

**Ishik University**  
**Department of Interior design 2019-2020**  
**Fall Semester**

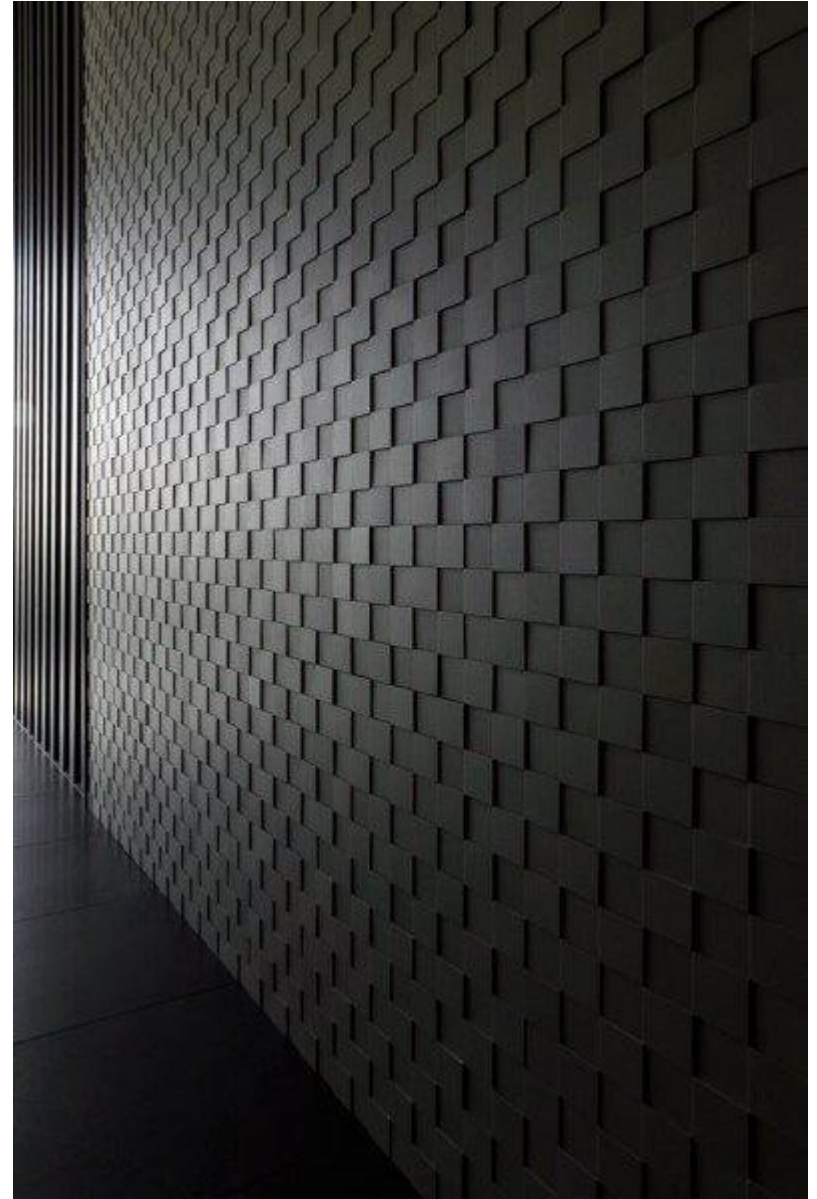


## **Walls**



**Lecturer: Dlman Aziz Mohammed**

walls  
3 Stage  
LECTURE -2-



# Outline

Definition of Wall

Functional Requirements

Types of Walls

Brick Wall

Stone Masonry Wall

Curtain wall

Block Wall

Dry Wall

# Definition of Wall

- A continuous, vertical structure
- External walls – to enclose and protect a building against weather for reasonable indoor comfort
- Internal walls – to divide buildings into rooms



# Functional Requirements

## 1- Strength & Stability

- To resist stresses due to self-weight, superimposed and lateral pressure such as wind
- To be able to avoid buckling due to excessive slenderness

## 2- Resistance to Weather and Ground Moisture

- To resist passage of moisture into building
- Moisture (water vapour or liquid water) from groundwater or rain
- Methods:
  - i. Thicker wall
  - ii. Cavity wall
  - iii. Damp proof membrane .

# Functional Requirements

## 3- Durability and Freedom from Maintenance

- Indicated by frequency and extent of work necessary to maintain the wall
- Minimum cost of maintenance

## 4- Resistance to the Passage of Heat

- Barrier to heat gain/loss which increases cost of cooling and heating
- Affect energy consumption
- Heat gain – higher need for air conditioning
- Glass & metal – poor thermal insulation
- Methods of thermal insulation

Thicker wall

Cavity/double wall

Thermal insulation layer

Internal lining for claddings and glass



# Functional Requirements

## 5- Resistance to the Passage of Noise

Exclude noise from traffic, aircraft, train, building services plant & impact sound caused by neighbours

