



SV PES

FACULTY OF ENGINEERING TECHNOLOGY & RESEARCH

# Chemical department

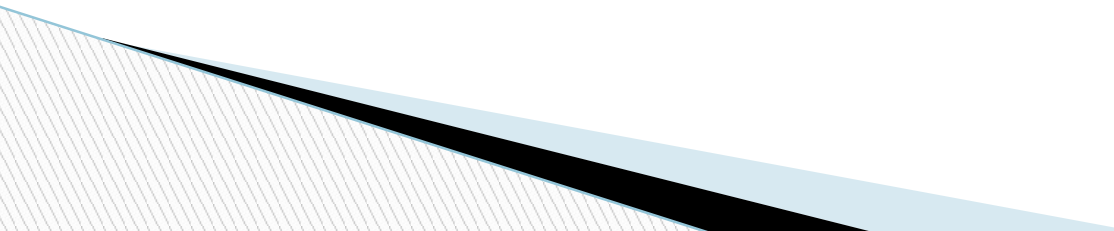
## Topic. **Construction**

Guided by

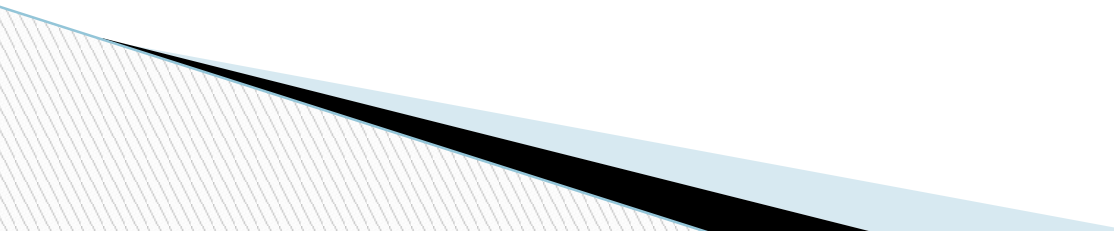
**J.M.J SIR**

**D.M.P SIR**

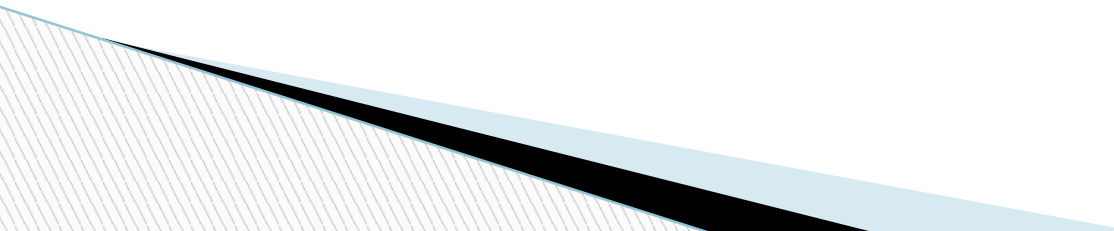
# GROUP-2

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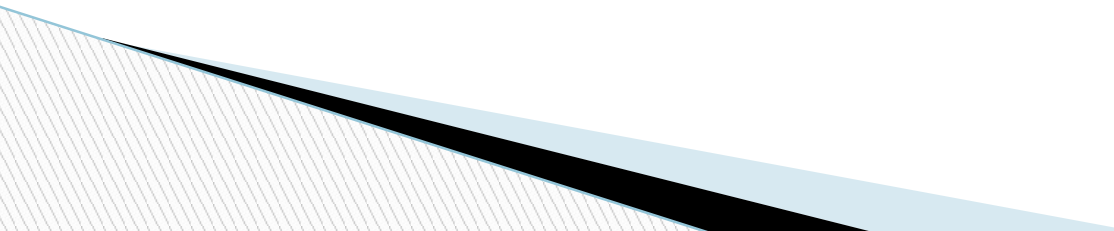
# Topic:construction

- Introduction
  - Types of building
  - Design load/building load
  - Common building components
  - Introduction building bye-laws
- 

# Types of building

- Two types of building
    1. Based upon occupancy
    2. Based on structure
- 

# Based upon occupancy

- Building include based upon occupancy.
    1. Residential building
    2. Educational building
    3. Institutional building
    4. Assembly building
    5. Business building
    6. Mercantile building
    7. Industrial building
    8. Storage building
- 

