



Salahaddin University- Erbil
College of Engineering
Department of Architecture

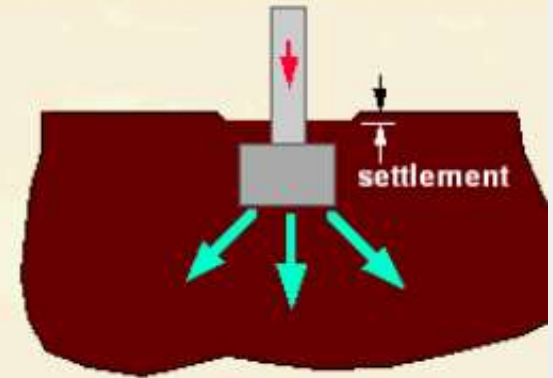
Working Drawing Foundation

Lecturer : Working drawing Staff

2021 - 2022

Definition 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.
- 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.



Foundation Systems

Shallow Foundation

Deep Foundation

Pile Foundation

Pier (Caisson)
Foundation

Isolated spread
footings

Wall footings

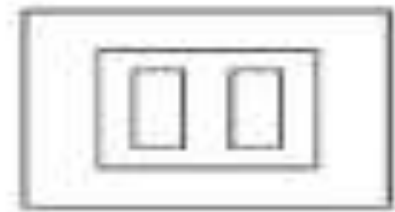
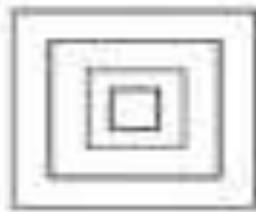
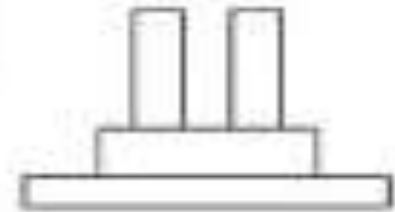
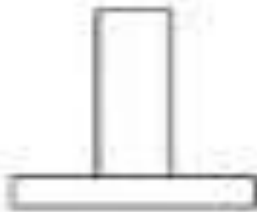
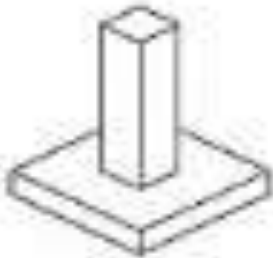
Combined
footings

Cantilever or
strap footings

Raft or Mat
foundation

Types of Shallow Foundation

SET 1: SHALLOW FOUNDATIONS. COLUMN FOOTINGS



SINGLE
FOOTING

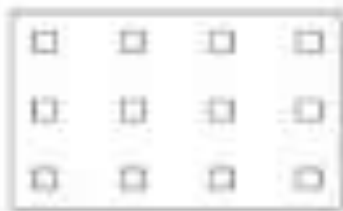
STEPPED
FOOTING

SLOPED
FOOTING

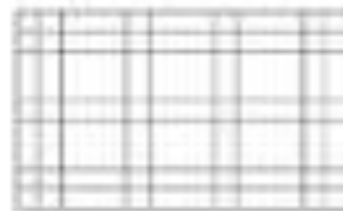
COMBINED
FOOTING

Types of Shallow Foundation

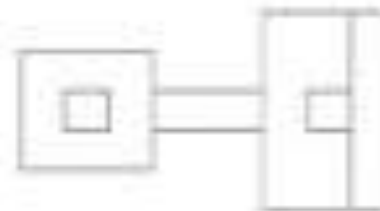
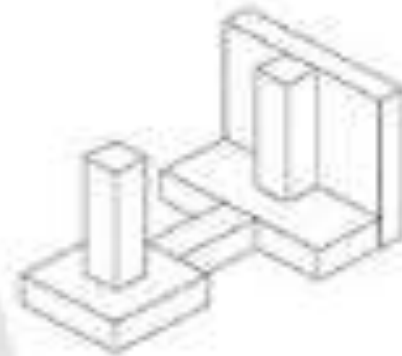
SET 3 SPREAD FOOTINGS



