

CE-200

Details of Construction

Lesson-1

Introduction to Building Construction

What is a building ?

- A building can be defined as a structure broadly consisting of walls, floors and roofs, erected to provide covered space for different uses such as residence, education, business, manufacturing, storage, hospitalization, entertainment, worship etc.

- **Building Construction Parameters :**
- Buildings are constructed according to the drawings and specifications prepared by architects.
- Building must conform to the prescribed city bye-laws e.g., minimum front, side and rear set backs, minimum height and area of habitable rooms, kitchen, bath, minimum area of windows, width of stair case etc.
- Architects should follow these bye-laws in evolving design of the building.
- Building design should ensure optimum utilization of built-up space.
- It should satisfy the functional requirements of people for whom it is constructed.

- **Types of Buildings:**

- Depending upon the character of occupancy or the type of use, different types of buildings have been classified in following groups as per national building code:

- **Residential Building** – e.g., private dwellings, apartment houses (flats), hotels etc.

- **Educational Building** – e.g., school, college etc.

- **Institutional Building** – e.g., hospital, nursing homes, jails .

(1) Building used for medical or other treatment or care of persons suffering from illness, for penal or detentions.

(2) It provides sleeping accommodation for the occupants.

- **Assembly Building**. Building where group of people congregate or gather for amusement, recreation, social, religious purposes etc. e.g., exhibition halls, museums, gymnasiums, restaurants, dance halls etc.
- **Business Building**. Building used for transaction of business, for the keeping of accounts and records for similar purposes, e.g., city halls, town halls, court houses, stock exchange etc.
- **Mercantile Building**. Building used for shops, stores, market, for display and sale of merchandise either wholesale or retail.

- **Industrial Building.** Building in which products or materials of all kinds and properties are fabricated, assembled or processed, e.g., refineries, gas plants, mills, dairies, etc.
- **Storage Building.** Building used for storage of goods, wares or merchandise, e.g., warehouse, cold storage, transit sheds, garages, hangers etc.
- **Hazardous Building.** Building which is used for the storage, handling, manufacture or processing of highly combustible explosive materials or products which are liable to burn with extreme rapidity and/or which may produce poisonous fumes or explosions, e.g., ammonia plant, toxic chemical plants etc.

Components of a Building

- A building can be broadly divided in two parts viz.
 - (a) Sub-structure
 - (b) Super-structure
- Sub-structure. The portion of the building below the surrounding ground is known as sub-structure.
- Super-structure. The portion above the ground is termed as super-structure.

- Broadly summarized as under:
 - Foundation.
 - Plinth.
 - Wall.
 - Columns.
 - Floors.
 - Doors, windows and ventilators.
 - Stairs.
 - Roof.
 - Building Finishes.
 - Building Services.

- **Foundation**

Lowest part of the structure below the ground level.

Transmits all the dead, live and other loads to the soil.

- **Plinth**

1. Portion between the ground surrounding the building and the top of the floor immediately above the ground.
2. Level of the surrounding ground is known as **formation level** or simply **ground level** and the level of the ground floor is known as **plinth level**.
3. Plinth height should be such that after proper levelling and grading of ground there is no possibility of rain water entering the ground floor.
4. Built up covered area measured at the floor level is termed as **plinth area**.

- **Wall**

1. Provided to enclose or divide the floor space in desired pattern.
2. Provide privacy, security and give protection against sun, rain, cold and other adverse effects of weather.

- Broadly divided in two categories:

- **Load bearing wall.** A load bearing wall supports its own weight as well as the super imposed loads transferred to it through floors / roofs.

- **Non-load bearing wall.** A non-load bearing wall on the other hand carries its own weight and is not designed to carry any super-imposed load from the structure. They are normally provided as partition walls.

- **Column**

1. An isolated vertical load bearing member.
2. Width is neither less than its thickness nor more than four times its thickness.
3. Pier is a vertical load bearing member similar to a column.