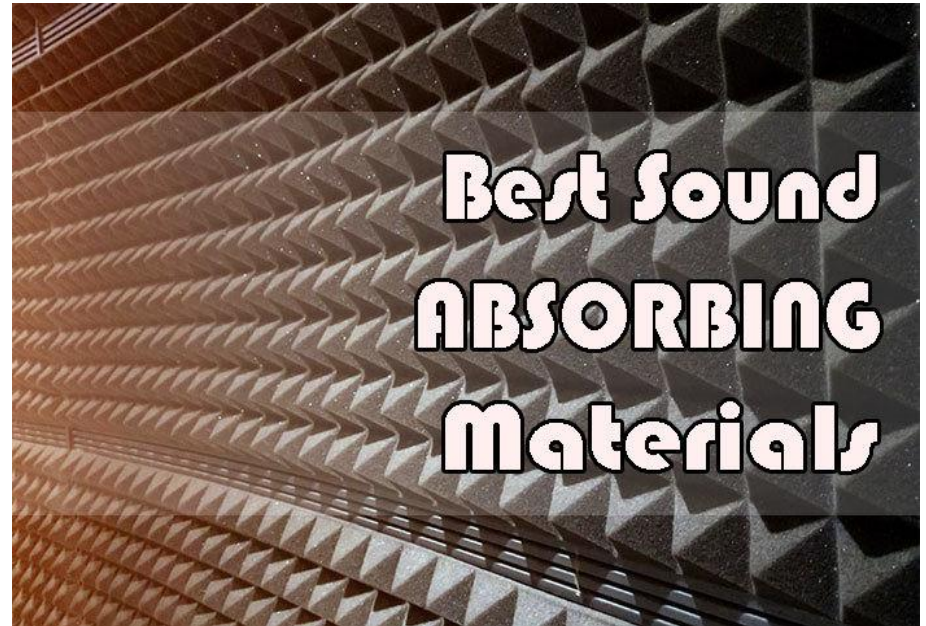
Noise – lead to irritation & poor productivity

Methods:

Thicker walls

Cavity/double wall

Lining with absorbent material



# Functional Requirements

## 6- Aesthetics

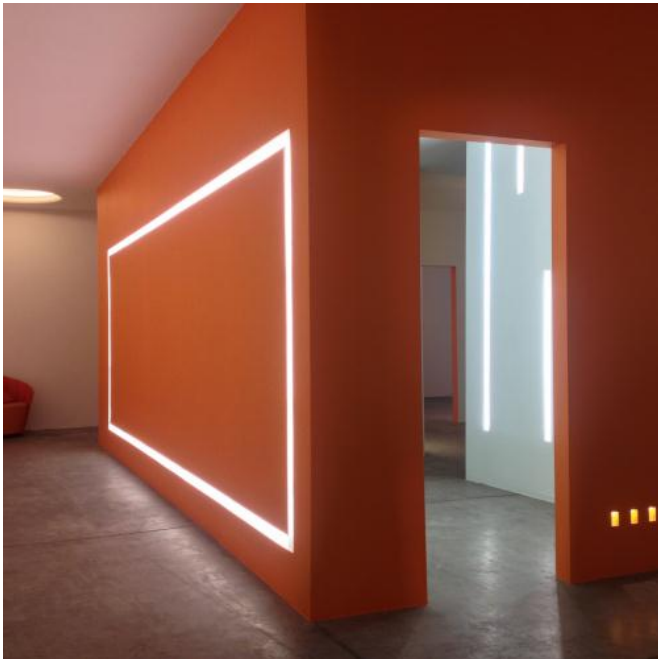
- Walls are important visually
- Affected by choice of materials





# Wall

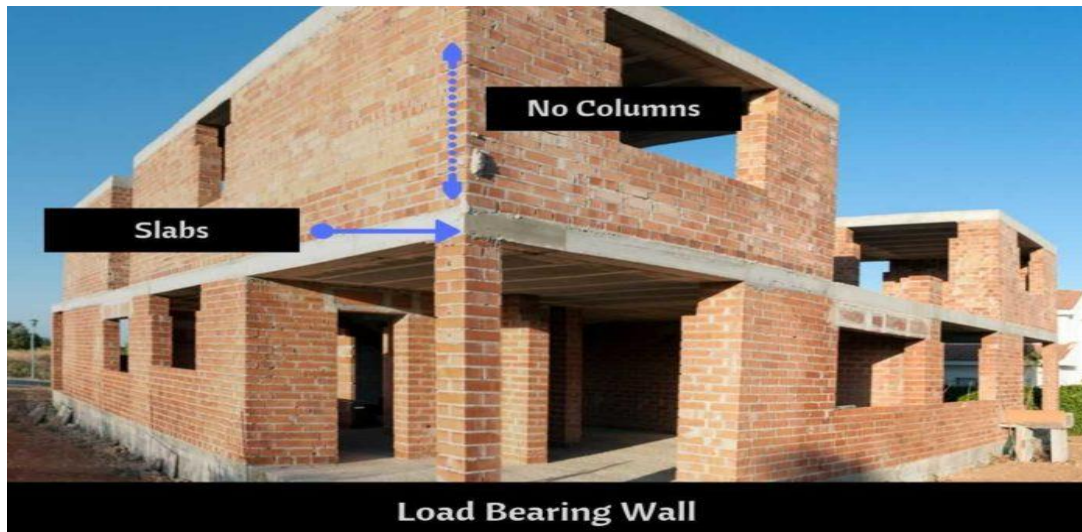
**Wall** is a structural element which divides the space (room) into two spaces (rooms) and also provides safety and shelter. Generally, the walls are differentiated as a two types outer-walls and inner-walls. Outer-walls gives an enclosure to the house for shelter and inner-walls helps to partition the enclosure into the required number of rooms. Inner walls are also called as Partition walls or Interior Walls and Outer walls are also called as Exterior walls.



# Types of Walls

## 1. Load Bearing Wall :

As the name itself suggests that, the whole building structure is rested on walls instead of columns. In general, the loads from slab transfers to the beams, from beams to the columns and then spread to the foundation.



