

CHAPTER 8
FOUNDATIONS

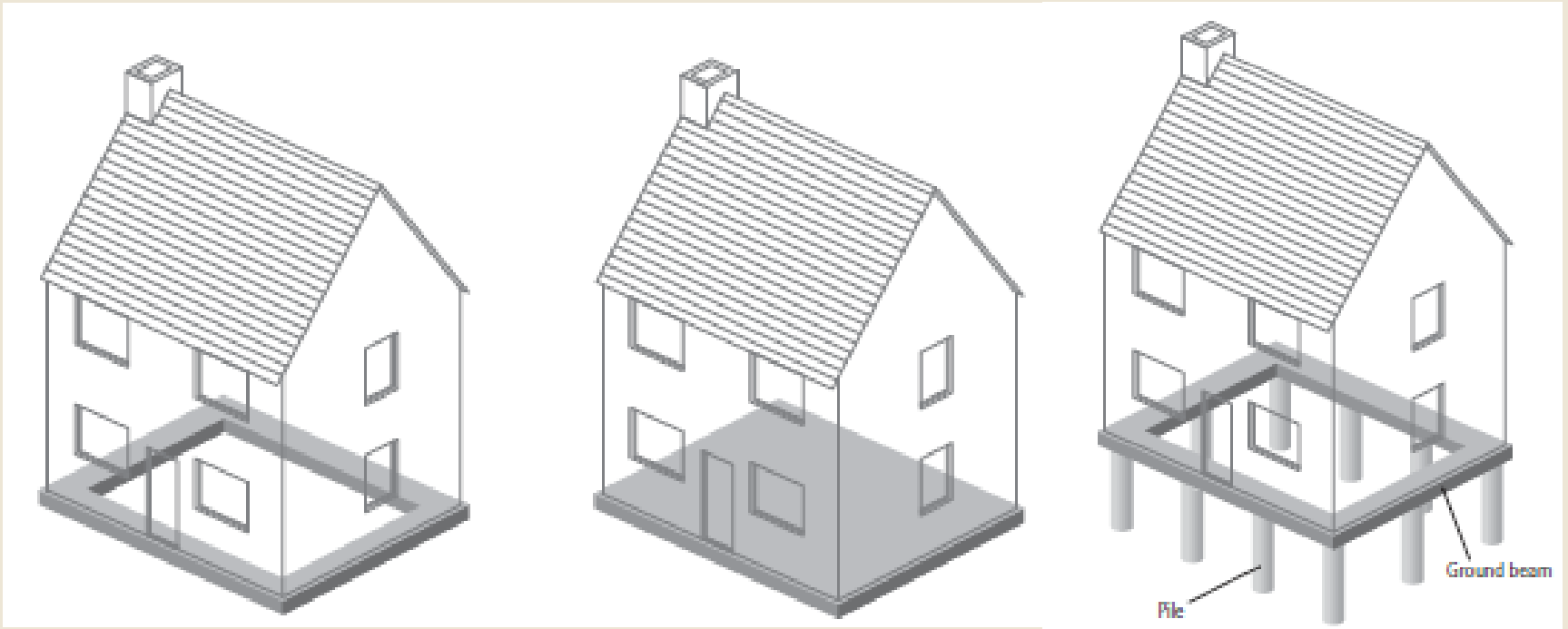


Function of Foundations

- Transmit building loads directly to the earth
- Limit the amount of settlement of the building
- Provide a level platform for the building
- Anchor the structure against wind
- Resist pressure imposed by surrounding soil



