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Building Constructi on



Introduction

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GENERAL

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- ❑ A construction is a process of constructing something by man for one purpose or another. It may be a road, bridge, a dam, a dwelling place, an airport, a commercial building, etc.
- ❑ A building can be generally considered as a structure consisting of floors, walls and roofs erected to provide covered space for different uses such as residence, business, entertainment, workshop, etc.
- ❑ Buildings come in a wide amount of shapes and functions, and have been adapted throughout history for a wide number of factors:
 - ◆ building materials available
 - ◆ weather conditions
 - ◆ land prices
 - ◆ aesthetic reasons
 - ◆ specific uses

- ❑ The main considerations in architectural design of buildings for all purpose are:
 - ✓ Climate and its effect
 - ✓ People and their requirements
 - ✓ Materials for construction and method of construction
 - ✓ Regulations and building codes
- ❑ Requirements which must be satisfied for the construction of a modern house are:
 - ✓ A plot of land
 - ✓ Permission from local authorities
 - ✓ Materials for building
 - ✓ Skilled labourers for the erection
 - ✓ Finance
 - ✓ Professionals, such as architects and engineers

DEFINITION OF TERMS

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Building: is an assemblage that is firmly attached to the ground and that provides total or nearly total shelter for machines, processing equipment, performance of human activities, storage of human possessions, or any combination of these.

Building design: is the process of providing all information necessary for construction of a building that will meet its owner's requirements and also satisfy public health, welfare, and safety requirements.

Building construction: is the process of assembling materials to form a building based on the building design.

BUILDING CLASSIFICATIONS

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- Buildings can be generally classified in different groups depending upon their occupancy of use or type of construction.

Classification Based On Occupancy

- Residential buildings
- Educational buildings
- Assembly buildings
- Business buildings
- Mixed use buildings
- Industrial buildings
- Institutional buildings
- Storage buildings

Classification Based On Types Of Construction

- Type 1: Fire-resisting construction
- Type 2: Non-combustible construction
- Type 3: Heavy timber construction
- Type 4: Ordinary construction
- Type 5: Wood frame construction

COMPONENTS OF A BUILDING

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□ A building has two basic parts:

- Sub-structure
- Super structure

Sub-structure: is the lower portion of the building, usually located below the ground level, which transmits the loads of the super-structure to the supporting soil.

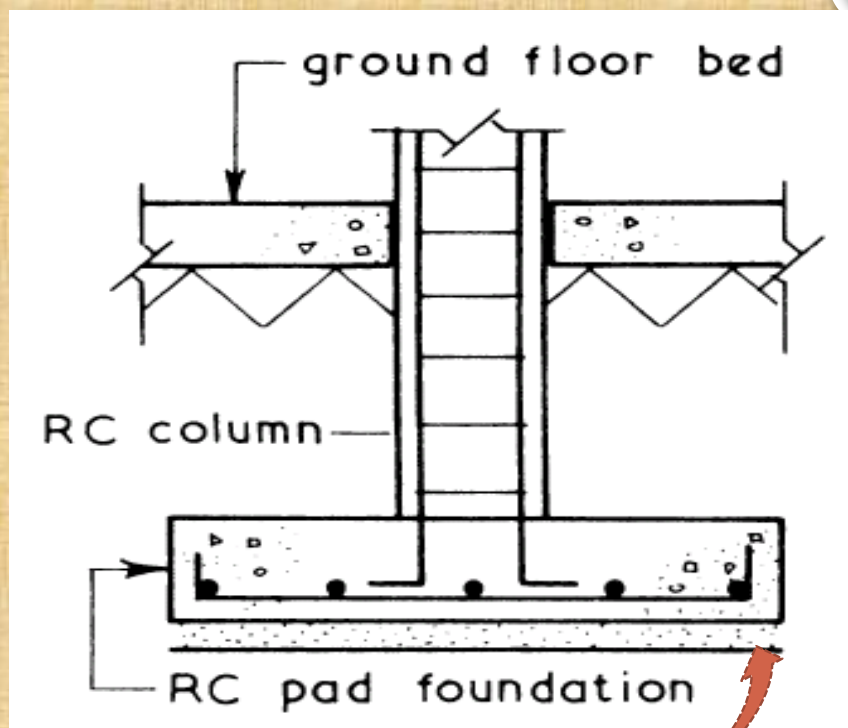
Super-structure: is that part of the structure which is above the ground level, and which serves the purpose of its intended use.

□ The basic component of a building include:

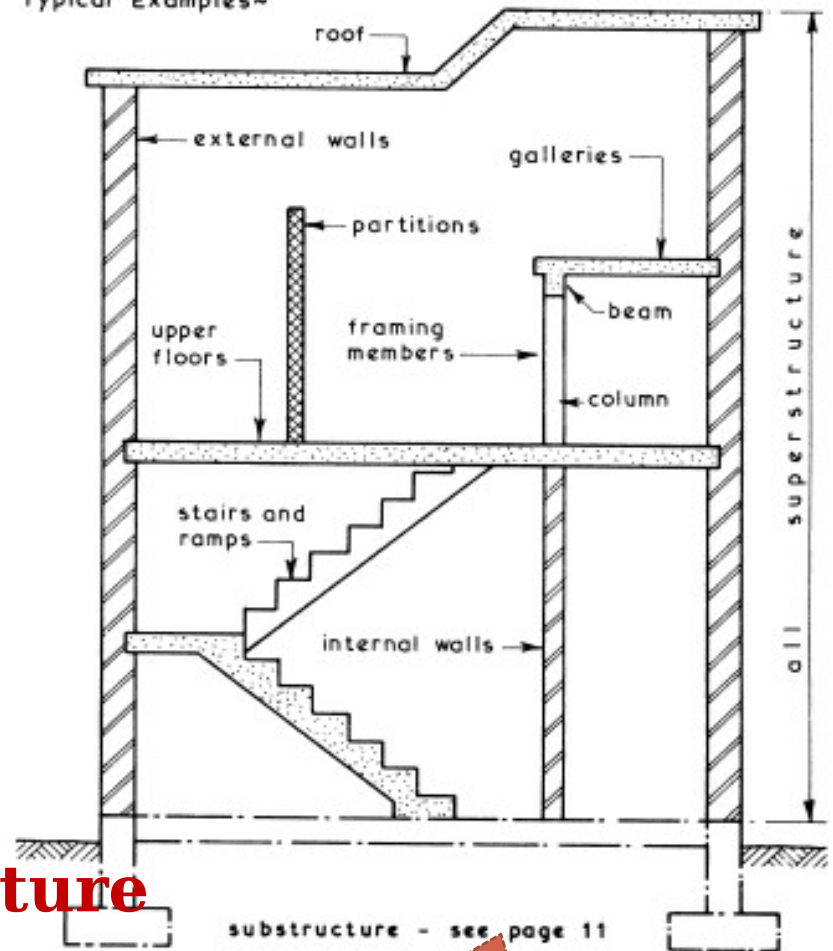
- ◆ Foundations ◆ Walls ◆ floor
- ◆ structures ◆ Roof structures ◆ Building finishes
- ◆ Doors, windows and other openings ◆ Vertical transportation

COMPONENTS OF A BUILDING

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Typical Examples~



Sub-structure
super-structure and sub-structure

DESIGN AND PERFORMANCE REQUIREMENTS

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- To accommodate the basic functional requirements, a building should satisfy the following requirements in its design and construction works:
 - **Strength and stability**
 - ✓ Any structural component of a building should be strong enough to carry or support all possible types of loads to which it is likely to be subjected.
 - ✓ The Loads in a building are commonly classified as: dead loads, super imposed or live loads and wind loads.
 - **Dimensional stability**
 - ✓ Refers to the resistance to dimensional changes in building materials and structures caused due to:
 - Elastic and plastic deformations as a result of applied loads
 - Expansion and contraction due to changes in temperature and moisture content.

DESIGN AND PERFORMANCE REQUIREMENTS

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■ **Comfort and convenience**

- ✓ Should be satisfied by proper planning of the buildings and its units.
 - Optimum utilization of space
 - Lighting considerations
 - Orientation

■ **Resistance to moisture penetration**

- ✓ The presence of moisture in any building structure deteriorates the materials strength, reduces durability and could cause partial or total failure of the structure.

■ **Fire protection**

- A building structure should not ignite easily
- A building should provide means of fire escape
- A building should be designed to reduce the spread of fire

DESIGN AND PERFORMANCE REQUIREMENTS

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■ **Heat insulation**

- ✓ The building should be designed in such a way to maintain fairly constant temperature of the internal environment independently of the varying climatic conditions externally.

■ **Day light and ventilation**

- ✓ Day lighting is essential to promote the activities carried in the building and to create pleasant inside environment.
- ✓ Ventilation is essential to prevent undue concentration of odours, fumes, dust, etc and maintain suitable condition for the user of the building.

■ **Sound insulation**

- ✓ The insulation of noise is a very important requirement for buildings such as hospitals, educational institutions, offices and residential building located in noisy areas.

DESIGN AND PERFORMANCE REQUIREMENTS

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■ **Durability**

- ✓ The durability of a building is defined as the time over which a building remains serviceable and depends mainly on
 - Type of building materials
 - Environmental exposure
 - Quality of workmanship
 - Degree of maintenance, etc

■ **Security**

- ✓ Due considerations should be given in designing and constructing external walls and openings to protect a building against burglary or theft

■ **Economy**

- ✓ The designer must exercise economy at every stage of planning, design, construction, maintenance and operation.

Main Parties in Building Construction Project

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- ✓ The practice of **planning, designing, constructing**, and **operating** buildings is most usually a collective effort of different groups of professionals and trades.
- ✓ Depending on the **size, complexity**, and **purpose** of a particular building project, the project team may include:
 - A **client** or an owner: Individuals, government, real estate developers etc.
 - Financial institutions or other investors that provide the funding
 - Local planning and code authorities
 - **Consultants** or Licensed architects and engineers who provide building design and prepare construction documents
 - **Contractors** who provide construction services and install building systems
 - Marketing or leasing agents

Main Parties in Building Construction Project

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Client

•The client is the most important party who is active from inception to completion and event to post-occupancy maintenance.

Consultant

•The main role of the consultant is to interpret the client's project requirement into a specific design.

Contractor

•These are groups established mainly as commercial companies, that contract to construct development projects.

Resource for Building Construction

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- ✓ The following resources are vital for construction industry:
 - **Human Resources (Labor or Workmen)**
 - ✓ These include professional, skilled, semi skilled and unskilled laborers.
 - **Financial Resources (Fund)**
 - ✓ Usually funds are available from among Governmental institution, Private institutions and Donors in the form of loan or assistance.
 - **Information Resources**
 - ✓ Information can be understood in two terms: data whether processed or not; and its technology.
 - **Physical Resources** (Materials, Equipment and Other Assets)
 - **Services and Management**