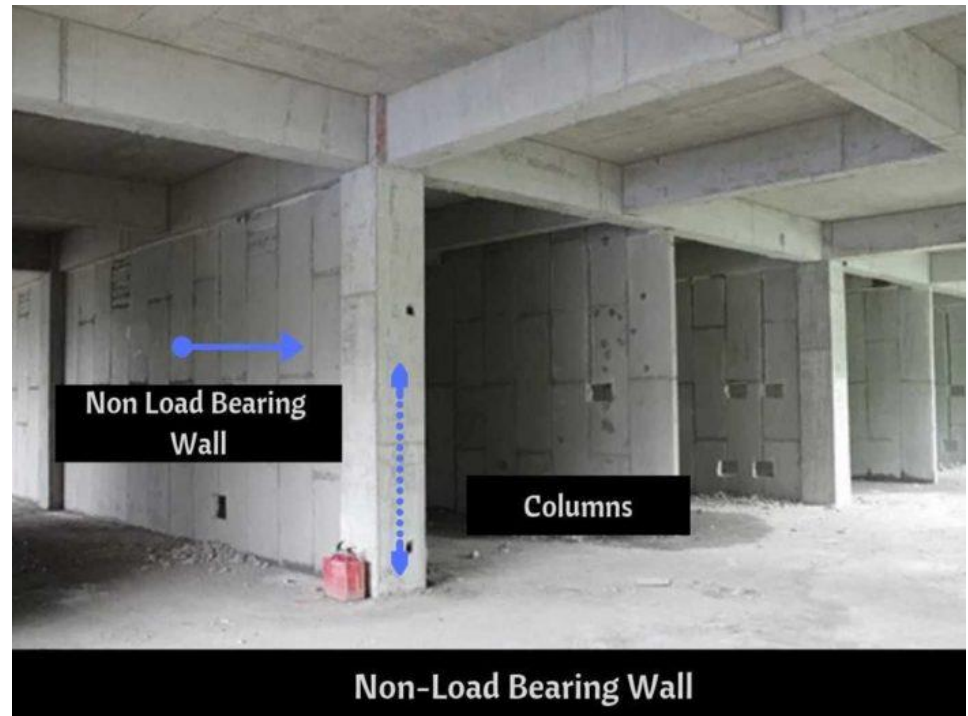
From the above image, you can identify that the structure has beams and slabs but not columns. In simple words, whether its exterior or interior walls, the wall which is bearing the whole weight of the structure, including self-weight of structural elements is called Load bearing wall. Strip foundation is adopted for the load-bearing type of wall.

# Types of Walls

## 2. Non-load Bearing wall or Drop Wall:

This type of wall doesn't support floor or roof loads above them which means it won't carry any of the weight of the structure above it. Partition walls inside the building are the best example of it, where these are constructed only to divide the rooms and these walls don't possess any structural integrity. The non-load bearing wall can be removed or shortened without affecting the building structure.

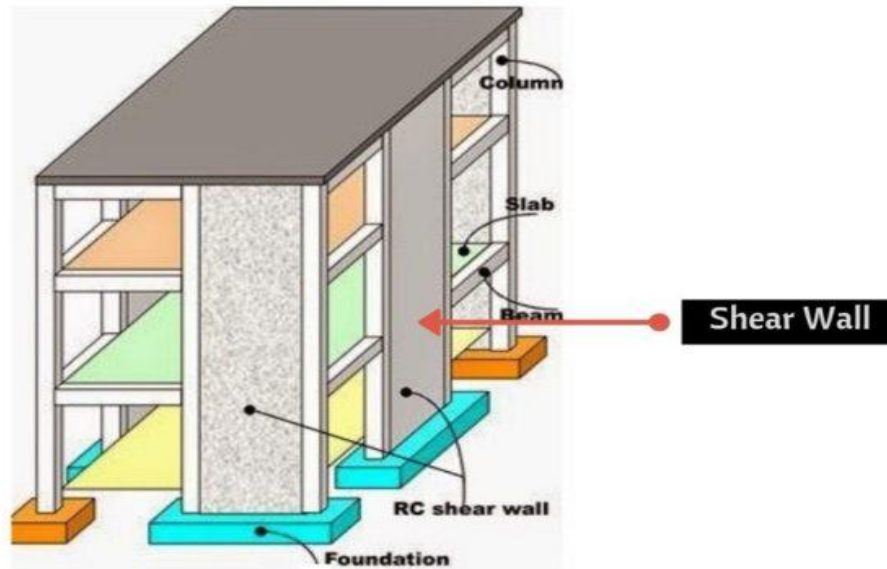
The thickness of Non Load bearing wall generally lies in between 100mm to 125mm.



# Types of Walls

## 3. Shear wall:

Shear wall is the wall which is constructed around the lift pit, Water sump or Staircase to retain the soil. Any shear wall bears two pressures on it either it may be wind pressure and soil pressure or wind pressure or water pressure . Shear wall is adopted to resist these forces. These walls are used to carry the lateral force exerted on the structure due to wind, earthquake or any other lateral load.



Shear Wall

# Types of Walls

## 4. Retaining Wall:

The wall which is built to maintain the unequal level of the ground on its two faces is called a Retaining wall. The wall which is constructed around the plot below ground level to retain the soil at one end and land sliding after the earthwork on site are called retaining wall. Retaining wall can be made of RCC or CRS.

Retaining walls are further divided into the following types:

- 1.Gravity retaining wall
- 2.Reinforced Concrete retaining wall
- 3.Brick masonry r retaining wall
- 4.Anchored earth walls
- 5.Stone made Retaining wall



# Types of Walls

## 5. Brick masonry wall:

The wall which is constructed with the help of bricks is called Brick masonry wall. Masonry is used to join the bricks in the wall. The thickness of the brick wall could be 24cm or 12cm

- The 20cm wall is adopted for outer walls.
- The 10cm wall is adopted for inner walls.