Different Types of Foundation



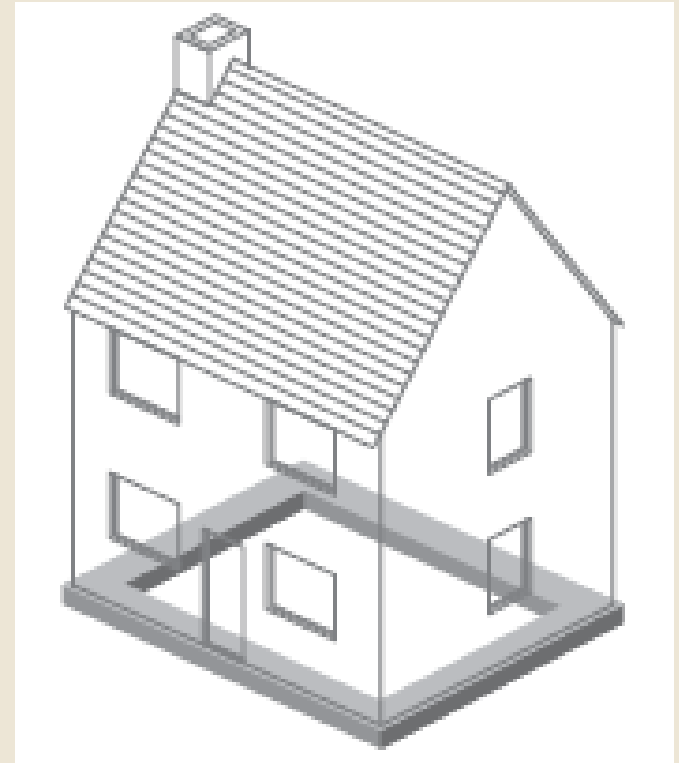
Strip Foundation

Raft Foundation

Pile Foundation

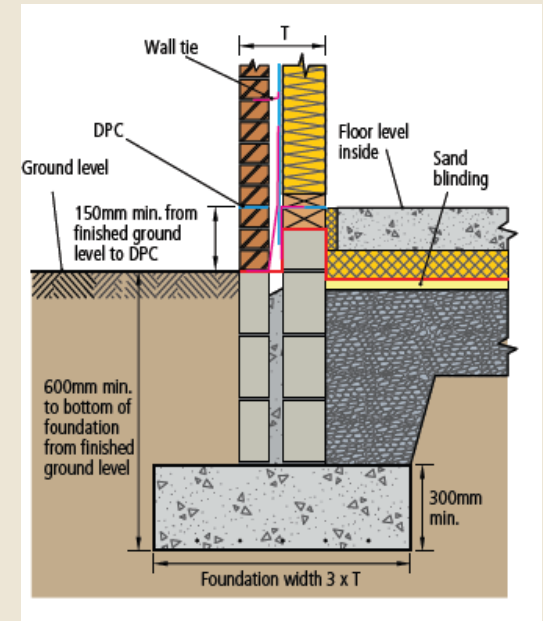
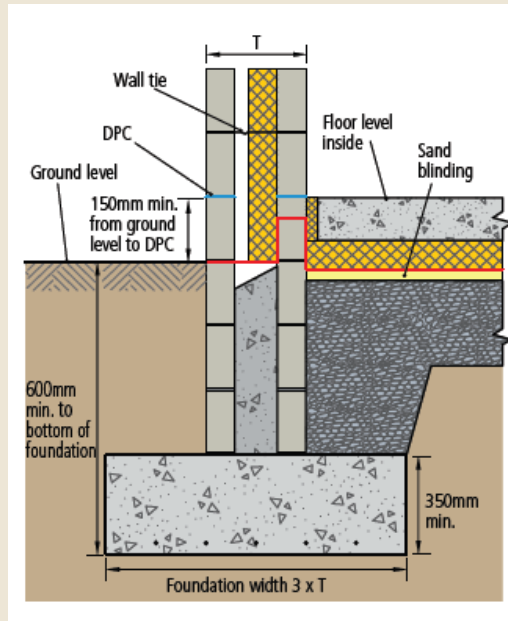
Strip Foundation

- Soil with good bearing capacity
- Most suitable for building houses rather than larger buildings
- More economic

