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A Study of Traditional and Modern Building Components

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Abstract:

Building components are the fundamental elements that together form a safe, functional and comfortable building. They include structural and non-structural elements such as foundations, walls, columns, beams, slabs, roofs, doors, windows, flooring and finishing components. Traditionally, buildings were constructed using locally available materials such as stone, timber, mud, bamboo and clay bricks. With the development of construction technology, modern buildings increasingly use reinforced cement concrete, structural steel, concrete blocks, aluminium, glass, prefabricated components and other engineered materials. This paper presents a comparative study of traditional and modern building components based on their types, functions, materials, durability, construction time, cost, maintenance and environmental considerations. The study also discusses the importance of sustainable building components in contemporary construction. Existing research indicates that traditional materials and passive design features can provide useful thermal and environmental benefits, while modern materials offer advantages in structural performance, standardization and faster construction. Therefore, appropriate selection and combination of traditional and modern components can contribute to economical, durable and sustainable buildings.

Keywords: Building components, Traditional Construction, Modern Construction, Building Materials, Sustainable Construction, Structural Components

1. Introduction

A building is a complex system consisting of several interconnected components, each performing a specific structural, functional, protective, or aesthetic role. Building components can be broadly understood as the physical elements that form a building, beginning from the foundation and extending to the roof, openings, finishes, and building services. The performance of the complete building depends on the appropriate selection, design, construction, and maintenance of these individual components.

The major components of a building include foundations, plinths, walls, columns, beams, slabs, roofs, staircases, doors, windows, flooring, plastering, painting, and building services. Structural components are primarily responsible for carrying and transferring loads, whereas non-structural components provide enclosure, access, ventilation, lighting, comfort, and aesthetic appearance.

The development of construction technology has resulted in significant changes in building components and materials. Traditional construction commonly relied on locally available materials such as stone, timber, earth, bamboo, and clay products. Modern construction uses reinforced concrete, structural steel, concrete blocks, glass, aluminium, prefabricated components, and various engineered materials.

In India, the **National Building Code of India 2016 (NBC 2016)** provides comprehensive provisions related to building requirements, materials, structural design and construction, building services, fire and life safety, sustainability, and facility management. Its structural provisions include soils and foundations, timber and bamboo, masonry, concrete, steel, prefabrication, composite construction, and glass and glazing.

The increasing environmental impact of construction has also made material and component selection an important research area. Studies on building-material selection emphasize environmental, economic, technical, and social criteria, while recent research increasingly considers circular economy principles, reuse, recycling, and life-cycle performance.

Therefore, understanding building components and their classification is important for students, engineers, architects, contractors, and other professionals involved in the construction industry.

2. Literature Review

Previous studies have examined building materials and components from structural, environmental, economic, and sustainability perspectives. Research on building-material selection has identified the importance of selecting suitable materials during the early stages of building design because material selection affects resource consumption, waste generation, environmental performance, and the overall life cycle of buildings. Rahla et al. reviewed material-selection criteria based on circular-economy principles and highlighted the importance of resource efficiency, reuse, recyclability, and reduction of waste in the built environment.

The **National Building Code of India 2016** provides a comprehensive framework for building construction and includes separate provisions for building materials, structural design, construction practices, building services, sustainability, and facility management. The code recognizes materials and systems such as masonry, concrete, steel, timber, bamboo, prefabrication, composite construction, and glass and glazing.

Recent research has increasingly focused on sustainable alternatives to conventional building materials. A systematic review of compressed stabilized earth blocks reported their potential as cost-effective and environmentally sustainable alternatives, while also identifying the need for standardization and testing to support wider adoption.

Research on sustainable earthen construction has also investigated adobe, compressed earth blocks, and rammed earth walls. Such studies indicate that earthen construction can provide environmental and thermal benefits, although performance depends on material composition, stabilization, construction technique, and local conditions.

Another recent review examined low-carbon construction materials including bio-based materials, recycled materials, low-carbon cementitious systems, engineered timber, and bamboo. The research indicates that sustainable construction requires consideration of both technical performance and environmental impact rather than relying on a single material-selection criterion.

The literature therefore shows that building components should not be studied only according to their physical types. Their material properties, applications, durability, construction requirements, environmental performance, and life-cycle considerations are also important.

3. Case and Methodology

3.1 Research Approach

This research adopts a **descriptive and comparative review approach** for studying building components and their types. The study is based primarily on published literature, technical information, and building-construction standards.

The methodology consists of four major stages:

1. Identification of major building components.
2. Classification of components according to their location and function.
3. Study of common types and materials associated with each component.
4. Comparative analysis based on function, material, application, durability, maintenance, and sustainability.