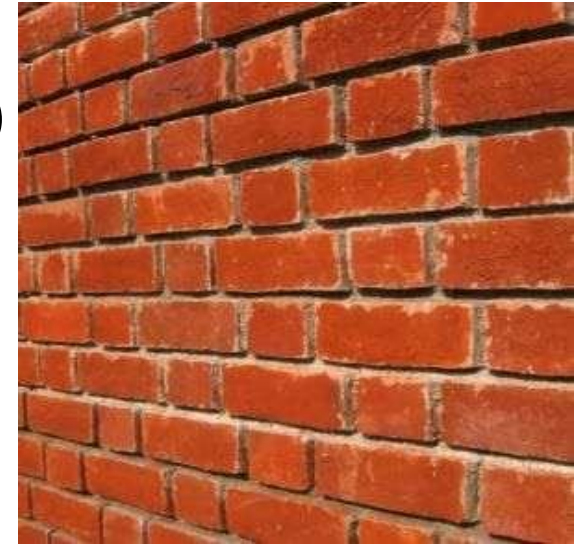
Remember, the length of the brick wall in a single stretch should not exceed more than 4m. If it exceeds, a column must be constructed with RCC.



Brick Wall

# Types of Walls

- Made of bricks laid in mortar
- Laid to overlap in some form of bonding
- Pointing to ensure joints are solidly filled (watertight) and for decorative reasons
- Brick – small block of burned clay, concrete or sand-lime
- Can be used for load bearing and non-load bearing walls



# Types of Walls

- Brick wall Finished with
  - i. **Plastering**
  - ii. Tiles
  - iii. Self finished





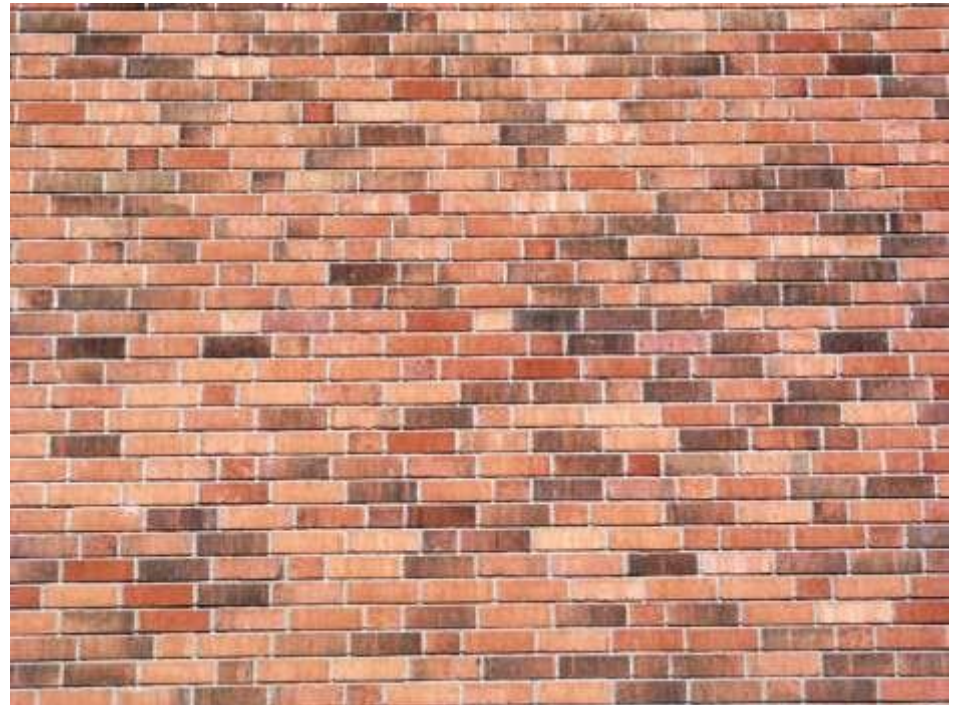
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# Types of Walls