- **Floor**

1. Flat supporting elements.
2. Divide building into different levels thus increases accommodation on given plot of land.
3. Basic purpose is to provide firm and dry platform for people and furniture, stores, equipments etc.
4. Generally referred to by its location.

- **Basement Floor.** Floor below the ground level.
- A floor basically consists of two parts.
- **Sub Floor.** Structural components of the floor which supports all the loads (dead and super imposed).
- **Flooring.** Covering layer of desired specification (cement concrete, terrazzo, tiles etc) provided over the sub floor to serve as a finishing layer.

- **Doors, Windows and Ventilators.**

Consists of two Components:

(a) Door frame (b) Door shutter

1. Door is the most commonly used moving component in a building.
2. It provides access to a building, passage or room.
3. Doors are made of wood, steel, aluminium, plastic, flexible rubber etc.
4. They can be side hung, sliding, folding, revolving or rolling type.

- Stair .
- Structure comprising of a number of steps connecting one floor to another.
- The stair must be constructed in such a manner that it is safe and comfortable to use and it should be so located as to permit easy communication.
- Stairs may be made from material like timber, stone, bricks, steel, reinforced concrete etc.
- The selection of the type of material to be used depends upon the aesthetical importance, funds available, durability and fire resisting qualities desired.

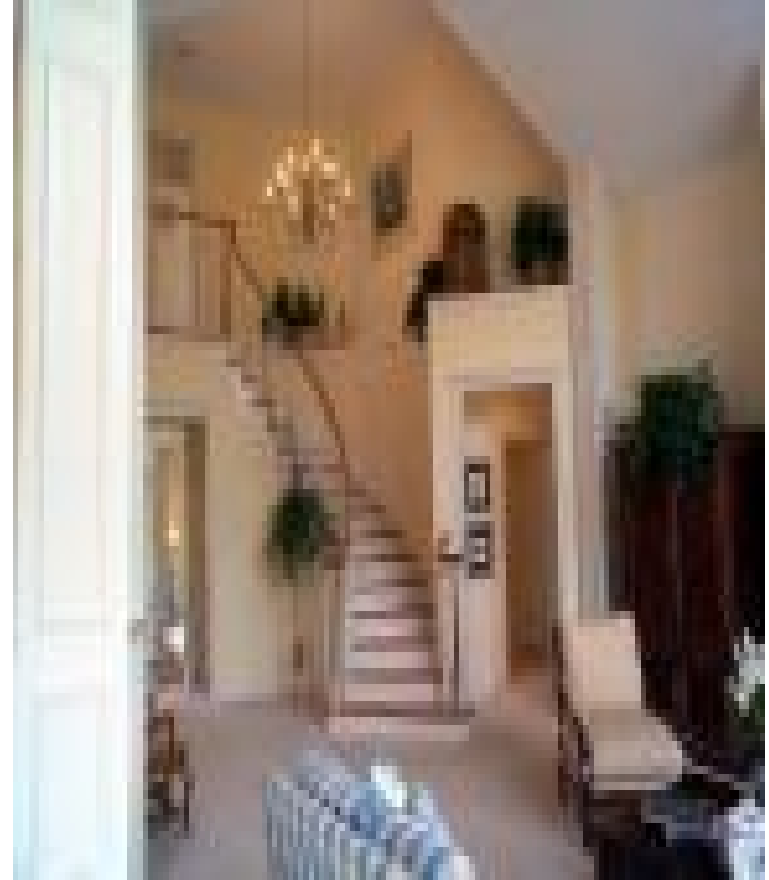
Stairs



Stairs



Stairs



Stairs



- **Roof.** Upper most component, covers the space below and protects it from rain, snow, sun and wind etc. A roof basically consists of two components:
 1. Roof decking – the structural component which supports the roof covering.
 2. Roof covering – top layer.
- **The structural component** of a roof can be either :
 - Flat- e.g., flat slab
 - Pitched – e.g. ,truss
 - Curved –e.g., shell or dome
- # **The choice of the type of roof** is made keeping in view the location of the building, weather conditions, funds available and functional and aesthetics requirement.

