

## UNIT II

### CONSTRUCTION PRACTICE - SUPER STRUCTURE

#### Topic 4 - Composite Masonry and Cavity Walls

##### Composite Masonry

- **Definition:** Composite masonry refers to a construction technique where two or more different types of building materials are used together to form a single masonry structure.
- **Purpose:** To combine the advantages of different materials for improved strength, durability, insulation, or aesthetics.

##### Types of Composite Masonry

###### 1. Stone and Brick Composite Masonry:

- Combines stone masonry for the exterior with brick masonry for the interior.
- Advantages: Stone provides durability and aesthetic appeal, while bricks offer cost-effectiveness and better bonding.

###### 2. Brick and Concrete Block Composite Masonry:

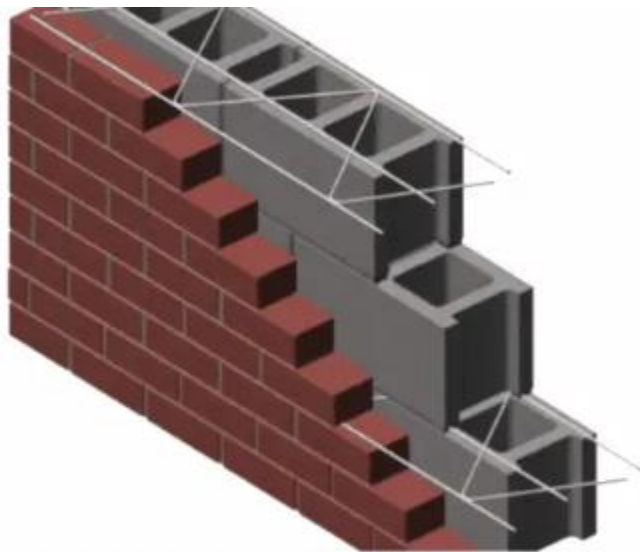
- Exterior walls made of bricks and inner walls made of concrete blocks.
- Advantages: Brick enhances aesthetic value and weather resistance, while concrete blocks reduce cost and weight.

###### 3. Stone and Reinforced Concrete Composite Masonry:

- Stone masonry is combined with reinforced concrete to handle higher loads.
- Common in construction where structural strength and appearance are both critical.

## Advantages of Composite Masonry

- **Economical:** Using less expensive materials internally while retaining the aesthetic or weather-resistant properties of more expensive materials on the exterior.
- **Strength:** Reinforcement in the inner layers can be added for improved load-bearing capacity.
- **Thermal and Sound Insulation:** The combination of materials helps in better insulation.
- **Durability:** Properly chosen materials extend the life and weather-resistance of the structure.



### COMPOSITE MASONRY

“ Composite masonry is a masonry constructed with two or more types of construction units or different types of construction materials. ”

## Cavity Walls

- **Definition:** Cavity walls are double-wall constructions consisting of two "leaves" or layers of masonry separated by an air space or cavity. These layers are typically connected by metal ties.

## Components of Cavity Walls

### 1. Outer Leaf:

- The external layer, usually made from materials like brick, stone, or concrete blocks.
- It acts as the first line of defense against weather conditions.

### 2. Inner Leaf:

- The internal layer, typically made from bricks or blocks.
- This provides the structural support and interior finishing.

### 3. Cavity:

- The air gap (usually 50mm to 100mm) between the two layers.
- Prevents water penetration and helps in thermal insulation.

### 4. Wall Ties:

- Metal connectors that tie the outer and inner leaves together.
- Placed at regular intervals to ensure structural stability.

### 5. Insulation (optional):

- Cavity walls may include insulation materials within the cavity to improve thermal performance.

## Advantages of Cavity Walls

### 1. Thermal Insulation:

- The air gap between the two leaves reduces heat transfer, keeping the interior cooler in summer and warmer in winter.

## 2. **Moisture Protection:**

- The cavity prevents water from penetrating to the interior. Any moisture that reaches the outer leaf drains down through the cavity.

## 3. **Sound Insulation:**

- The cavity also acts as a buffer, reducing noise transmission between the outside and inside.

## 4. **Energy Efficiency:**

- Cavity walls contribute to energy savings by reducing the need for artificial heating or cooling.

