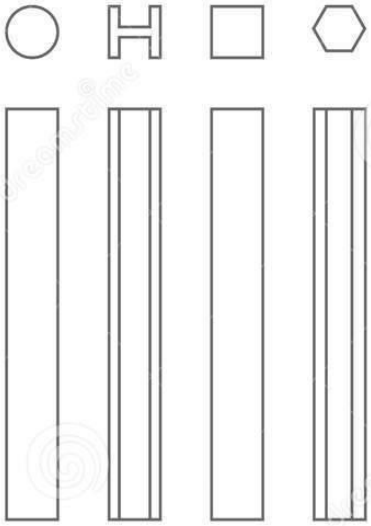
SET 4: DEEP FOUNDATIONS. PILES



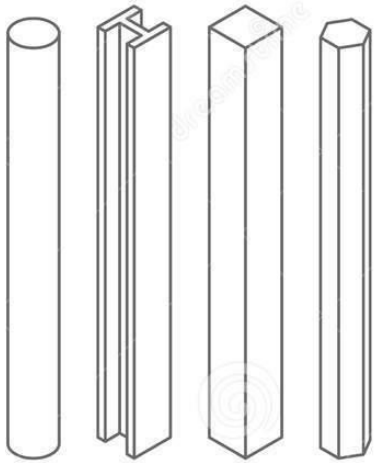
PILES CAP LAYOUT



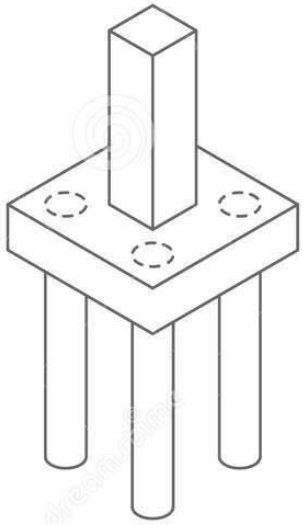




TYPE OF PILES



ISOMETRIC PILES



PILE FOUNDATION

THANK YOU