## Brick Wall

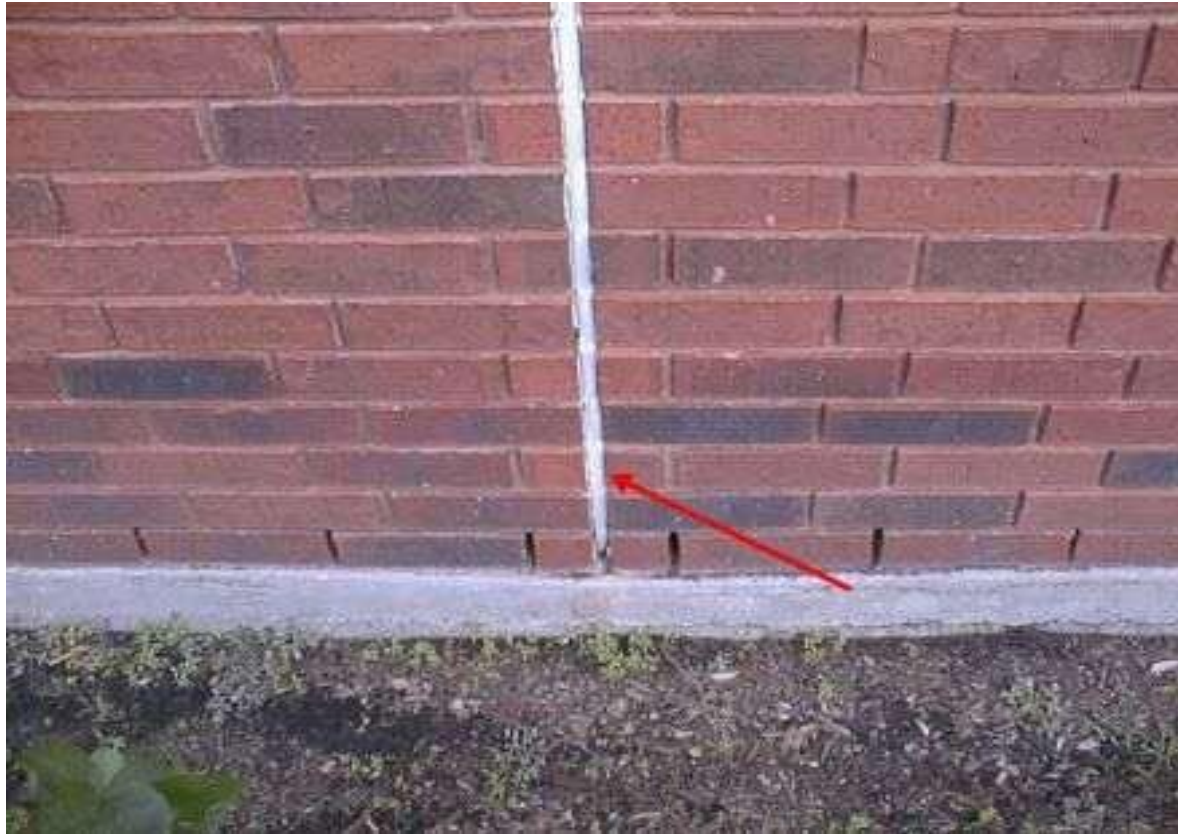
### Advantages

- Cheap
- Good fire resistance
- Quite good thermal insulator
- Doesn't deteriorate structurally and requires little maintenance
- 240 mm thick brick wall give acceptable sound insulation