# Based on structure

## 1. Load bearing structure

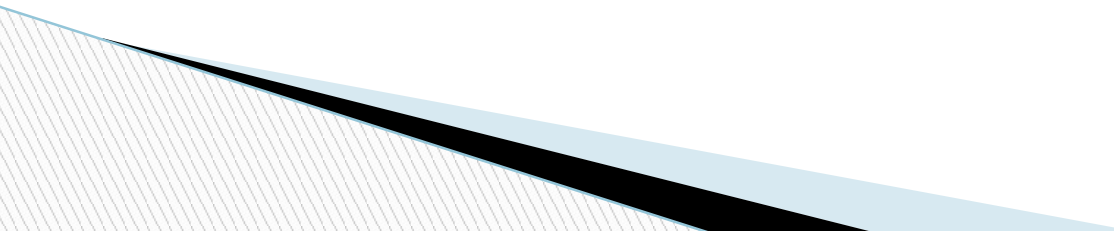
- It has load bearing walls which receive the loads and transmit the same to the ground through their foundation.
- 20,30,40,cm thick walls are load bearing walls.
- R.c.c slab is provided directly on load bearing walls.

**Based on structure(contd...)**



# Based on structure(contd...)

## 2.Framed structure

- In the buildings with framed structure,load is transferred through a frame of R.C.C slab,beam,colomn.
  - In this type of structures,there are partition walls of 10 cm thick,which divide and enclosethe space.
  - Construction time is less.
- 



**Based on structure(contd...)**



# Design loads/building load

Various loads are taken into account while designing the foundation of a structure loads coming on a structure are:

## □ **Live load:**

**Live load consists of moving or variable load due to people or occupants, their furniture, temporary stores, machinery etc.**

| No. | Type of floor   |          |
|-----|---|----------|
| 1   | Dwelling house, hospitals ,<br>hostels                              | 200      |
| 2   | Office ,light work room   | 250-400  |
| 3   | Bank, office, reading room  | 300      |
| 4   | Shops, classrooms, assembly<br>halls, restaurants, power<br>station | 400      |
| 5   | Warehouse, workshop, factory,<br>store room , dancehall             | 500-1000 |
| 6   | Light garage  | 250-400  |
| 7   | Heavy garage  | 750      |
| 8   | Stairs  | 300-500  |
| 9   | Balcony   | 300-500  |

**The above stated loads are uniformly distributed static loads in kg/m<sup>2</sup> on the plane area and provide for normal effects of impact and acceleration.**

**For multi-storeyed buildings, live loads are considered in designing columns, walls, and foundations depend upon number of floors**

| <b>Number of floors carried by member (column, foundation, wall etc.)</b> | <b>Total L.L on all floors above the member</b> |
|---|---|
| <b>1</b>  | <b>100%</b>                                     |
| <b>2</b>  | <b>90%</b>                                      |
| <b>3</b>  | <b>80%</b>                                      |
| <b>4</b>  | <b>70%</b>                                      |
| <b>5</b>  | <b>60%</b>                                      |
| <b>6 or more</b>  | <b>50%</b>                                      |

# Dead lode

Dead lode comprises of the weight of all walls, partitions, floors and roof including all other permanent construction in the building

| NO | Material/structure  | Unit weight |
|----|---|-------------|
| 1  | Wall : brick masonry<br>10 cm thick<br>20 cm thick<br>30 cm thick |             |
| 2  | Roof :G.I sheet 0.5 mm thick<br>1.63 mm thick<br>A.C sheet        |             |
| 3  | Slab R.C.C  |             |
| 4  | PCC (plain cement concrete )                                      |             |
| 5  | Mangalore tiles   |             |
| 6  | Clay  |             |
| 7  | Sand  |             |
| 8  | Fresh water   |             |
| 9  | Steel   |             |
| 10 | Cement  |             |
| 11 | Timber  |             |
| 12 | Bricks  |             |

**It is considered as basic wind pressure which is an equivalent static pressure in the direction of wind.**

**Wind pressure  $p$  [ $\text{km/m}$ ]  $^2 = kv^2$**

**Where,  $k$  = co-efficient, 0.006 (as per building code)**

**$V$  = wind velocity km/hr.**

**wind pressure acts horizontally on the exposed vertical surfaces of walls, columns etc. and inclined roof of the structure. When the height of building is less than 3 times width of the building wind load may be neglected. Wind load is effective for tall buildings.**

