INTRODUCTION TO BUILDING CONSTRUCTION

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BASIC COMPONENTS OF STRUCTURE
LOAD/WALL BEARING & FRAMED STRUCTURE

TYPES OF STRUCTURES

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WHAT IS LOAD BEARING STRUCTURE?

Load bearing structure is probably the oldest and most common type of structure, and it is the structure in which the loads of the roofs as well as lateral loads such as earthquake, wind etc. are borne (bear) by walls, and through walls they are transferred to lower floor and eventually to foundations. It is also known as wall bearing structure.
LOAD BEARING STRUCTURE V/S FRAME STRUCTURE
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Components of a Building:
- Weathering Course
- Parapet
- Roof Slab
- Brick Masonry
- Lintel
- Door
- Damp Proof Course
- Plinth
- Step
- Ground Level
- Basement
- Foundation
- Foundation Concrete

Cross Section of Wall on AA:
- 7.5CM C.C. Terrace Over 12CM RCC
- 4.20M
- 2.5CM C.C. 1:2:4 Over 7.5CM C.C. 1:4:8
- 30CM
- 40CM
- 50CM
- 60CM
- 1.10M
- Lime Concrete
- Floor Finish
- Floor Concrete
- Sand Filling
A framed structure is a structure having the combination of structural components i.e. beam, column and slab connected together to resist the gravity and different lateral loads. These structures are generally used to overcome the large forces, moments developing due to the applied loads. It is also known as beam column structure.

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LOAD BEARING STRUCTURE

V/s.

FRAME STRUCTURE

- Negative wind loads
- Snow loads
- Live loads
- Positive wind loads
- Hydrostatic pressure from water pressure in ground
- Dead loads

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<table>
<thead>
<tr>
<th>LOAD BEARING STRUCTURE</th>
<th>FRAMED STRUCTURE</th>
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</thead>
<tbody>
<tr>
<td><strong>Load bearing structure</strong> consists of heavy masonry walls of brick or stone that support the entire structure</td>
<td><strong>Framed structure</strong> consists of beam, column, and slab.</td>
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<tr>
<td>In load bearing structure, vertical load transfer path is from slab/floor to walls and walls to load bearing footing i.e. soil</td>
<td>In a framed structure, vertical load transfer path is from slab/floor to beams, beams to columns and columns to load bearing footings and then to soil.</td>
</tr>
<tr>
<td>Limited storey buildings can only be constructed</td>
<td>Multi storey buildings of any heights can be constructed. Ex: Burj Khalifa has 163 floors</td>
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<tr>
<td>Load bearing structures are poor resistant to earthquake, as they are constructed with masonry units like stone, brick bonded together</td>
<td>Framed structure is more rigid and more resistant to earthquake as entire frame made of column, beam and slabs act as one unit</td>
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<tr>
<td>In load bearing walls are thicker.</td>
<td>In framed structure all the walls are thinner.</td>
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<tr>
<td>In load bearing system, beams and columns are not there. Hence walls have to be built first.</td>
<td>In framed structures, walls are constructed after the frame is ready.</td>
</tr>
<tr>
<td>In these types of structures less carpet area is available, as walls are thicker and hence carpet area efficiency of planning is less.</td>
<td>In these types of structures more carpet area is available, as walls are thinner. <a href="https://architecturaldraughtsman.edublogs.org/">https://architecturaldraughtsman.edublogs.org/</a></td>
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<tr>
<td>LOAD BEARING STRUCTURE</td>
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<tr>
<td>Excavation for this type of construction is more.</td>
<td>Excavation for this type of construction is less for a similar building.</td>
</tr>
<tr>
<td>Excavation for this type of construction is less for a similar building.</td>
<td>It is less labor intensive, but it needs different skills.</td>
</tr>
<tr>
<td>Speed of construction is less.</td>
<td>Speed of construction is MORE.</td>
</tr>
<tr>
<td>It is more material intensive. Hence dead load is also more. It consumes less cement and steel.</td>
<td>It is less material intensive. It consumes more cement and steel.</td>
</tr>
<tr>
<td>Cost of repair of load bearing structure is less.</td>
<td>Cost of repair of framed structure is more</td>
</tr>
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<td>Life is not much affected even though some standards are not strictly followed.</td>
<td>Life is reduced if not done with proper technique, and specifications i.e. codes are not strictly followed.</td>
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<tr>
<td>Skilled as well as non-skilled worker can construct.</td>
<td>Only skilled workers are needed for its construction.</td>
</tr>
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<td>Thickness of wall cannot be maintained uniform throughout. Thickness of wall increases with increase in height. Hence plan dimension changes on all floor.</td>
<td>Thickness of wall can be maintained uniform throughout. Thickness of wall remains same with increase in height. Hence plan dimension does not change on different floor.</td>
</tr>
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<td><strong>FRAMED STRUCTURE</strong></td>
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<td>In load bearing structural system external &amp; internal walls serve as a <strong>structural element</strong> as well as serve the purpose of enclosure for protection from weather i.e. rain, sound, heat, fire etc.</td>
<td>In framed <strong>structural system</strong>, external &amp; internal walls serve only the purpose of enclosures for creation of rooms and protection from weather.</td>
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<tr>
<td>It is not flexible in design as you cannot remove/shift walls, hence effectiveness becomes less. In <strong>load bearing structure</strong>, it is necessary to construct wall over wall, as walls are load bearing components. Therefore, you cannot change the location of wall resulting in less flexibility in use.</td>
<td>It is flexible in design as you can shift location of walls. More functional architectural design is possible. Flexible utilization of space. No necessity to construct walls on walls. Any wall can be taken anywhere. Hence, flexibility in use.</td>
</tr>
<tr>
<td>Room dimensions cannot be changed as walls have to be above walls only.</td>
<td>Room dimensions can be changed</td>
</tr>
<tr>
<td>Inclusion of Cantilever element is difficult task in this system. Also, it is permitted up to short span only</td>
<td>Cantilever elements can be easily provided in this system.</td>
</tr>
<tr>
<td>In case of a load bearing structure, large span areas are not possible. Limitation of span i.e. room sizes</td>
<td>In case of a framed structure, large span areas are possible. No Limitation of span i.e. room sizes.</td>
</tr>
<tr>
<td>Design of load bearing structure is simple.</td>
<td>Design of framed structure is not simple as compared to load bearing structure. You need design skills and software tools.</td>
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CANTELEVER STRUCTURE

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MADRAS TERRACE ROOF LAYING
MARKING

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EXCAVATION

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PCC FOR FOUNDATION

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FOOTING REINFORCEMENT

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FOOTING CONCRETE
COLUMN CONCRETE
EARTH REFILLING

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CONSOLIDATION

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PLINTH BEAM

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BASEMENT BRICKWORK & SOIL FILLING
PCC FLOORING

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COLUMN SHUTTERING & CONCRETE

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ROOF SHUTTERING

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BEAM FABRICATING

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SLAB FABRICATING

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ROOF SLAB CONCRETE

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BRICKWORK & PLASTERING