### Disadvantages

- Expansion is quite large – expansion joints needed
- Slow construction

# Types of Walls

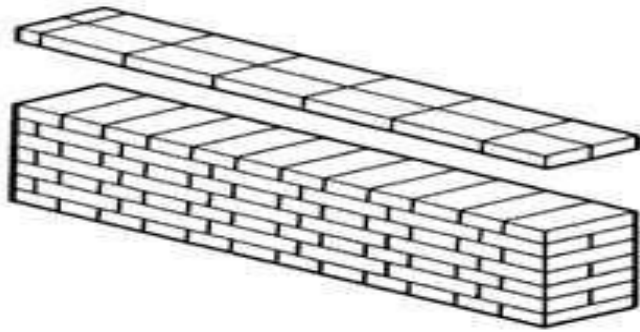


Expansion joint

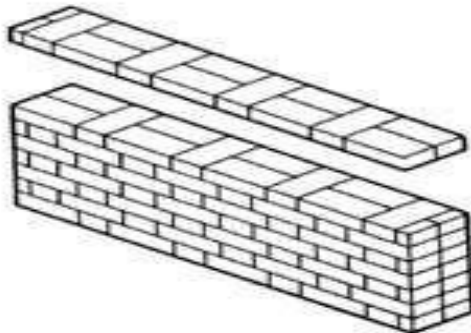
# Types of Walls

## Brick Wall

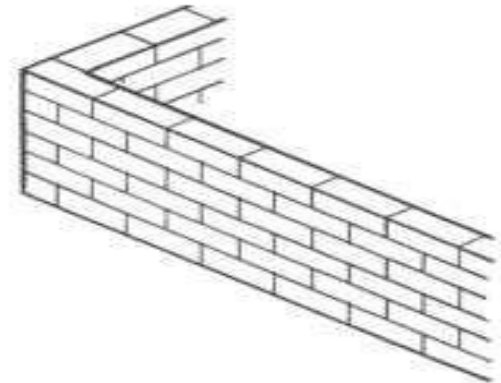
- Common types of bond for brickwork



ENGLISH BOND



FLEMISH BOND



STRETCHER BOND

# Stone Masonry Wall

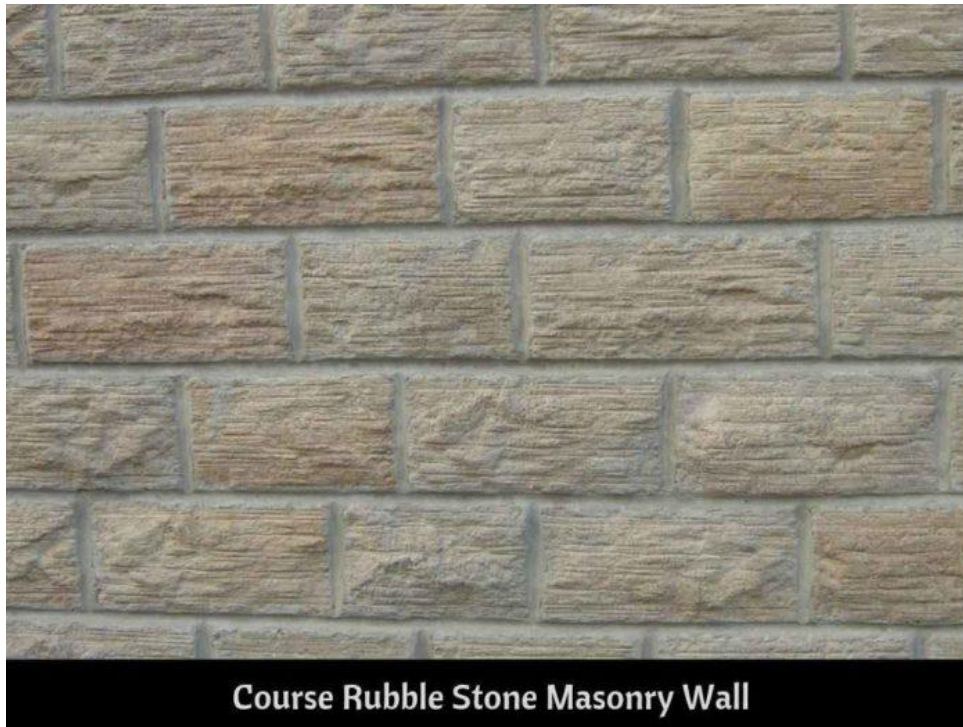
## Stone Masonry Wall

- Natural or manufactured stone
- Bound together by mortar
- Very durable. However, quality of mortar and workmanship and patterns of assembly strongly affect the durability.`
- Can be used as load bearing or non-load bearing walls

# Stone Masonry Wall

## **Course Rubble Stone masonry wall:**

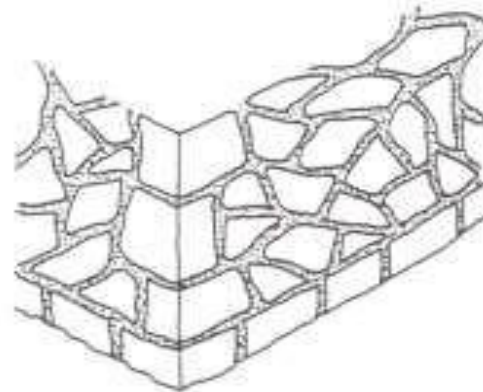
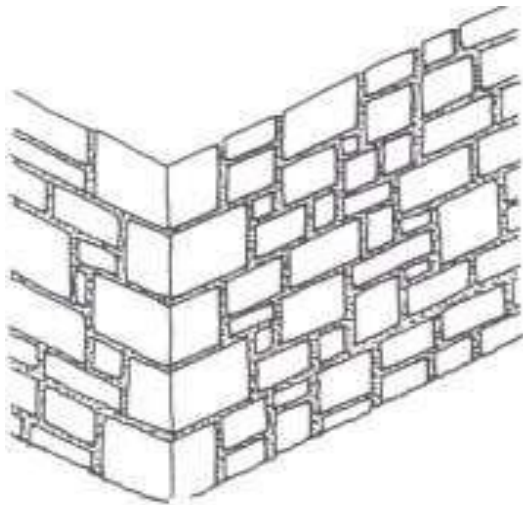
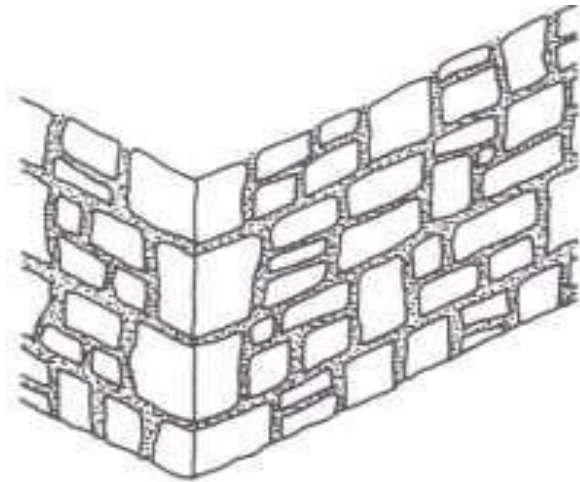
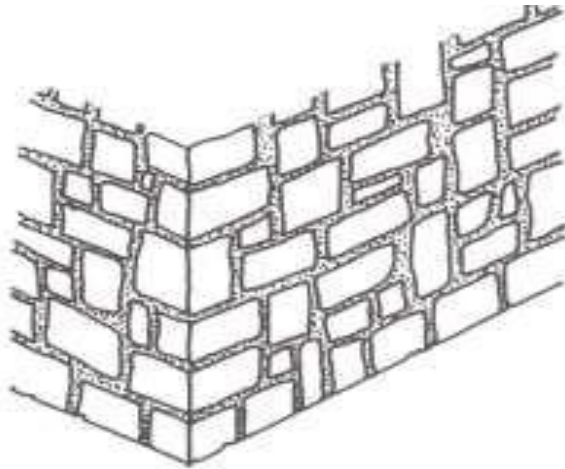
The wall which is constructed with regular size of stones which are well finished & dressed is called Course Rubble Stone masonry wall. This type of wall is generally adopted for abutments of bridges, compound walls or boundary walls.



**Course Rubble Stone Masonry Wall**

# Stone Masonry Wall

## Rubble Walling





# Stone Masonry Wall

## **Random rubble stone masonry wall:**

The wall which is constructed with the irregular size of stones is called Random rubble masonry wall. This type of wall consumes more masonry than Course rubble stone wall.



**Random Rubble Stone Masonry Wall**

# Stone Masonry Wall

## Ashlar Masonry

- This type of masonry is built from accurately dressed stones with uniform and fine joints of about 3mm thickness by arranging the stone blocks in various patterns.
- The backing of Ashlar masonry walls may be built of Ashlar masonry or rubble masonry. The size of stones blocks should be in proportion to wall thickness.