3.2 Classification of Building Components

Building components can be classified into the following major groups:

A. Substructure Components

These components are located below or near ground level.

- Foundation
- Plinth
- Damp-proof course

B. Superstructure Components

These components form the main portion of the building above the foundation.

- Walls
- Columns
- Beams
- Slabs
- Roofs
- Staircases

C. Opening Components

These provide access, ventilation, natural lighting, and communication between spaces.

- Doors
- Windows
- Ventilators

D. Finishing Components

These improve protection, appearance, durability, and usability.

- Flooring
- Plastering
- Painting
- Cladding
- Ceiling finishes

E. Building Services

These support the functional operation and comfort of the building.

- Water supply
- Drainage and sanitation
- Electrical systems
- Lighting
- Ventilation
- Fire-safety systems

NBC 2016 separately addresses building services including lighting and natural ventilation, electrical installations, air conditioning and mechanical ventilation, acoustics, lifts, communication systems, water supply, drainage and sanitation, and solid-waste management.

4. Results & Analysis

4.1 Foundation

The foundation is the lowest major structural component of a building. Its primary purpose is to transfer the loads from the building safely to the supporting soil.

Types of Foundations Shallow foundations:

- Isolated footing
- Combined footing
- Strip footing
- Raft foundation Deep foundations:

- Pile foundation
- Pier foundation

The selection of foundation type depends on factors such as soil characteristics, structural loads, groundwater conditions, site conditions, and building configuration.

4.2 Plinth

The plinth is the portion of a building between the ground level and the floor level. It helps separate the building from the surrounding ground and provides a transition between the foundation and superstructure.

Important elements associated with the plinth include:

- Plinth wall
- Plinth beam
- Damp-proof course
- Filling and flooring

4.3 Walls

Walls provide enclosure and separation between spaces. Depending on the structural system, they may also carry building loads.

Types of Walls:

- Load-bearing walls
- Non-load-bearing walls
- Partition walls
- Retaining walls
- Cavity walls Common Materials:

- Brick
- Stone
- Concrete blocks
- AAC blocks
- Reinforced concrete
- Earth-based materials

The choice of wall material affects strength, thermal performance, durability, cost, and construction speed.

4.4 Columns

Columns are vertical structural members that transfer loads from beams and slabs to the foundation.

Types of Columns:

- Reinforced concrete columns
- Steel columns

- Masonry columns
- Composite columns

Columns are particularly important in framed structures because their performance directly influences the stability and load-carrying capacity of the building.

4.5 Beams

Beams are structural members that primarily resist bending and transfer loads from slabs or other structural elements to columns or walls.

Types of Beams:

- Reinforced concrete beams
- Steel beams
- Timber beams
- Composite beams

The selection depends on span, loading, structural system, construction method, and required performance.

4.6 Slabs

Slabs provide horizontal surfaces for floors and roofs and transfer imposed loads to supporting beams, walls, or columns.

Types of Slabs:

- One-way slab
- Two-way slab
- Flat slab
- Ribbed slab
- Waffle slab
- Precast slab
- Composite slab

Modern construction systems increasingly include prefabricated and composite solutions. NBC 2016 specifically recognizes prefabrication and systems building and mixed/composite construction within its structural provisions.

4.7 Roof

The roof is the uppermost protective component of a building. It protects the internal spaces from rain, sunlight, wind, and other environmental conditions.

Types of Roofs:

- Flat roof

- Pitched roof
- Hipped roof
- Gable roof
- Curved roof
- Trussed roof

Roof selection depends on climate, structural requirements, architectural design, available materials, and maintenance requirements.

4.8 Staircase

A staircase provides vertical movement between different floors.

Types of Staircases:

- Straight staircase
- Dog-legged staircase
- Open-well staircase
- Spiral staircase
- Bifurcated staircase

The design of stairs must consider safety, comfort, dimensions, circulation, and accessibility.

4.9 Doors

Doors provide controlled access to rooms and buildings and also contribute to privacy, security, ventilation, and aesthetics.

Types of Doors:

- Hinged door
- Sliding door
- Folding door
- Revolving door
- Sliding-folding door

Common materials include timber, steel, aluminium, glass, and uPVC.

4.10 Windows

Windows provide natural lighting, ventilation, visibility, and connection with the external environment.

Types of Windows:

- Fixed window

- Casement window
- Sliding window
- Louvered window
- Awning window
- Bay window

The selection of window type and glazing affects daylight, ventilation, thermal performance, and energy consumption.