## **Snow load**

**Actual load due to snow will depend up to the shape of the roofs are its capacity to retain the snow ,the load due to snow may be assumed to be 2.5 kN/m per centimetre depth of snow.**

## **Rain load**

**Load due to accumulation of rain water on roofs are considered separately and depend upon positioning, shape and drainage system for roofs.**

**In addition to above stated loads following special load s should be taken into consideration.**



## □ Earthquake forces

An earthquake produces waves in every possible direction below ground. As per intensity or scale of earthquake, jerks and shocks are acting on earth. The shaking of earth cause effect on the structures supported on earth. To void shaking of earth certain consideration should be made in design of structures to contract earthquake moment in earthquake prone areas.

$$F_E = w a/g$$

Where,  $F_E$  =earthquake force

$W$  = weight

$g$  = gravitational acceleration

$a$  = acceleration (due to earth quake)

= 0.005 to 0.1 of  $g$

## □ **Hydrostatic forces:**

**The pressure generated by water is called as hydrostatic pressure. They act on the structure which remain in the water and which are erected in flowing water body. Hence for strength and stability hydrostatic pressure should be taken into consideration for special structure like overhead water tank, supports of bridge, dams etc.**

# Basic building components

```
graph TD; A[Basic building components] --> B[SUPER STURCTURE]; A --> C[Substructer]; B --- D[Plinth]; B --- E[D.P.C]; B --- F[Walls and columns]; B --- G[Floors]; B --- H[Beams]; B --- I[Roofs and slabs]; B --- J[Lintels and Aechers]; B --- K[Doors and Window]; B --- L[Chajjas]; B --- M[Parapet]; B --- N[Steps and Stairs]; B --- O[Cupboard and Shelves]; C --- P[Foundati on];
```

## SUPER STURCTURE

Plinth  
D.P.C  
Walls and columns  
Floors  
Beams  
Roofs and slabs  
Lintels and Aechers  
Doors and Window  
Chajjas  
Parapet  
Steps and Stairs  
Cupboard and Shelves