RAFT
FOUNDATION



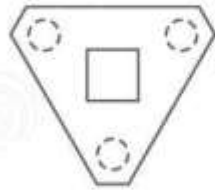
HAT FOUNDATION
WITH RIBS



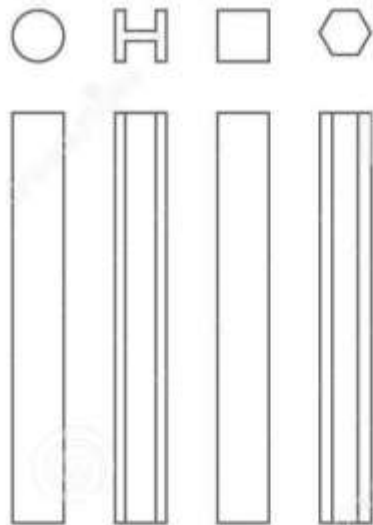
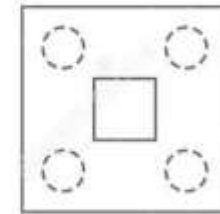
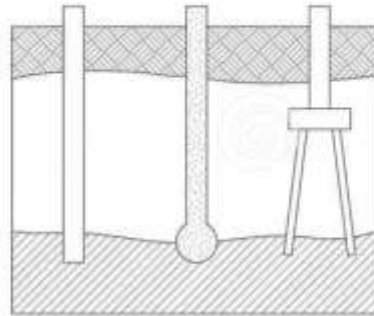
CANTILEVER
FOOTING

Types of Deep Foundation

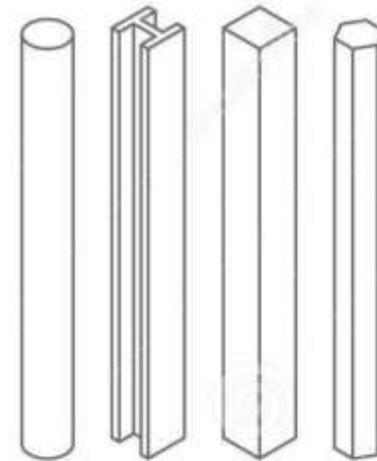
SET 4: DEEP FOUNDATIONS. PILES



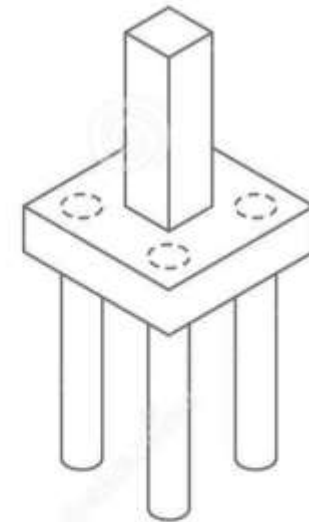
PILES CAP LAYOUT



TYPE OF PILES

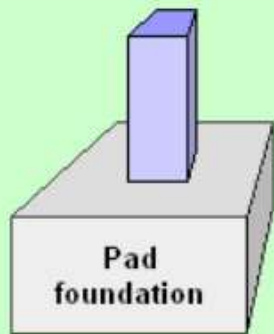


ISOMETRIC PILES

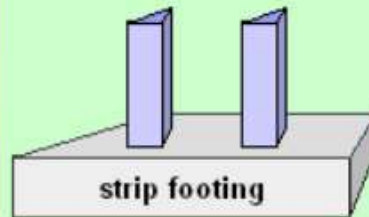


PILE FOUNDATION

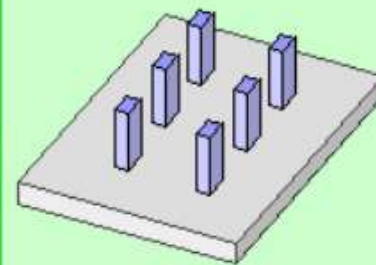
Use of Different Foundation



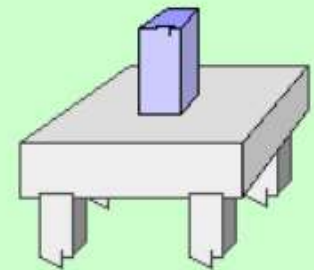
Where suitable bearing strata are at a shallow depth, mass concrete pad footings can be used. It is also the most economical choice for the ground conditions. The depth of the pad allows dispersion of the load without the need for reinforcement.