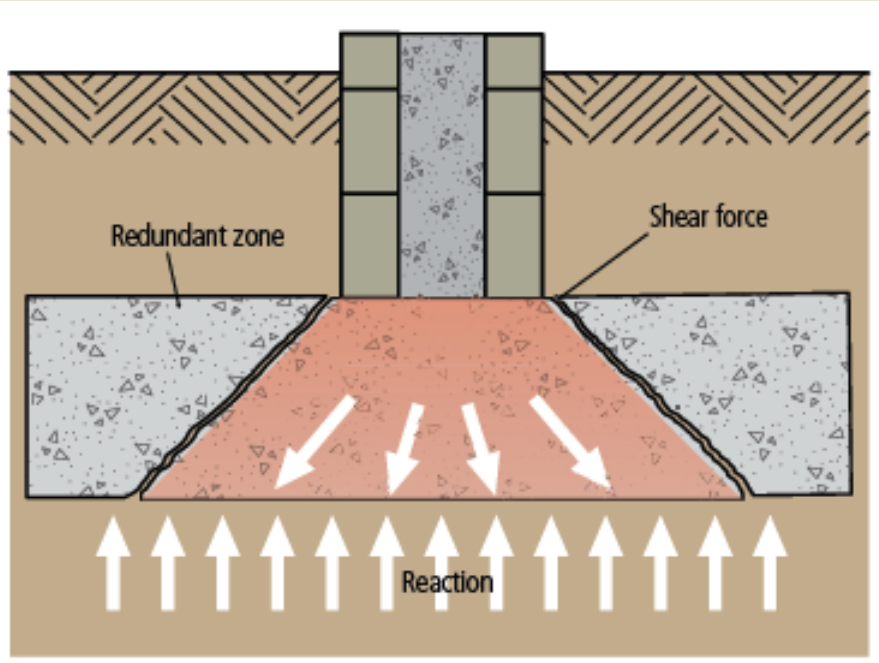
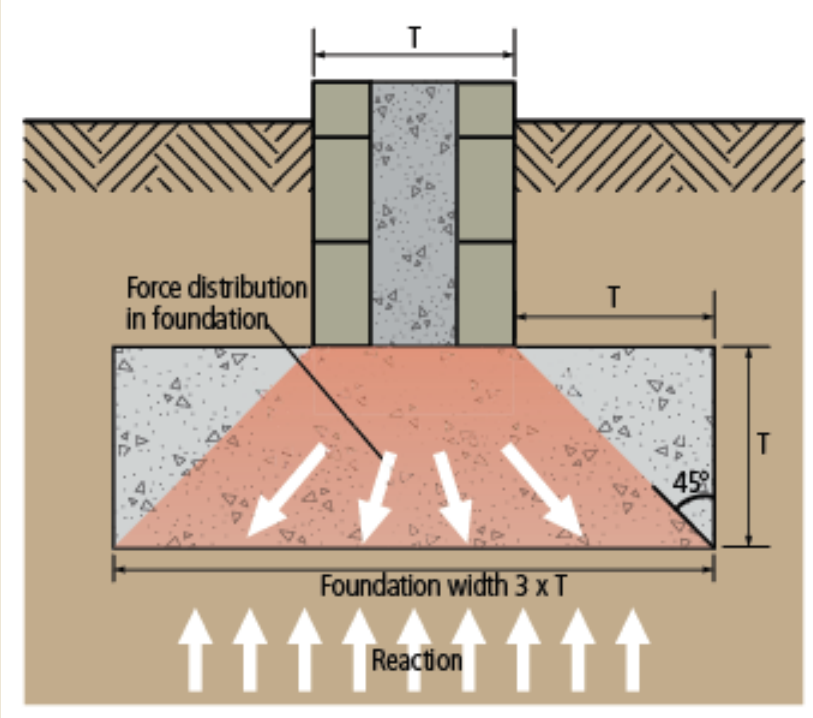