## Substructer

Foundati  
on

# A typical cross section through door and window showing all Building components

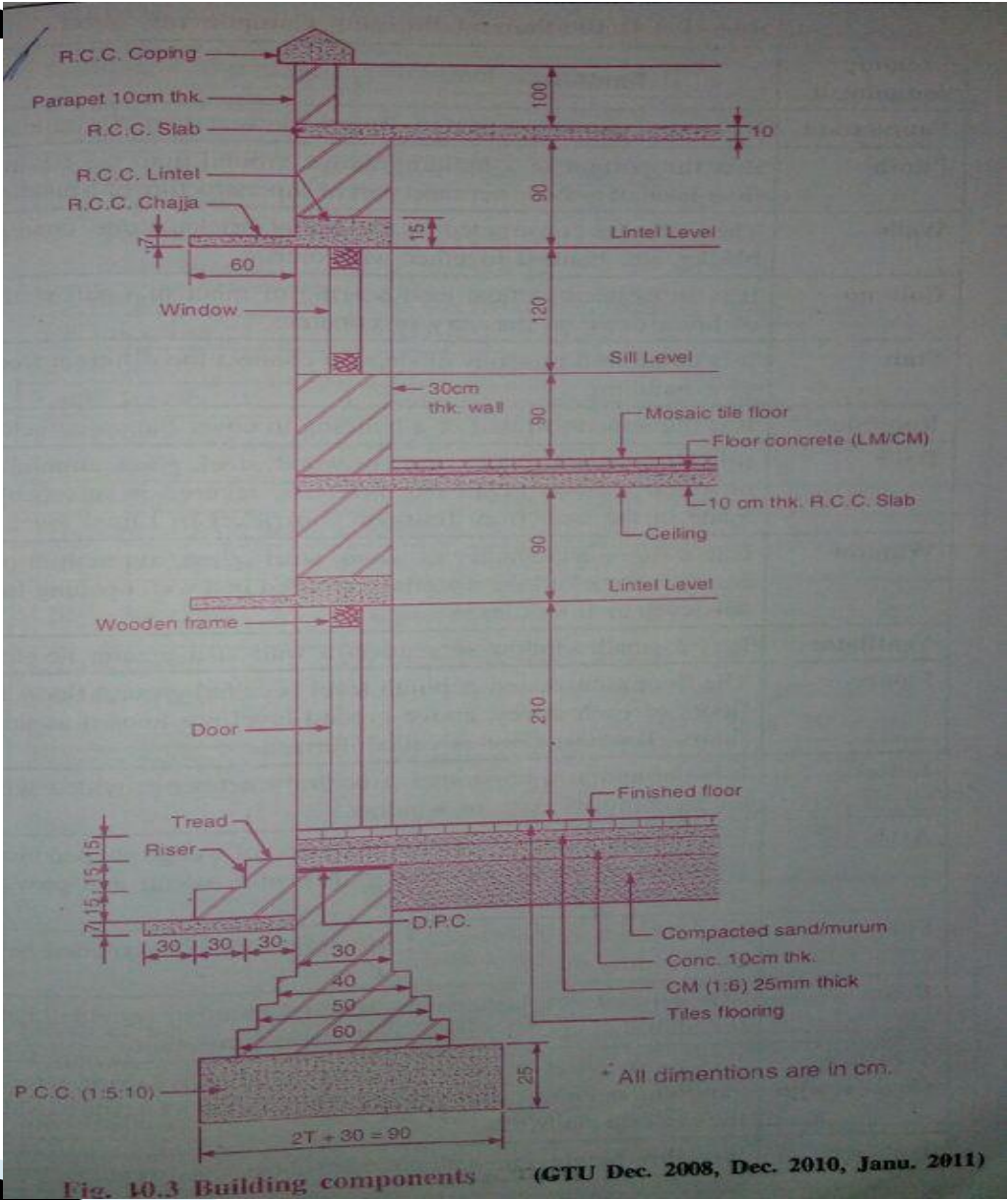


Fig. 10.3 Building components

(GTU Dec. 2008, Dec. 2010, Janu. 2011)

# Defination of building Components

**Foundation** - It is a sturcture below the G.L . It is the lowest part of a building

**Plinth** - It is the portion of a building above ground up to the finished floor level. It is the loer most part of building

**Walls** - It costructed by the use of bricks, stone, concrete , blocks , etc.

**Column** - It is a load bearingg member of smaal section of bricks or stone or concreate

**Stair** - It is series of steps to connect the different floors of building

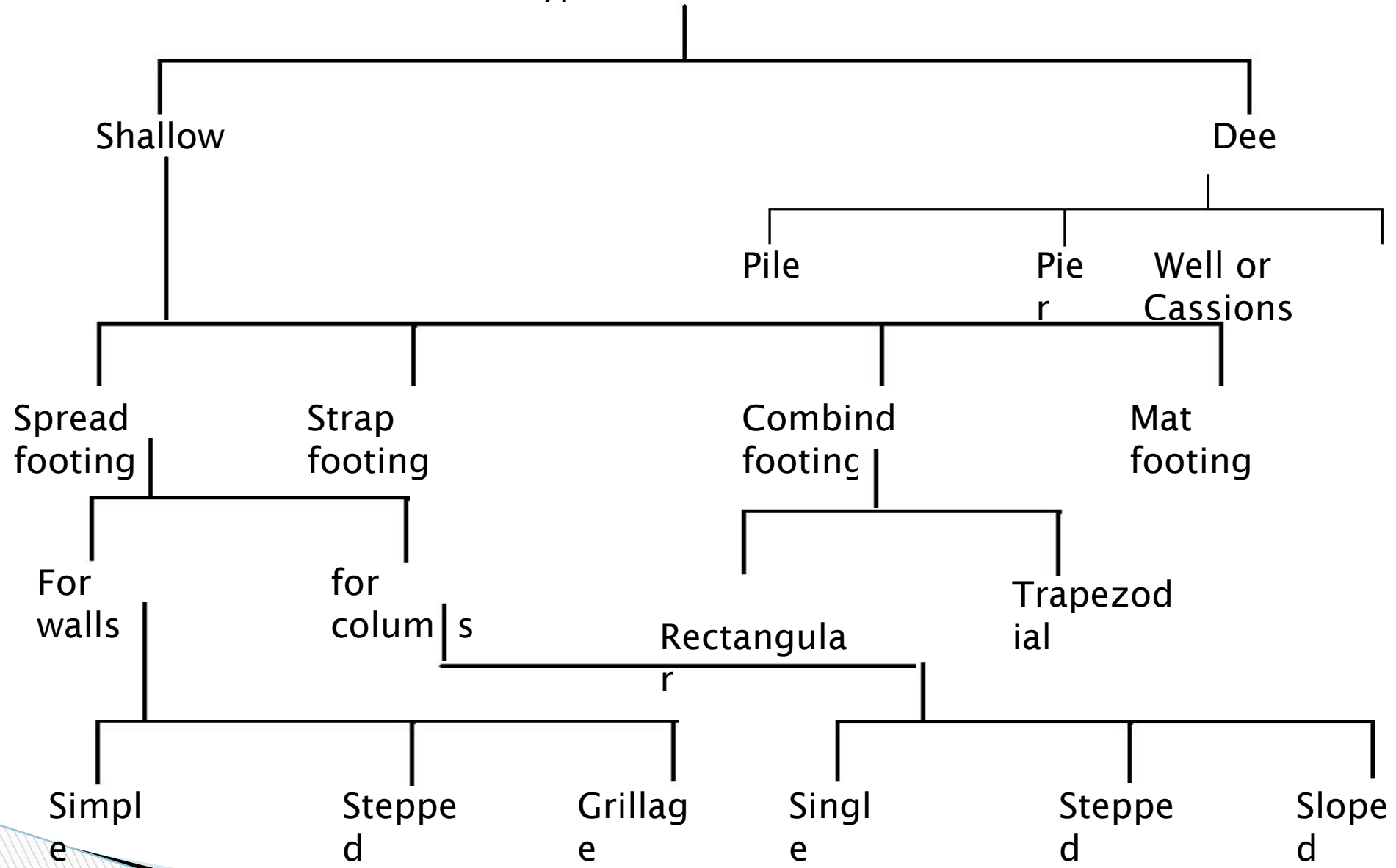
**Roof** - It is the uppermost part of a building to cover the space below