## **Construction of Cavity Walls**

### 1. **Foundation Preparation:**

- Cavity walls require proper alignment and a wider foundation to support both leaves.

### 2. **Laying the Leaves:**

- Both the inner and outer leaves are laid simultaneously with regular placement of wall ties.

### 3. **Installing Wall Ties:**

- Wall ties are inserted at specified intervals (usually 900 mm horizontally and 450 mm vertically) to join the two leaves.
- Ties are typically corrosion-resistant.

### 4. **Insulation Installation (if applicable):**

- Insulating material can be inserted into the cavity as the wall is constructed, or blown in after construction.

### 5. **Weep Holes:**

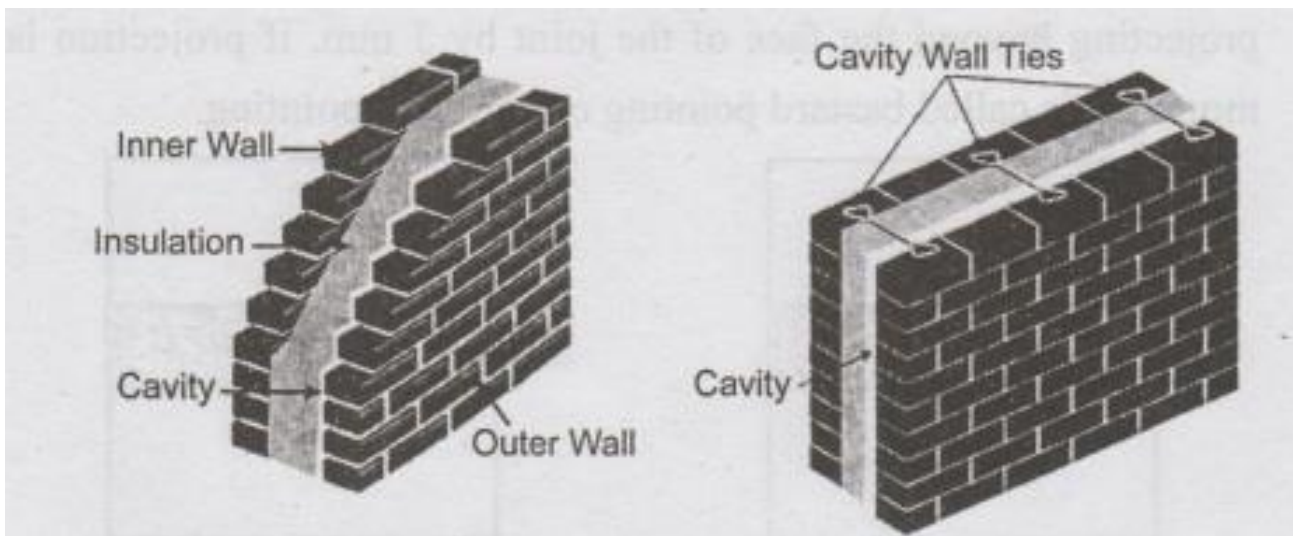
- Small openings at the bottom of the outer leaf allow water that has entered the cavity to drain out.

## Disadvantages of Cavity Walls

- **Cost:** More expensive than traditional solid walls due to additional materials and labor involved.
- **Space:** Requires more space, making it unsuitable for narrow or confined plots.
- **Complexity:** Installation requires precise construction techniques to ensure proper alignment and functionality.

## Applications of Cavity Walls

- Commonly used in regions with high rainfall, as the cavity provides excellent moisture protection.
- Used in climates requiring good thermal insulation.
- Suitable for residential and commercial buildings where energy efficiency and moisture resistance are critical.



## Comparison: Composite Masonry vs Cavity Walls

Feature	Composite Masonry	Cavity Walls
Material	Combination of two or more masonry types	Two separate masonry leaves with a cavity
Thermal Insulation	Can vary based on materials used	Excellent due to air gap or insulation
Moisture Resistance	Depends on materials	High moisture resistance due to cavity
Cost	Can be economical	More expensive than solid walls
Complexity	Moderate	High
Applications	Foundations, walls with aesthetic needs	External walls in rainy and cold climates