Design Features

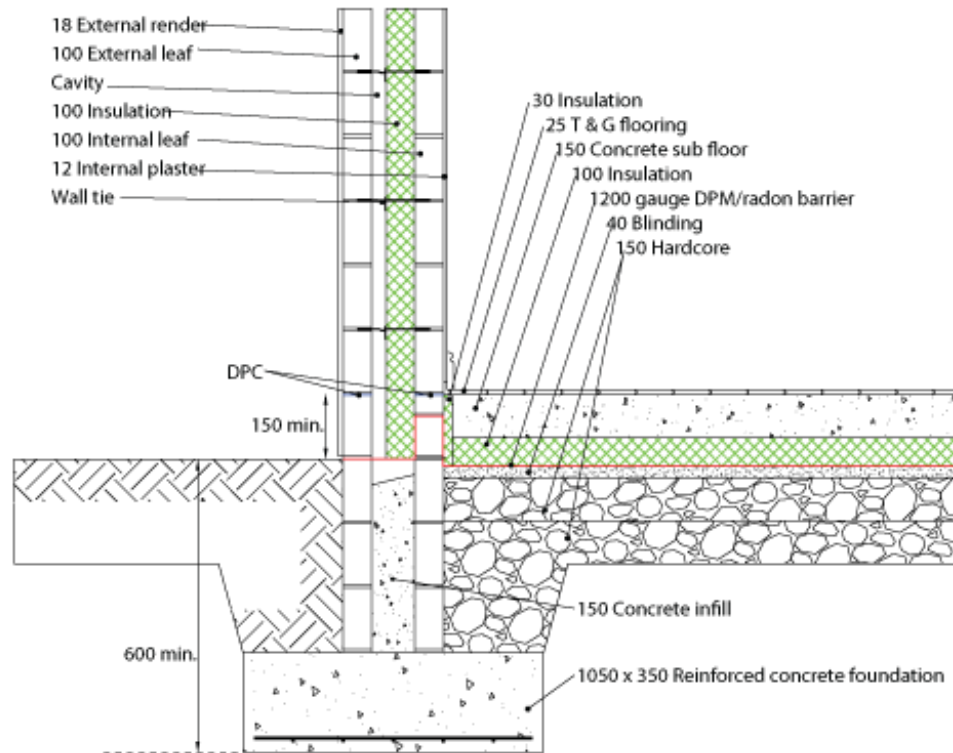
- Depth must be greater or equal to the width of the wall to be built.
- Width must be three times the width of the wall to be built.