**Floors** - The floors of each storey, above ground level are none as upper floors

**Lintel** - It is defined as a horizontal structural member provided across the opening the doors and window

**Beam** - It is defined as a horizontal structural member provided rested

# Types of

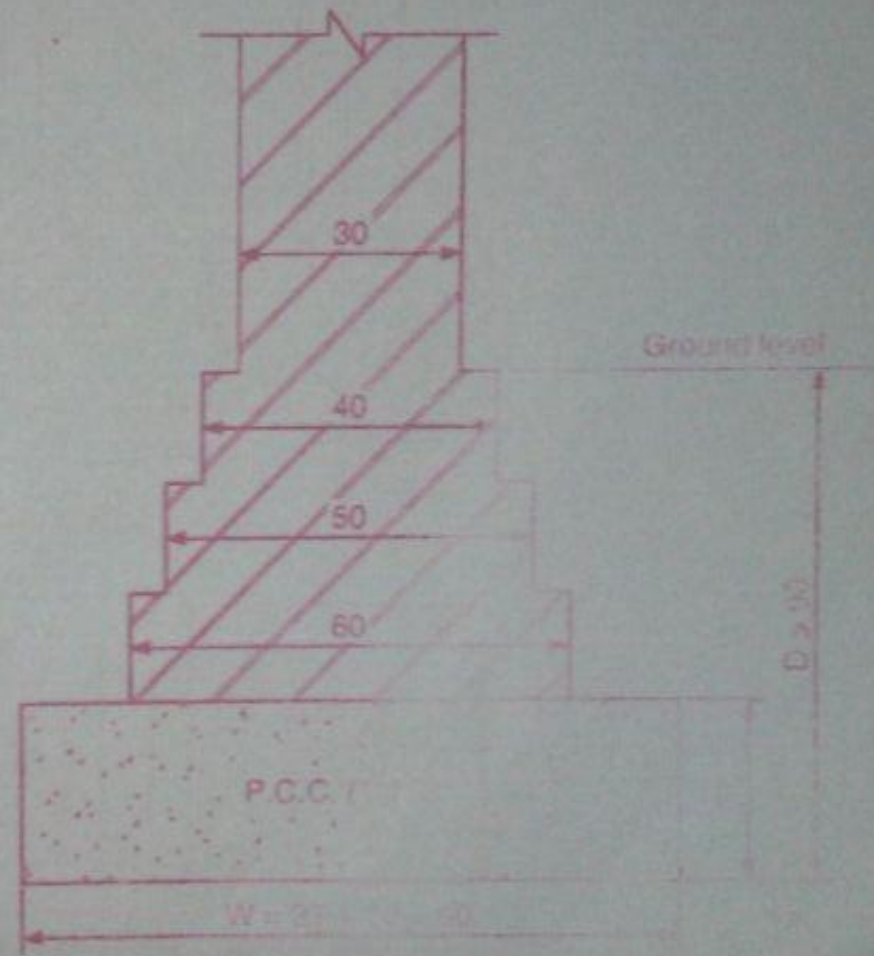
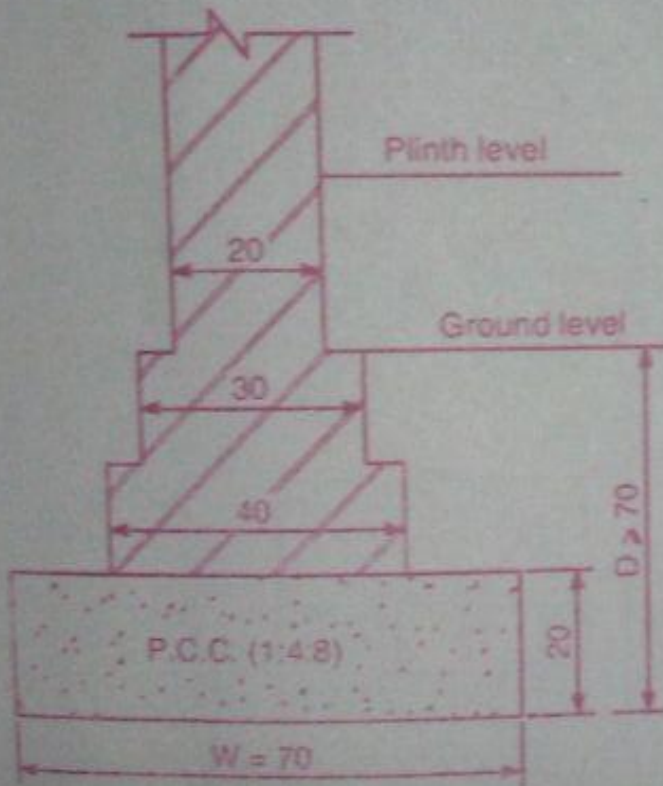


