Common structural forms for Low-rise construction
Key Words/phrases

• Common – something done often
• Structural - forming part of the structure of a building
• Low-rise - (of a building) having few storeys
Learning Objectives

In this topic you will learn:

1. The most common parts or structural forms of low-rise buildings,

2. You will learn the terminology (industry specific words) associated with each part or component,

3. As well as the advantages and disadvantages of the parts and components.
Traditional cavity wall construction

In a cavity wall construction:

• The walls and foundations are usually the **load bearing elements** of the construction

• The external walls are normally constructed as cavity walls while internal walls are solid or partition walls

• The external cavity walls have an outer skin of brickwork and an inner skin of block work

• The outer skin can also be rendered to provide extra insulation
Cross Wall Construction

- In cross wall construction, the front and back of the building is constructed as non-load bearing, while load bearing walls are at right angles to these walls.

- This leads to the name cross-wall.

- The floor between these cross-walls is connected to all four walls and provides lateral restraint.
Structurally Insulated Panels (SIPS)

- These are insulated timber panels that are strong enough to take loads.
- They have a central layer of insulation, with a plywood face on either side.
- SIPS construction is similar to timber-framed construction but is faster and large panels can be made to speed up the process.
- The method provides a lighter frame, is thermally efficient and helps to reduce site waste.
- Because the panels are made from wood, fire resistance could be an issue.
- Finishes can be applied directly to the panels. These include:
  - Exterior brickwork
  - Block work
  - Tiling and rendered finishes
  - As well as more sustainable finishes such as timber cladding and hemp rendering
Timber framed construction

- Timber framing is commonly used in houses.
- The frames are made of softwood and faced (covered) with plywood.
- Loadbearing timber walls are made up of small timbers called studs. Short timber pieces called noggins are placed between them to give stability.
- Timber framed construction is a sustainable form of construction
- It can be constructed with a high level of accuracy and in less time than traditional construction.
Timber framed construction

- Frames provide space for the services (gas pipes/water pipes/electricity cables) and are thermally efficient.
- Timber frames are finished using a variety of secondary finishes, these include:
  - Brickwork
  - Rendered block work
  - Cedar cladding
  - Tile hanging
  - uPVC cladding
  - Shingles
The most common parts of timber framed buildings and their functions

- Damp-proof course – moisture can penetrate the building from the foundations or under the floors.

- A damp-proof course (dpc) stops moisture coming in from the foundations, while a damp-proof membrane (dpm) is provided under the floors for the same purpose.

- Finishes – timber framed buildings can be finished like any other building and can even be given the look of a traditional building with a brickwork finish. These finishes are attached to the timber frame using flexible wall ties.

- Insulation – insulation is provided between the timber studs. Insulation is tied into these studs so that there are no gaps.
The most common parts of timber framed buildings and their functions

- **Lintels** – where openings are provided for windows and doors, a small beam called a lintel is used to direct rain water away from the opening. Timber studs are also placed around the openings to add strength.

- **Studs** – the timber frame is made of a number of upright timbers called studs.

- **Moisture resistance** – a polythene sheet, called a vapour check, is built in between the internal wall and the insulation to stop moisture penetration.

- **Plywood sheets** – these are attached to the external walls to provide bracing.
Common structural forms for low-rise construction – subject knowledge test

- Why are cavity walls used as external walls?

- What is an advantage of cross-wall construction?

- What is a SIP?

- Draw a diagram to show how a timber framed wall is constructed. Label the studs and noggins.

- Give two advantages of timber framed construction

- Name two secondary finishes of timber frames

- Name three common parts of timber framed buildings and explain what they do.
Videos links

https://www.youtube.com/watch?v=xK6qnvKPGHA - timber framed house construction
https://www.youtube.com/watch?v=O5MRLDq7zEw - SIPS