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.

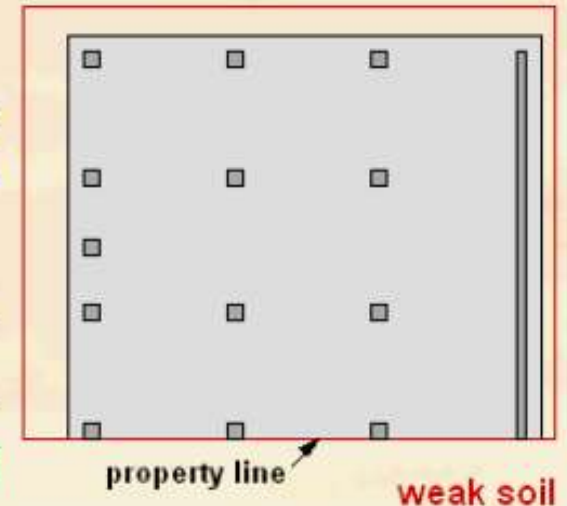
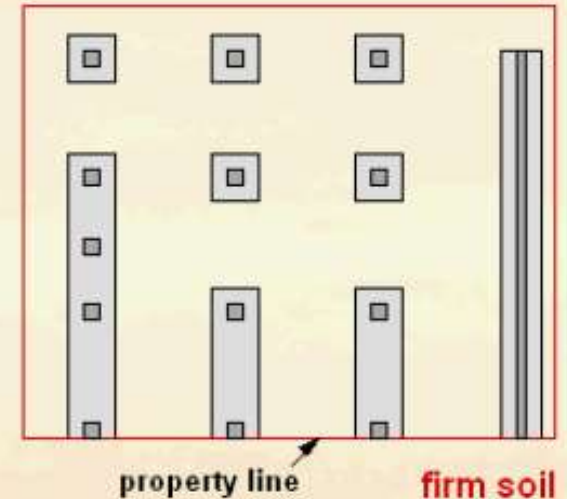
Foundation for Firm and Weak soil

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.

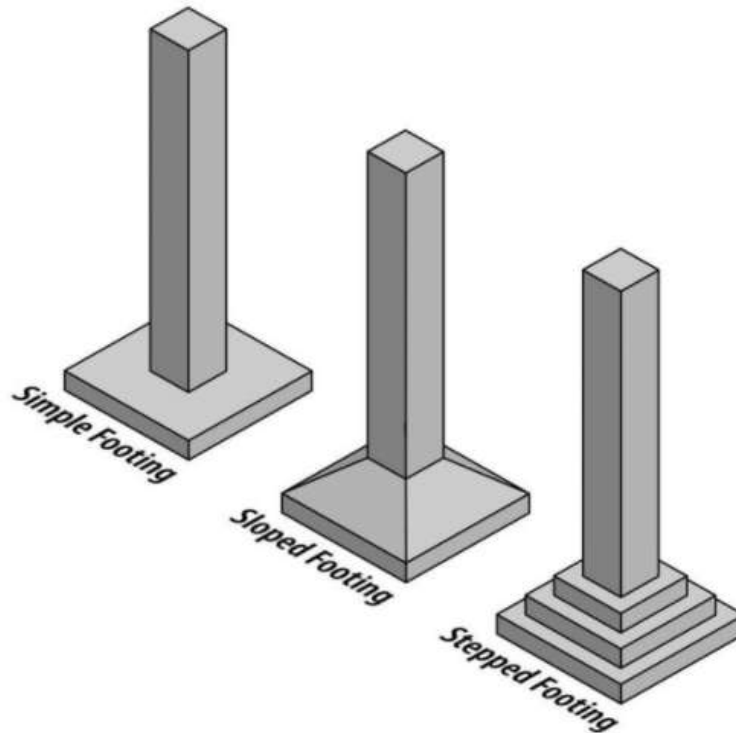


Isolated footing

Advantages of Isolated Footing:-

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1. Economical when columns are placed at longer distances.
2. Workmen with little or no knowledge can easily construct.
3. Ease of Constructability:- Excavation, Form-work, Reinforcement placement and placing of Concrete is at ease.