Design of the Foundation

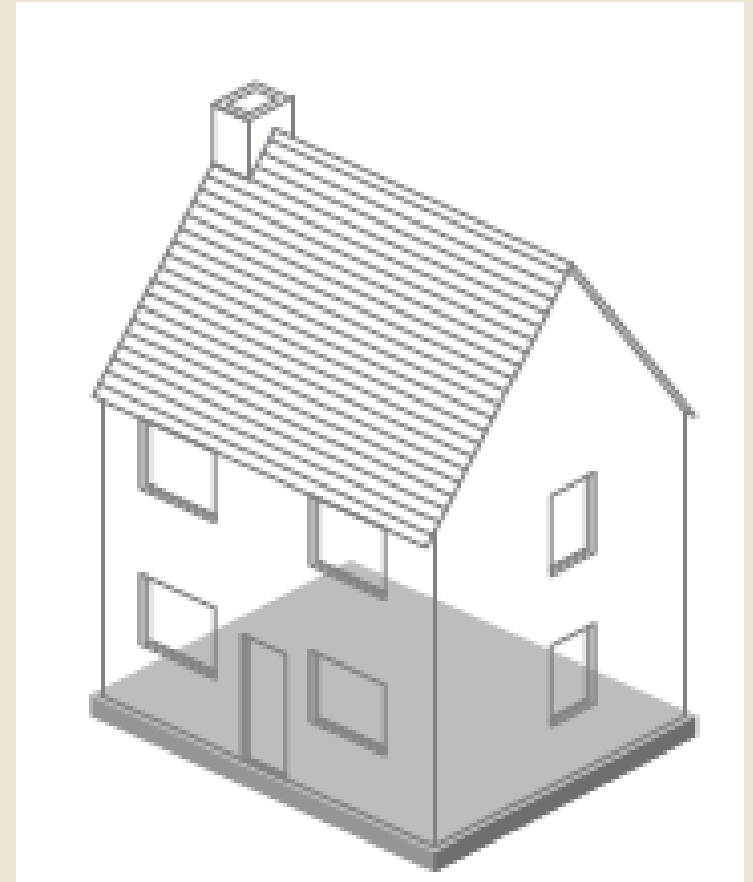


Strip Foundation

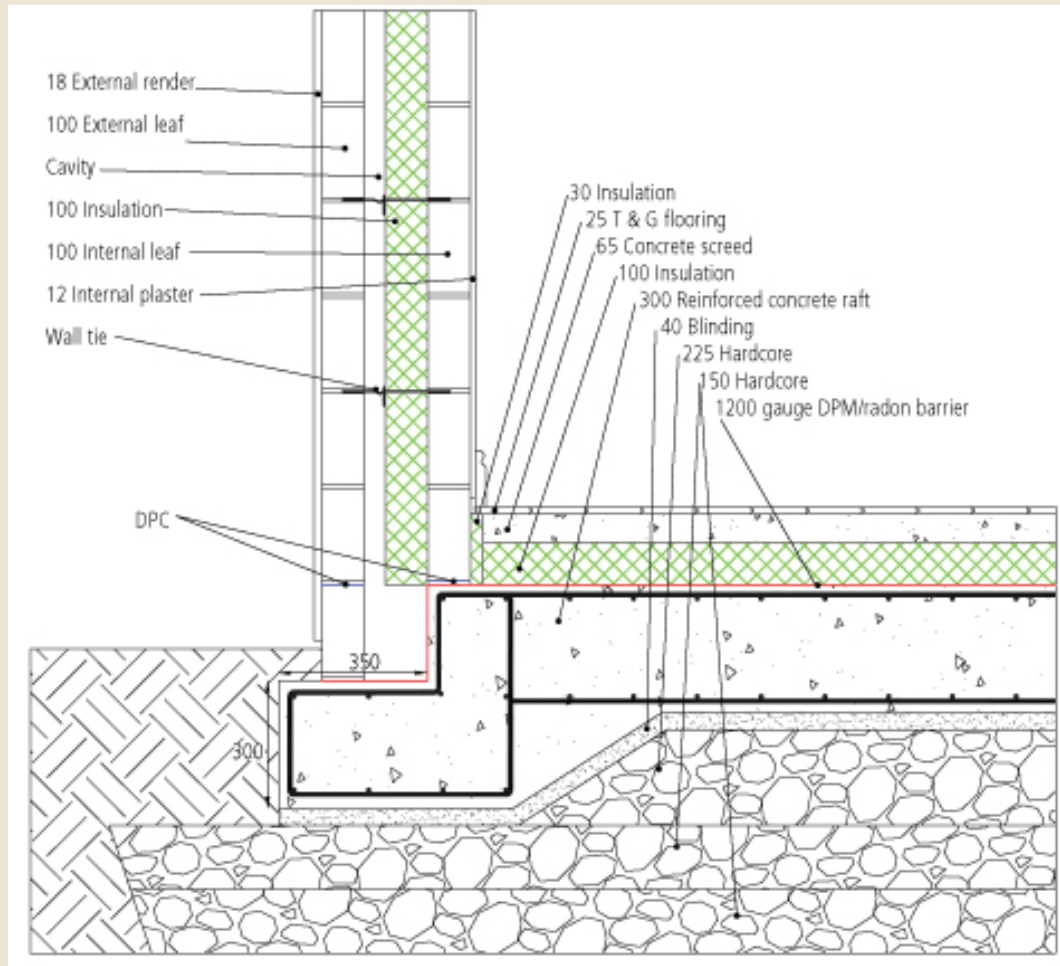


Raft Foundation

- Large slab of reinforced concrete
- Useful for low bearing capacity soil
- Allows even settlement of the building

