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Building component technical course
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Aim of course

- Discovery of building components in Denmark and China
- Understanding of basic building components used in single family houses
- Improve technical English in the building sector
- Serving the technical skills attached to construction technology
Foundation:

Definition
- Base of the building
- Connection between the building and the soil

Function
- Provide a solid, stable and secure platform which can support and transfer the loads from the building to the sub-soil.
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Types of foundation

- Direct foundation
- Indirect foundation
- Both can be either shallow or deep

Materials used for foundations

- Mass concrete (mix of sand, aggregates, cement and water)
- Reinforced concrete, reinforced by steel bars or mesh
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Shallow foundation:

A **shallow foundation** is a type of building foundation that transfers building loads to the earth very near to the surface, rather than to a subsurface layer at depths.

According to Terzaghi (an Austrian civil engineer), shallow foundations are constructed where soil layer at shallow depth (up to 1.5m) is able to support the structural loads.

The depth of shallow foundations are generally less than its width ([ratio of depth of foundations](#)), D to the **width** of foundation, B is equal to or less than 1).

Shallow foundations for small dwellings include:

- Spread footing foundations, raft slab foundation and trench foundations
Deep foundation:

A **deep foundation** is a type of foundation that transfers building loads to the earth farther down from the surface than a shallow foundation does to a subsurface layer or a range of depths.

The foundation is typically piles, either rammed or drilled.

It might also be trench or strip foundation, just to a greater depth than 1.5 m below the surface.
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Direct foundation:

- Rest directly on the subsoil.

- May have a pad if the subsoil requires a larger surface to carry the load.

- Perimeter drainage may be needed to keep foundation dry.

- Min. depth, 900 mm to keep foundation in frost free conditions to avoid frost heave.
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Foundations may need to be reinforced to avoid differential settlements.
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Spread footing
Bottom of foundation must be horizontal.

When terrain is sloping or depth of building requires variable depth of the foundation, the foundation must be stepped.

The recommendations are a ratio of 1:1 with max. and min. dimensions of 600 mm.
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Stepped foundation
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Shallow strip foundation
Raft slab foundation:

The raft is made of reinforced concrete.

This type of foundation is mainly used in poor soils and light loads.

Also where there is water pressure from the ground which will lift a normal ground supported floor.
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Raft slab foundation. Reinforcement in top and bottom of the floor.
Indirect foundation:

Indirect foundation is when the strong sub-soil is found deep under surface. To avoid excavating much soil it is often cheaper to ram or drill piles. The piles will then carry a beam, acting as a strip foundation.

The piles carry the load either by the tip or by friction.

The piles will also resist loads in upward direction and can help stabilize Buildings vertically and horizontally.
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Bored piles under a reinforced concrete beam acting as a strip foundation.
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Materials used for foundations:

- Plain concrete cast in a trench, may be reinforced by steel bars.
- Plain concrete cast in formwork and reinforced.
- Prefabricated hollow concrete blocks which are filled with concrete afterwards.
- Prefabricated light clinker blocks.
- Plain concrete cast in insulating polystyrene formwork.
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Trench filled with plain concrete and reinforcement.
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Prefabricated hollow concrete foundation block
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Light clinker foundation blocks.
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Foundation from concrete cast in formwork.
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Prefabricated polystyrene insulating foundation block