

### **1.3 BUILDING COMPONENTS AND THEIR REQUIREMENTS**

Building components and their requirements, covering structural and non-structural elements common to most buildings:

#### **1. Foundation**

**Function:** Transfers the load of the building to the ground safely.

**Types:**

- Shallow foundations (spread footings, raft)
- Deep foundations (piles, caissons)

**Requirements:**

- Adequate bearing capacity of soil
- Resistance to settlement and uplift
- Stability against sliding and overturning
- Durability against moisture, chemicals, and frost

#### **2. Plinth**

**Function:** Separates the superstructure from the foundation, raising it above ground level.

**Requirements:**

- Sufficient height (usually 450–600 mm) to prevent water ingress
- Made of damp-proof material (concrete, masonry)
- Strong enough to support superstructure load

#### **3. Walls**

**Function:** Enclose space, support loads (in load-bearing systems), and divide areas.

**Types:**

- Load-bearing walls
- Non-load-bearing (partition) walls

**Requirements:**

- Strength and stability
- Resistance to moisture, heat, and sound
- Fire resistance (especially in shared or public buildings)
- Aesthetic compatibility with design

#### **4. Columns**

**Function:** Vertical structural members that transfer loads from beams/slabs to the foundation.

**Requirements:**

- Designed for axial loads and bending
- Adequate cross-sectional area
- Fire and corrosion resistance (covering of concrete or protective coatings)

## 5. Beams

**Function:** Horizontal structural members supporting slabs and walls.

**Requirements:**

- Adequate bending and shear strength
- Proper reinforcement and spacing
- Deflection control
- Fire-resistant and corrosion-protected if exposed

## 6. Floors (Slabs)

**Function:** Provide usable horizontal surfaces inside the building.

**Requirements:**

- Load-bearing capacity (live + dead loads)
- Level and smooth finish
- Thermal and sound insulation if needed
- Fire resistance and moisture control (especially for wet areas)

## 7. Roof

**Function:** Covers and protects the building from weather.

**Types:** Flat roof, pitched roof, truss roof

**Requirements:**

- Waterproofing (roof membrane, slope for drainage)
- Thermal insulation
- Wind resistance
- Load-bearing for snow (if applicable)
- Durable materials (e.g., tiles, metal sheets, concrete)

## 8. Doors

**Function:** Allow entry/exit and control access between rooms/spaces.

**Requirements:**

- Correct size and swing direction
- Secure locking mechanisms
- Fire-rated doors where required (e.g., staircases)
- Easy operation and accessible height
- Durable frame and shutter material

## 9. Windows

**Function:** Provide natural light, ventilation, and external views.

**Requirements:**

- Proper size and placement for light and airflow
- Shatter-resistant glass (especially at lower levels)
- Weatherproof sealing
- Security features (grills, locks)
- Energy-efficient glazing (double/triple pane in climate-sensitive areas)

## 10. Staircases

**Function:** Vertical circulation between floors.

**Requirements:**

- Comfortable rise and tread dimensions
- Uniform step sizes
- Handrails and guardrails for safety
- Non-slip surfaces
- Fire escape access if required

## 11. Finishes (Flooring, Plastering, Painting, Cladding)

**Function:** Enhance appearance, protect surfaces, and improve comfort.

**Requirements:**

- Durable and easy to maintain
- Appropriate for use (e.g., anti-slip tiles in bathrooms)
- Resistant to moisture and wear
- Visually appealing

## 12. Building Services

These include **plumbing, electrical, HVAC, fire safety, and communication systems.**

**Requirements:**

- Code-compliant installation (national or local building codes)
- Easy maintenance access
- Energy-efficient systems
- Adequate capacity for the building's use
- Safe installation (proper grounding, insulation, drainage, etc.)

## 13. Damp-Proof Course (DPC)

**Function:** Prevents moisture rising from the ground into walls and floors.

**Requirements:**

- Installed above plinth level
- Continuous and unbroken layer
- Made of impermeable material (bitumen, polythene, etc.)
- Proper joint sealing to avoid moisture leaks

#### 14. Parapet and Railings

**Function:** Safety barriers at roof edges, balconies, and terraces.

**Requirements:**

- Minimum height as per code (usually 900–1200 mm)
- Structurally stable
- Corrosion and weather-resistant materials
- Aesthetic integration with building