- **Roof Covering** :
 - (1) Pitched roof – tiles, slates, A.C. sheets, G.I. sheets etc.
 - (2) Flat roof.– roof covering is termed as terracing which could comprise of a layer of varying thickness of material like lime concrete, mud phuska etc.The terracing serves dual purposes:
 - (a) provides suitable slopes on the roof for draining of rain water and
 - (b) acts as an insulation layer for providing thermal comfort to the users of the space below.

- **Building Finishes**: A building is considered in complete till such time the surface of its components is given appropriate treatment. Building finishes include plastering, pointing, white/ color washing, painting, distempering.
 - (1) Protect surface from adverse effect of weather.
 - (2) Decorative effect.

- **Building Services** :
 - (1) Plumbing Services- water supply, drainage, sanitation.
 - (2) Lighting, electricity, heating, air conditioning, fire control, telephone, intercom etc.

Technical Terms

- Balcony. A horizontal cantilevered projection including a hand-rail to serve as passage or sitting out place.
- Porch . A covered surface supported on pillars or otherwise for the purpose of pedestrian or vehicular approach to a building.
- Damp Proof Course. A course consisting of some appropriate water proofing material provided to prevent penetration of dampness or moisture e.g., lime, polythene etc normally used in ground floor.
- Footing. A foundation unit constructed in brick work, masonry or concrete under the base of wall or column for the purpose of distributing the load over a large area.

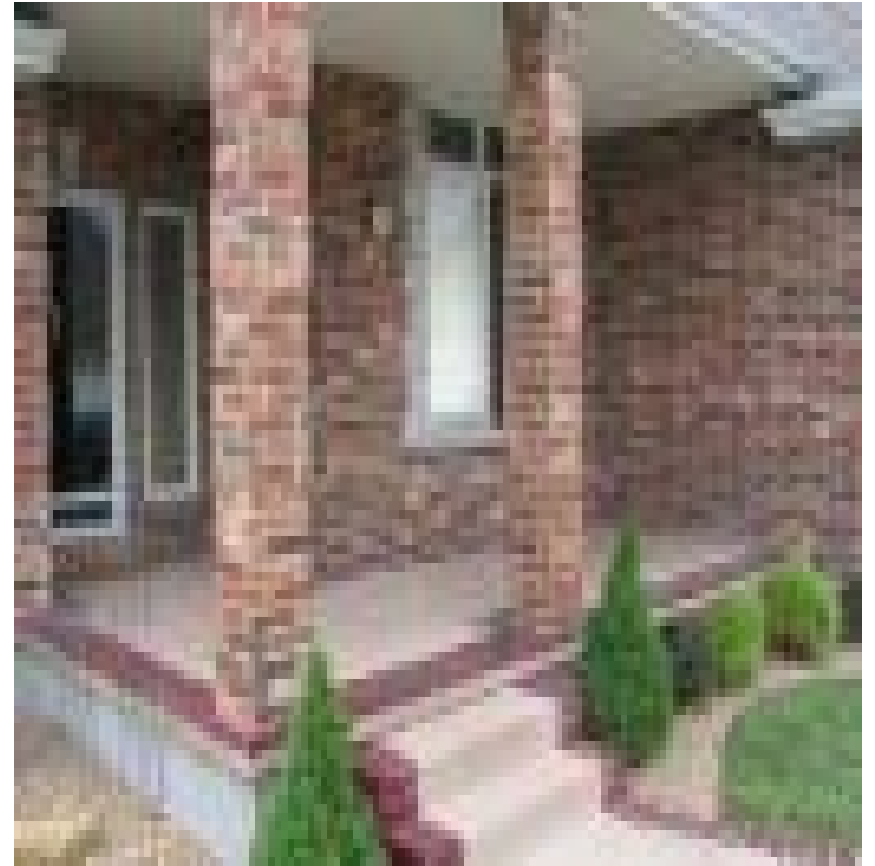
Balcony



Balcony



Porch



Porch



- Loft. An intermediary floor space created by introduction of a slab between floor and ceiling of a room, passage or wherever it is provided with maximum clear height of 1.5m for storage purposes only.
- Mezzanine Floor. An intermediate floor between two floor levels above ground floor and at least one side of it should form an integral part of space floor/below.
- Parapet. A low wall or railing built along the edge of a roof or floor.
- Partition. An interior non-load bearing wall, one storey or part storey in height.