4.11 Flooring

Flooring forms the finished walking surface of a building. Common Types:

- Cement flooring
- Ceramic tile flooring
- Vitrified tile flooring
- Natural stone flooring
- Wooden flooring
- Concrete flooring

The selection depends on usage, expected loads, appearance, maintenance, cost, and durability.

4.12 Finishing Components

Finishes protect building surfaces and improve their appearance. Major finishing components include:

- Plastering
- Painting
- Wall cladding
- Ceiling finishes
- Waterproofing

Finishing materials should be selected according to surface condition, exposure, durability, maintenance requirements, and intended appearance.

4.13 Comparative Analysis of Building Components

Component	Major types	Main Function	Common Materials
Foundation	Shallow, Deeep	Transfer load to soil	Concrete, steel, masonry
Wall	Load-bearing, Partition, Cavity	Enclosure/support	Brick, stone, concrete blocks

Column	RCC, Steel, Composite	Carry vertical loads	Concrete, steel
Beam	RCC, Steel, Timber	Transfer loads	Concrete, steel, timber
Slab	One-way, Two-way, Flat, Precast	Floor/roof surface	RCC, concrete, steel
Roof	Flat, Pitched, Trussed	Weather protection	RCC, steel, tiles
Staircase	Straight, Dog-legged, Spiral	Vertical circulation	RCC, steel, timber
Door	Hinged, Sliding, Folding	Access/security	Timber, steel, aluminium
Window	Fixed, Casement, Sliding	Light/ventilation	Glass, aluminium, uPVC
Flooring	Tile, Stone, Concrete, Wood	Walking surface	Tile, stone, concrete
Finishes	Plaster, Paint, Cladding	Protection/appearance	Cement, paint, stone

4.14 Sustainability Considerations

The study indicates that sustainability should be considered while selecting building components. Conventional materials can provide excellent structural and functional performance, but their production may involve significant energy and resource consumption.

Recent research has explored compressed stabilized earth blocks, recycled materials, bio-based materials, low-carbon cementitious materials, bamboo, engineered timber, and industrial waste-derived materials as alternatives or supplements to conventional construction materials.

Material selection should therefore consider:

- Strength
- Durability
- Cost
- Availability
- Maintenance
- Energy consumption
- Embodied environmental impact
- Recyclability
- Reuse potential
- Local climate

Research on circular construction emphasizes that material selection at early design stages can support resource efficiency, waste reduction, reuse, and improved circularity of buildings.

5. Conclusion

Building components play an important role in the strength, safety, durability, and functionality of a building. This study classified the major building components and their types, including foundations, walls, columns, beams, slabs, roofs, doors, windows, flooring, and finishes. Each component has a specific function and requires proper selection according to the building requirements. The study concludes that the use of suitable building components can improve construction quality, durability, cost-effectiveness, and sustainability.

The research also highlights the growing importance of environmental considerations in building-component selection. Sustainable materials, recycled resources, low-carbon materials, and circular construction practices can reduce the environmental impact of buildings when their technical performance is properly evaluated. Therefore, an integrated approach to selecting and combining building components is essential for developing buildings that are safe, durable, economical, functional, and sustainable**.**

References

[1] Bureau of Indian Standards, *National Building Code of India 2016 (NBC 2016)*, SP 7:2016, New Delhi, India.

[2] K. M. Rahla, R. Mateus, and L. Bragança, "Selection Criteria for Building Materials and Components in Line with the Circular Economy Principles in the Built Environment—A Review of Current Trends," *Infrastructures*, vol. 6, no. 4, p. 49, 2021.

[3] "Sustainable Earthen Construction: A Meta-Analytical Review of Environmental, Mechanical, and Thermal Performance," *Buildings*, vol. 15, no. 6, p. 918, 2025.

[4] "Compressed Stabilized Earth Blocks for Sustainable Building Construction: A PRISMA-Guided Systematic Review and TCCM Analysis," *Buildings*, vol. 16, no. 8, p. 1633, 2026.

[5] "Materials Pathways for Low-Carbon Construction: A Systematic Review of Bio-Based, Recycled, and Alternative Cementitious Systems," *Infrastructures*, vol. 11, no. 5, p. 158, 2026.

[6] E. Ciutac (Nicolaev), V. Ghisman, C. Iticescu, D. Tcaciuc, and D. L. Buruiana, "Industrial Waste Recycling for Sustainable Building Materials: A Review," *Buildings*, vol. 16, no. 9, p. 1741, 2026.

[7] "A Review of the Application of Synthetic and Natural Polymers as Construction and Building Materials for Achieving Sustainable Construction," *Buildings*, vol. 14, no. 8, p. 2569, 2024.