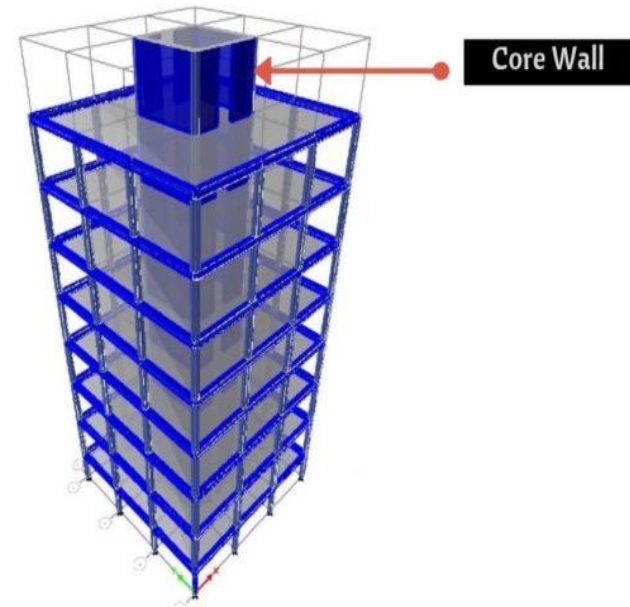


# Types of Walls

## 8. Core wall:

Core wall is constructed from the foundation and it raised upto the height of the building. In this type of wall, the wall itself acts as a column. Core wall is built to carry the lateral force exerted on the structure due to wind, earthquake or any other lateral load.

Core walls are a combination of shear walls. They are organized and arranged like a core and installed at the geometric center of the building to void the torsion effect



Core Wall

# Types of Walls

## 9. Precast wall:

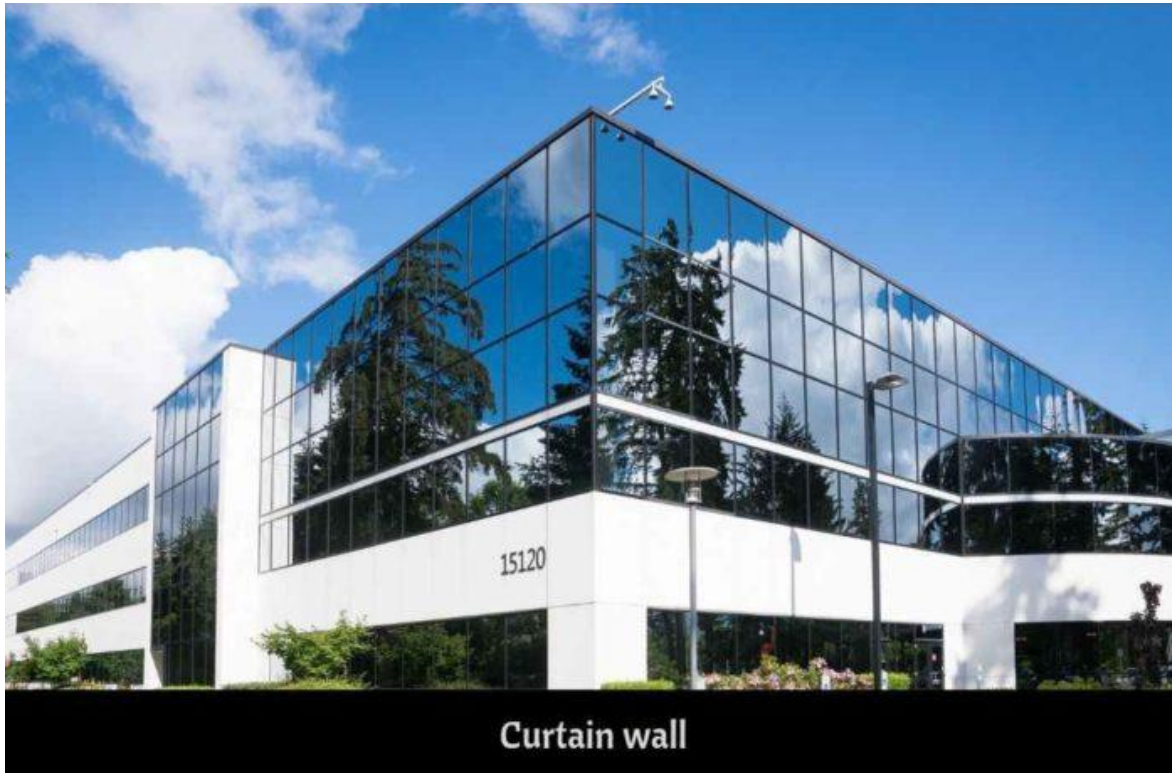
As the name itself proving that it is a ready-made wall where the wall is cast in the factory and bought to site to install it. Yes, the precast wall is possible in the current world. Many companies brought this to market. You need to specify the length and height of the wall. The wall is cast and transported to the site. This type of wall is preferred where there is limited to space to work and where there is less chance of labour. The best part of Precast walls is companies themselves provide skilled labour to install the walls at your site.



# Types of Walls

## 10. Curtain wall:

The wall which is constructed with glass, aluminium or with a steel frame is called a Curtain wall. This type of walls is generally adopted in offices, Hospitals and other public buildings.



# Types of Walls

## 11. Parapet wall:

The wall which is constructed on the top floor of the building to prevent the falling in anything from the roof. The height of the parapet wall is 3ft.



# Types of Walls

## 12. Boundary Wall or Compound wall:

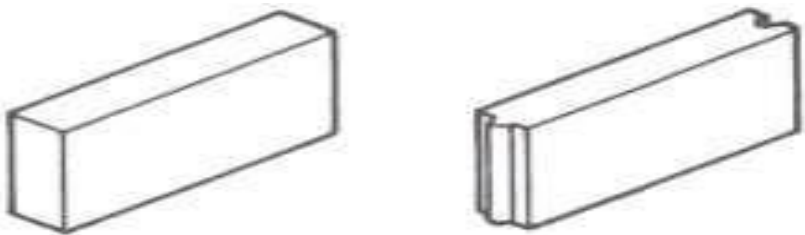
The wall which is constructed all around the building to show the limits of the plot is called a boundary wall.



