Unit 4 - Construction processes and Operations

30 hours towards your 360 Guided Learning Hours

In this Unit you will an understanding of

- Planning & Sequencing of construction work.
- Traditional and Modern construction processes and operations used in low-rise construction.
- The properties and uses of construction materials.

These are the typical stages in any construction project.
Good planning at the beginning and anticipation of contingencies will help the entire process go much more smoothly.

Planning & Sequencing of construction work.

- **Setting up the site**
  Site office, toilets, visitors desk, toilets, material store, temporary paths and roads
- **Groundwork**
  Site levelling, clearing existing structures, removing vegetation, marking out from plans
- **Sub-structure**
  Digging foundations/footings and preparing services (electrical/plumbing)
- **Superstructure**
  Blockwork, brickwork, cladding, renderwork, roofing, windows and doors
- **External Works**
  Guttering, paving, paths and roadways
- **Finishes**
  Painting, cleaning and perimeter fencing and access.

Setting up a site - 5 key priorities

- CREATE A SECURE PERIMETER TO LIMIT ACCESS AND PROTECT THE PUBLIC
- ESTABLISH A WORKFLOW IN LINE WITH HEALTH AND SAFETY RULES
- HAVE YOUR PAPERWORK AND DOCUMENTATION IN ORDER
- GET THE EQUIPMENT YOU NEED FOR THE WORK AND YOUR STAFF
- SORT OUT THE NECESSARY STORAGE AND ON-SITE AMENITIES

Groundwork

The term 'groundworks' refers **to work done to prepare sub-surfaces for the start of construction work**. Aside from any demolition or site enabling works that may need to be carried out, groundworks are usually the first stage of a construction project and may include: Ground investigation. Site clearance.

Sub-Structure

The substructure is **that part of a building or other structure which is below the ground**, unlike the superstructure which is above the ground.

Superstructure

The superstructure includes **beams, columns, blocks/bricks, finishes, windows, doors, the roof, floors, and anything else**. The parts of the superstructure are much lengthier than the parts of the substructure.

External works

The term '**external works**' describes any works carried out to the external environment of a **building** project. Such as window sills, soffits, facia, guttering, paving and roadways.

Finishes

Finishes are **used in the final part of the construction process**, forming the final surface of an element. They can protect the element they finish from impact, water, frost, corrosion, abrasion, and so on, and/or they can also be decorative.

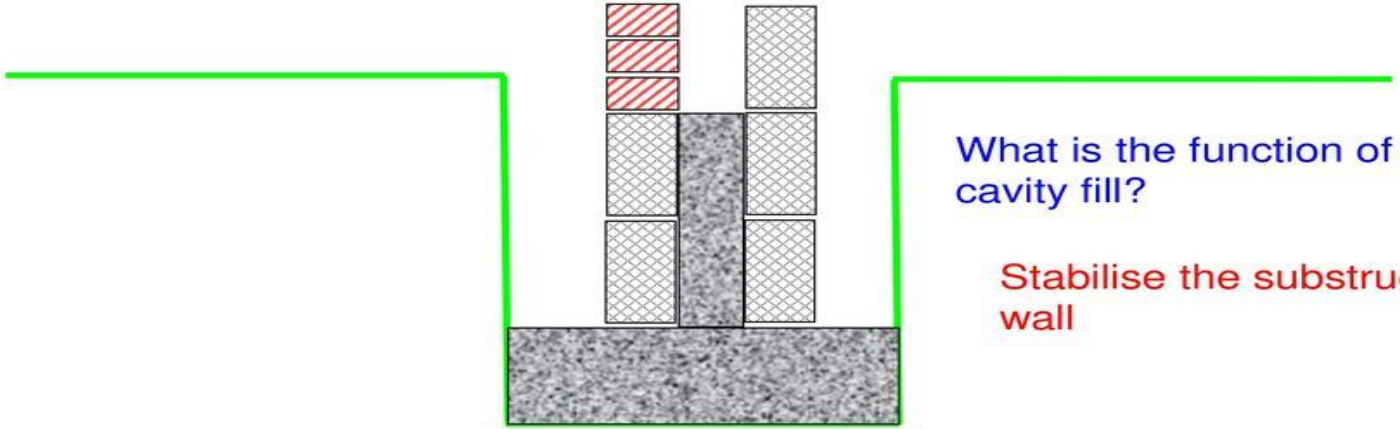
Substructure Task

Your task:

- Explore the different methods used to create footings/foundations.
- **Create a powerpoint presentation discussing each of the methods and their merits showing examples of instances where each method should be used.**
- Using our cabin project, advise what type of sub-structure we should use and why? Don't forget to think about cost in terms of materials and labour, as-well as the weight implications and soil condition/makeup in the area.

Build substructure walls

What materials are used? Blocks/bricks



What is the function of the cavity fill?

Stabilise the substructure wall

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Shallow foundation types

Individual footing or isolated footing

Also known as a spread footing or pad foundation, this type of foundation is used to support a single column and is square, rectangular or circular in shape. They are a uniform thickness and are designed to carry and spread concentrated loads. The size is calculated on the load and ground conditions.

Combined footing

These concrete footings are usually rectangular in shape and support two or more columns which are so close to each other their individual footings would overlap.

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Strip foundation

A strip footing is used for load-bearing walls including footings for extensions and conservatories and house foundations. They are also used to accommodate a row of closely-spaced columns. The wider base of this foundation type spreads the weight over a wider area and provides better stability.

Raft or mat foundation

A raft or mat foundation is a large slab supporting a number of columns and walls. This type of foundation is spread across the entire area of a building and is used when soil pressure is low or where columns and walls are so close that individual footings would not be appropriate or cost effective.

Deep foundation types

Pile foundations

Pile foundations are used when ground conditions near the surface are not suitable for heavy loads. Piles are driven into the ground using specialist equipment and filled with concrete before a ground beam is added to provide a surface to build on.

Drilled shafts or caissons

Drilled shafts, also known as caissons, are foundations that are cast in-situ. A column is drilled to the required depth before reinforcing steel is lowered into the hole and then filled with concrete.