Loft



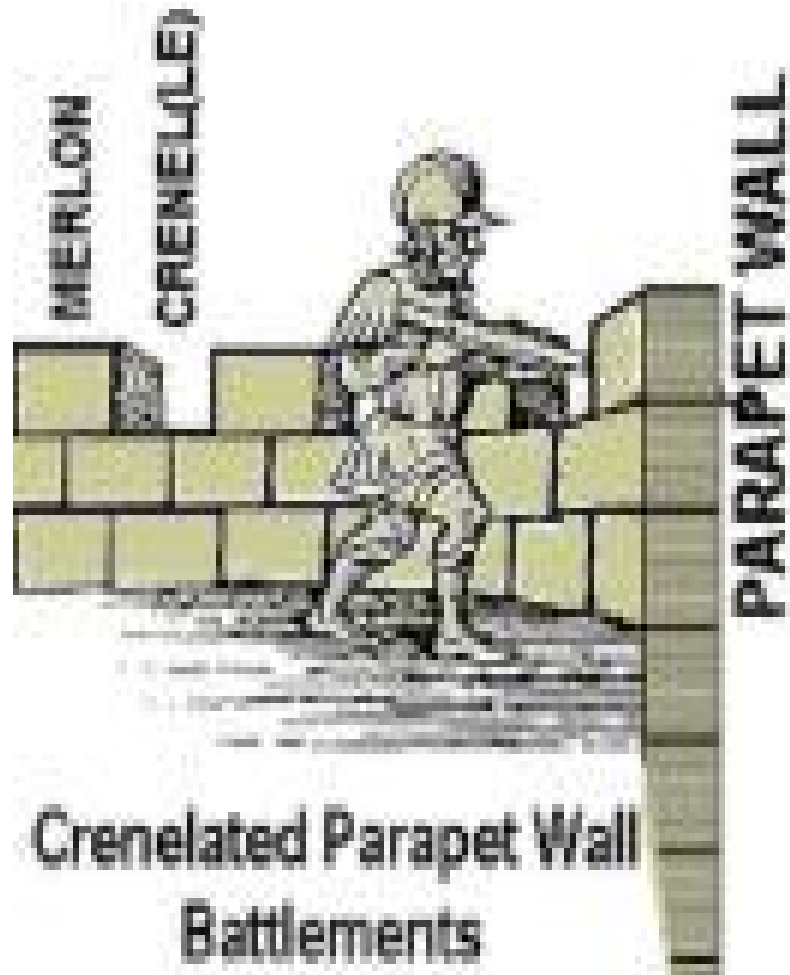
Mezzanine Floor



Parapet



Parapet



- Plinth . The portion of a structure between the surrounding ground and surface of the floor immediately above the ground.
- Plinth Area. The built up covered area measured at the floor level of the basement or of any storey.
- Floor Area Ratio (FAR). It is the ratio between the total area (plinth area) on all floors multiplied by 100 and the area of the plot.
$$FAR = (\text{Total covered area of all floors} \times 100) / \text{Plot area.}$$
- Basement / cellar. The lower story of a building below or partly below ground level.

- **Set-Back Line** . A line usually parallel to the plot boundaries and laid down in each case by the local municipal bodies beyond which nothing can be constructed towards the plot boundary.
- **Structural Wall**. Means a load bearing wall or a wall that carries load in addition to its own weight.
- **Water-Closet (WC)**. A privy with arrangement for flushing the pan with water. It does not include a bathroom.
- **Barsati**. Habitable room/rooms on the roof of building with or without toilets/kitchen.