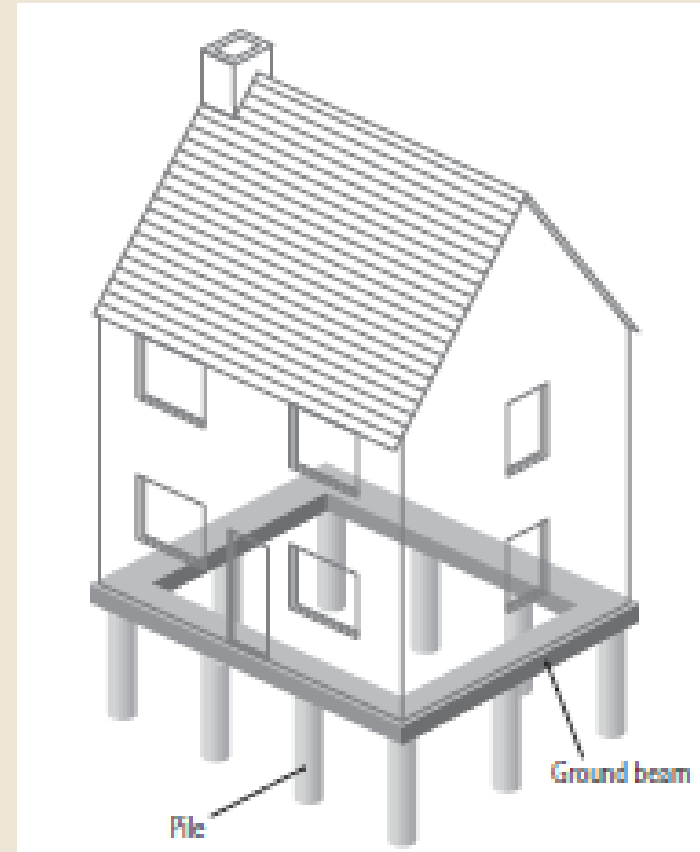


Raft Foundation

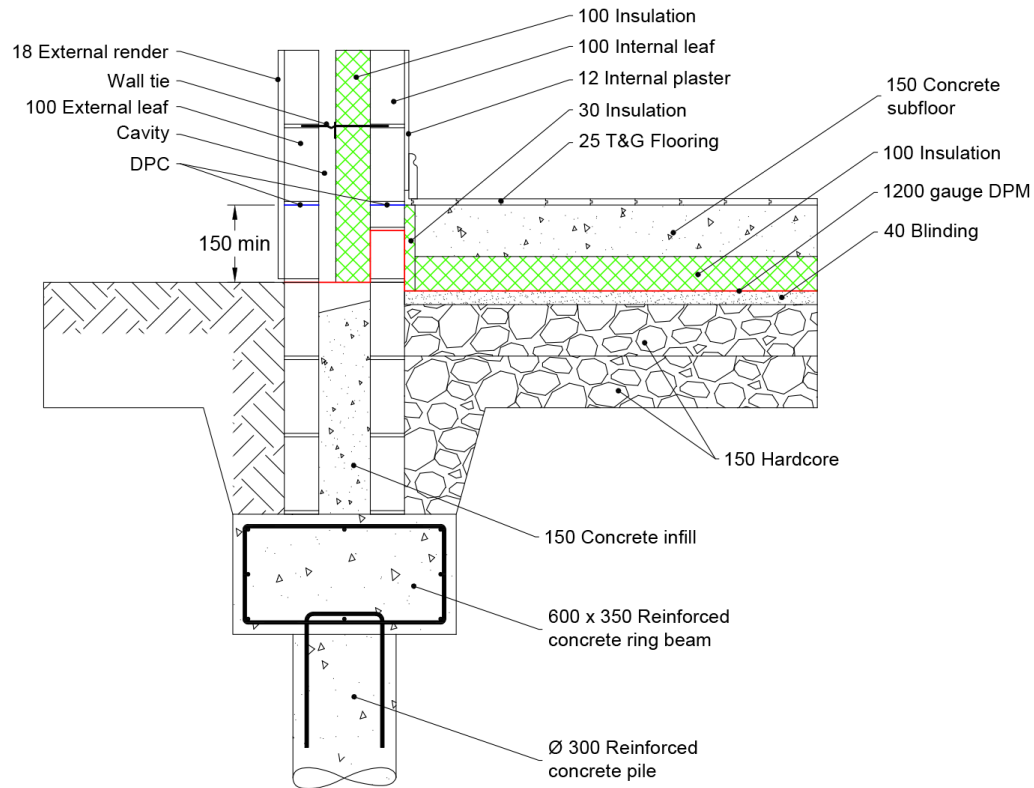


Pile Foundation

- Low soil bearing capacity
- Greater stability due to piles
- Expensive to build