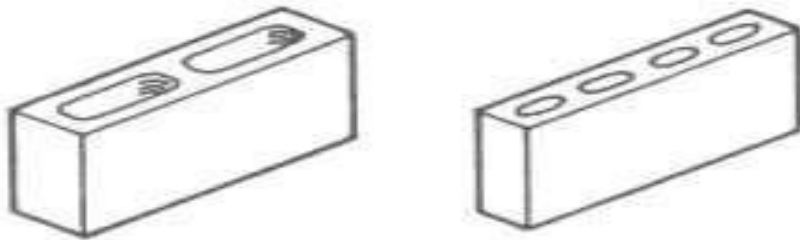
Boundary wall or Compound wall

# Block Wall

- Blocks – wall unit larger in size than bricks
- Used for load bearing and non-load bearing walls



solid blocks



cellular blocks





# Block Wall

- Types:
  - i. **Hollow clay blocks**
  - ii. Hollow concrete blocks
  - iii. Solid concrete blocks
  - iv. Lightweight concrete blocks



# Block Wall

- Types:
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# Block Wall

- Types:
  - i. Hollow clay blocks
  - ii. Hollow concrete blocks
  - iii. **Solid concrete blocks**
  - iv. Lightweight concrete blocks



# Block Wall

## Advantages

- Economical
- Faster erection
- Less joints
- High resistance to damage by fire, less than brick wall
- Good thermal insulator

## Disadvantages

- Suffer moisture movement causing cracking of plaster
- Settlement movement show more pronounced cracking
- Poor appearance – require finish
- Poor sound insulation

# Dry Wall

## Interior walls

Panels made of gypsum plaster pressed between two thick sheets of paper or fiberglass



# Dry Wall

## Referring mainly to dry wall partition

- Dry wall partition which subdivide a room and is non load bearing
- Requires finishing only at the fasteners and joints
- Less labor and drying time
- Very popular – faster
- Mounted on timber or steel frame
- Panels made of gypsum plaster pressed between two thick sheets of paper or fibreglass. 2 Panels usually sandwich a layer of rockwool.



## Internal Partition

### Performance Requirement

- Flexibility
- Sound Insulation
- Fire
- Strength & Stability
- Appearance & Durability
- Services Accommodation
- Ease of Construction

# partition Wall

## Internal Partition

### Performance Requirement

### Flexibility





# partition Wall

## Internal Partition

### Performance Requirement

#### Sound Insulation

- reduction obtained when sound passes from one side of a partition to another
- To achieve good sound insulation partitions require either a heavy construction or the use of carefully designed partition with two leaves which are as far as possible acoustically separate and the cavity filled with an absorbent quilt.



# partition Wall

## Internal Partition

### Performance Requirement

#### Sound Insulation

- If there is a door in the partition this has the effect of diminishing by about 10 dB
- Poor joints between the partition and adjacent walls, ceilings or floors can also reduce the sound reduction. Not only can this be a path for direct
- transmission of sound through any dry joints or gaps, but sound can also be transmitted via the services themselves from one side to the other.



# partition Wall

## Internal Partition

### Performance Requirement

#### Fire

- Partition used as part of fire compartmentalization strategy
- To prevent spread of smoke , dry partition should be extended to the soffit of slab instead of suspended ceiling



# partition Wall

## Performance Requirement

### Strength & Stability

- need to resist various types of loadings.
- These can include daily impact loading such as doors closing or people leaning against it.
- In addition partitions may be required to carry permanent loads such as shelves and wash basins.

## Internal Partition



# partition Wall

## Performance Requirement

### Ease of Construction

- Leveling
- Building services above
- Services penetration
- Construction of doors
- Level of fire rating and noise reduction



## Internal Partition



# Resources

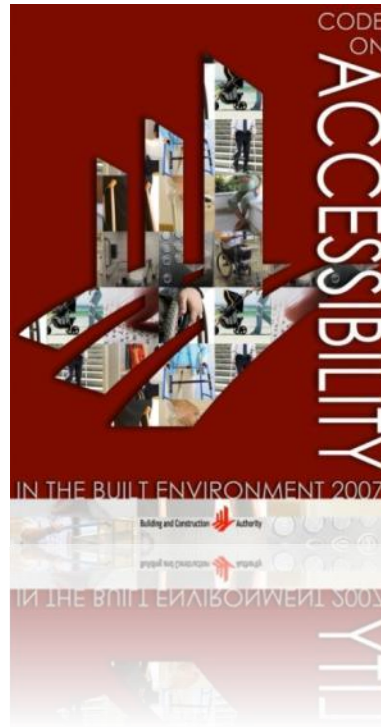
**APPROVED DOCUMENT**  
**ACCEPTABLE SOLUTIONS**

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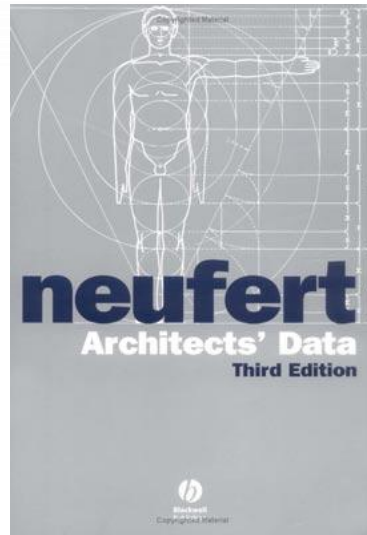
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**Thank You!**