Stepped Footing



Foundation Plan (Footing Layout)

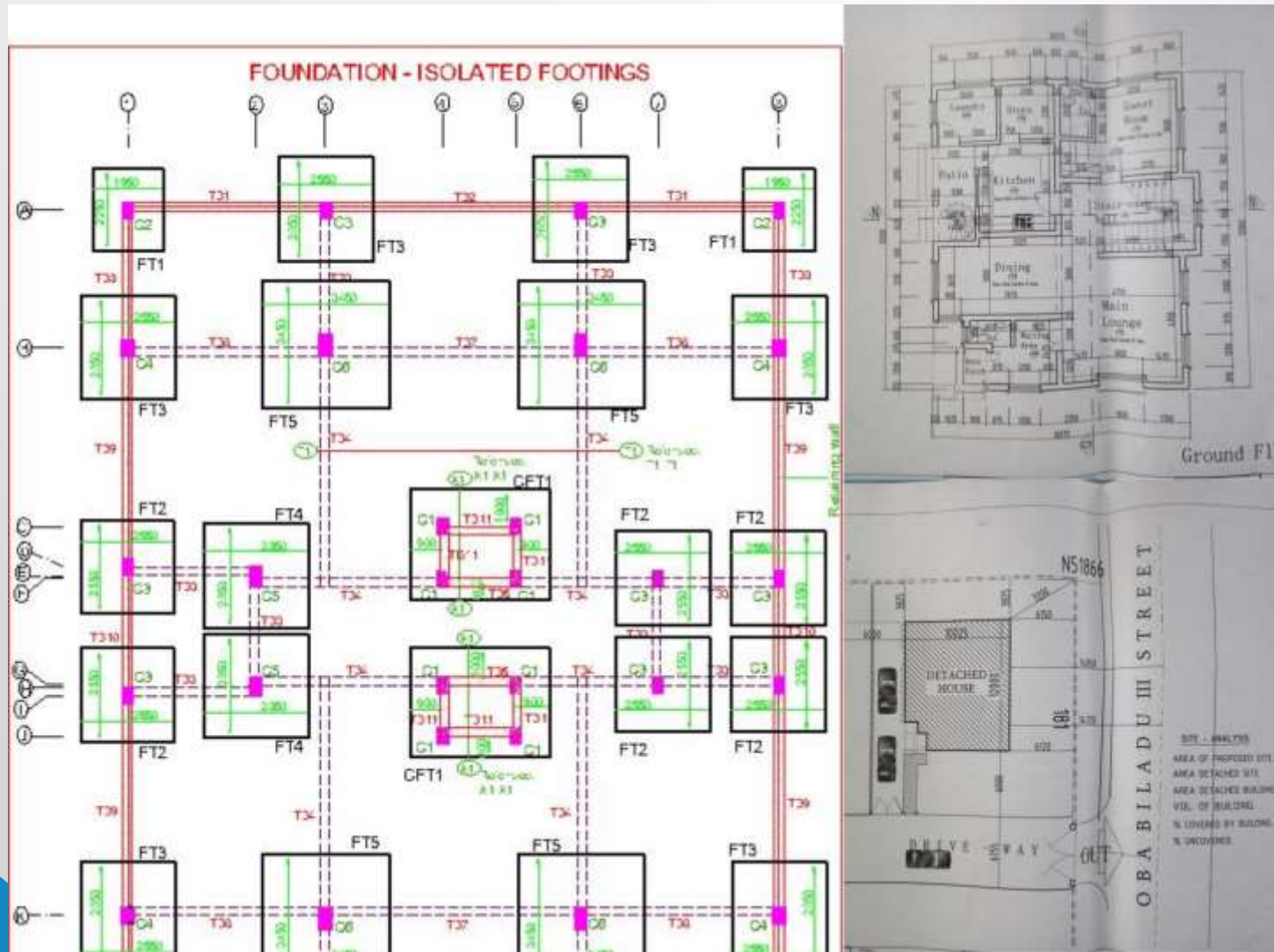


Table of foundation (footing layout)

| Name | No. | Dimension | Detail |
|------|-----|-----------|--------|
| F1 | | | |
| F2 | | | |
| F3 | | | |

THANK YOU