Pile Foundation



Types of Pile Foundations

End-Bearing Piles

- Hits solid layer of ground with high bearing capacity under the pile

Short-Bore Piles

- Max depth 4.5m
- Cast on site

Friction Bearing

- Is compressed so much into the ground that the whole pile provides friction to secure the pile



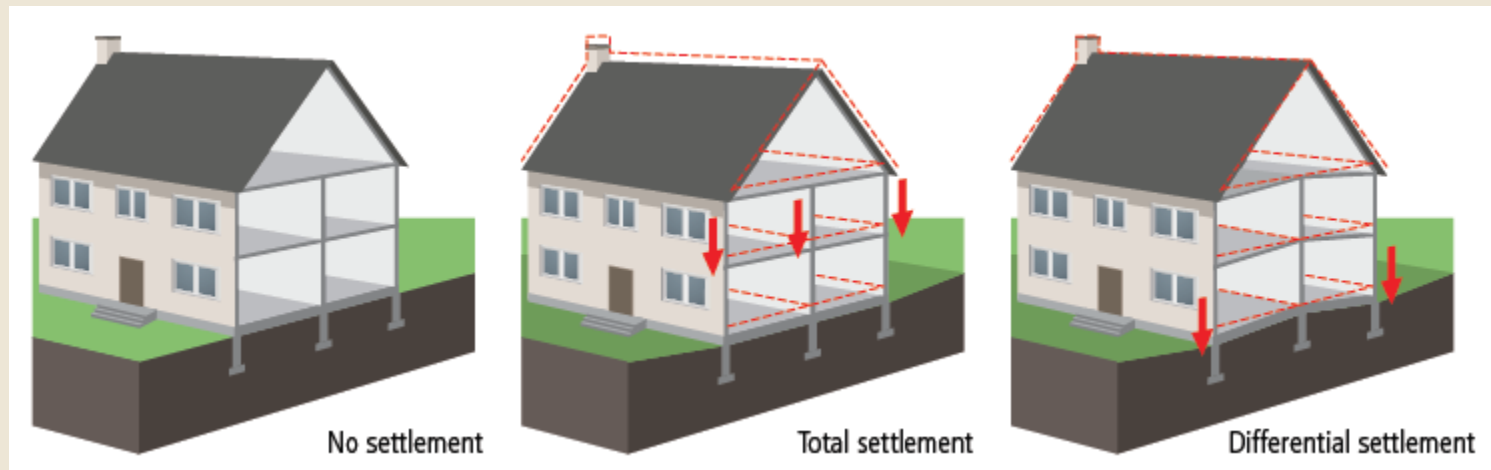
Settlement of Foundations

Total settlement

- Uniform settlement

Differential settlement

- Structure does not settle evenly



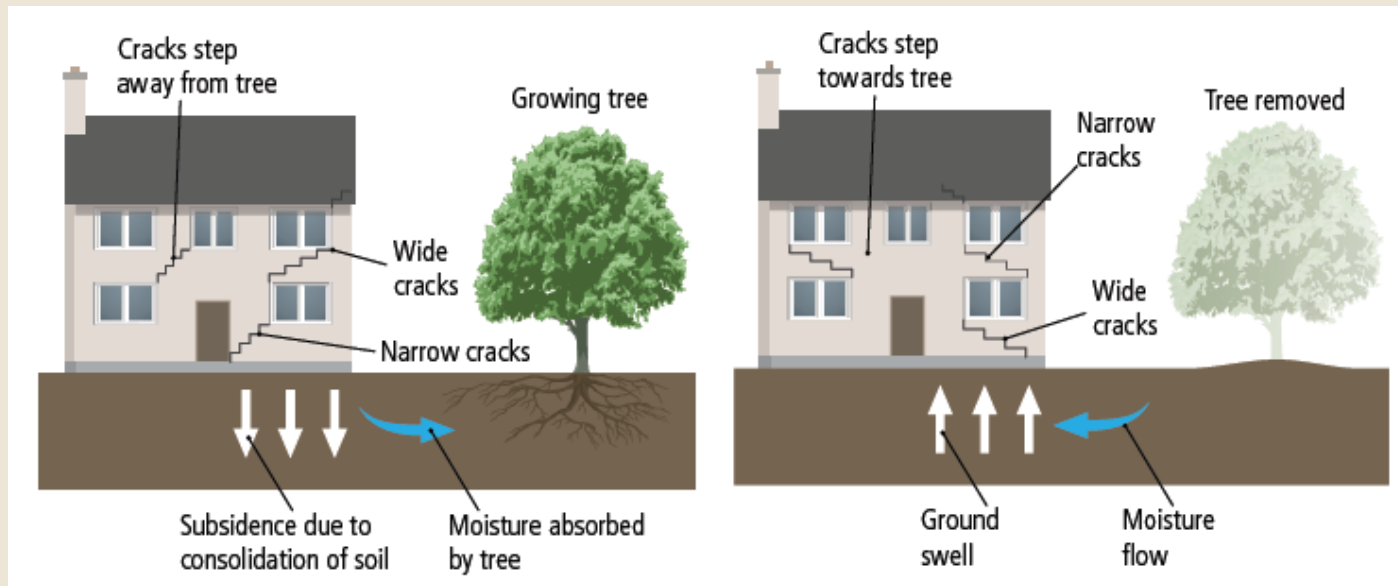
Causes of Settlement

- Consolidation of soil
- Removal of water from the soil
- Plastic flow of soil from under the building
- Cohesive soils bulging
- Soil erosion by wind or water
- Frost heave



Settlement Issues

- Building near trees
- Effect of frost
- Pyrite

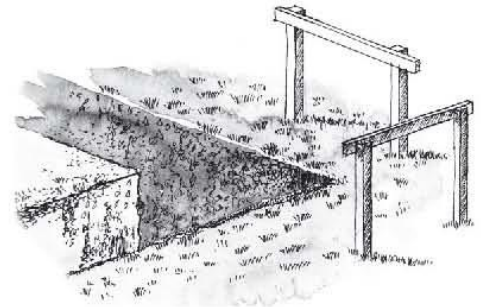


Relevant 2013 Exam Question

OL Q4

4. (a) One corner of a trench for a strip foundation is shown in the sketch. Describe, using notes and neat freehand sketches, the setting-out of a typical strip foundation under the following headings:

- levelling the profiles
- locating the position of the trench
- squaring the corner of the trench
- locating the finished level of the concrete in the foundation.



(b) Draw a sketch of a typical strip foundation for a 350 mm concrete block external wall and show the position of the reinforcing in the foundation. Include **three** typical dimensions in your sketch.

Relevant 2013 Exam Question

HL Q8

8. (a) Discuss in detail, using notes and freehand sketches, **two** functional requirements of a foundation suitable for a dwelling house.
- (b) A trial hole, as shown in the sketch, indicates a moderately firm clay subsoil for the foundations of a dwelling house. The external wall of the house is a 350 mm solid concrete block wall with an insulated cavity. Consideration is being given at the design stage to using either:
- a traditional strip foundation *or*
 - a raft foundation.
- Show, using notes and annotated freehand sketches, the typical design detailing for **each** type of foundation. Recommend a preferred foundation for the house and give **two** reasons for your recommendation.
- (c) Discuss in detail **three** best practice guidelines that should be observed to ensure the maximum strength of concrete in a foundation.