# 1 - Shallow Foundation

If depth of foundation is equal to or less than its width, it is called shallow foundations.

Generally it is 2 to 4 m

All dimensions are in cm



# Spread footing

of wall or column

stepped footing

-- which spread the super imposed load over larger area. Masonry walls have with a concrete base.

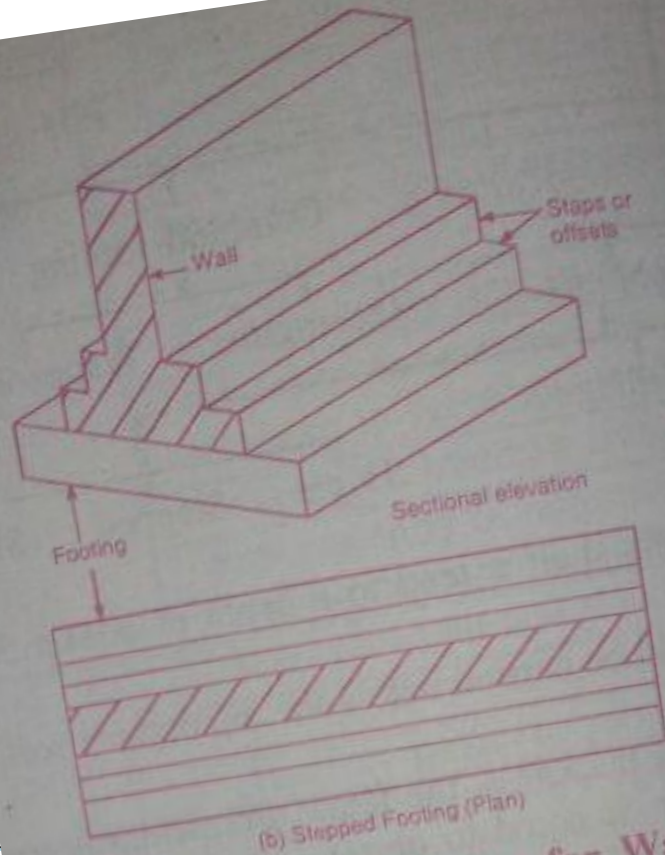


Fig. 10.5 Spread footing for Walls

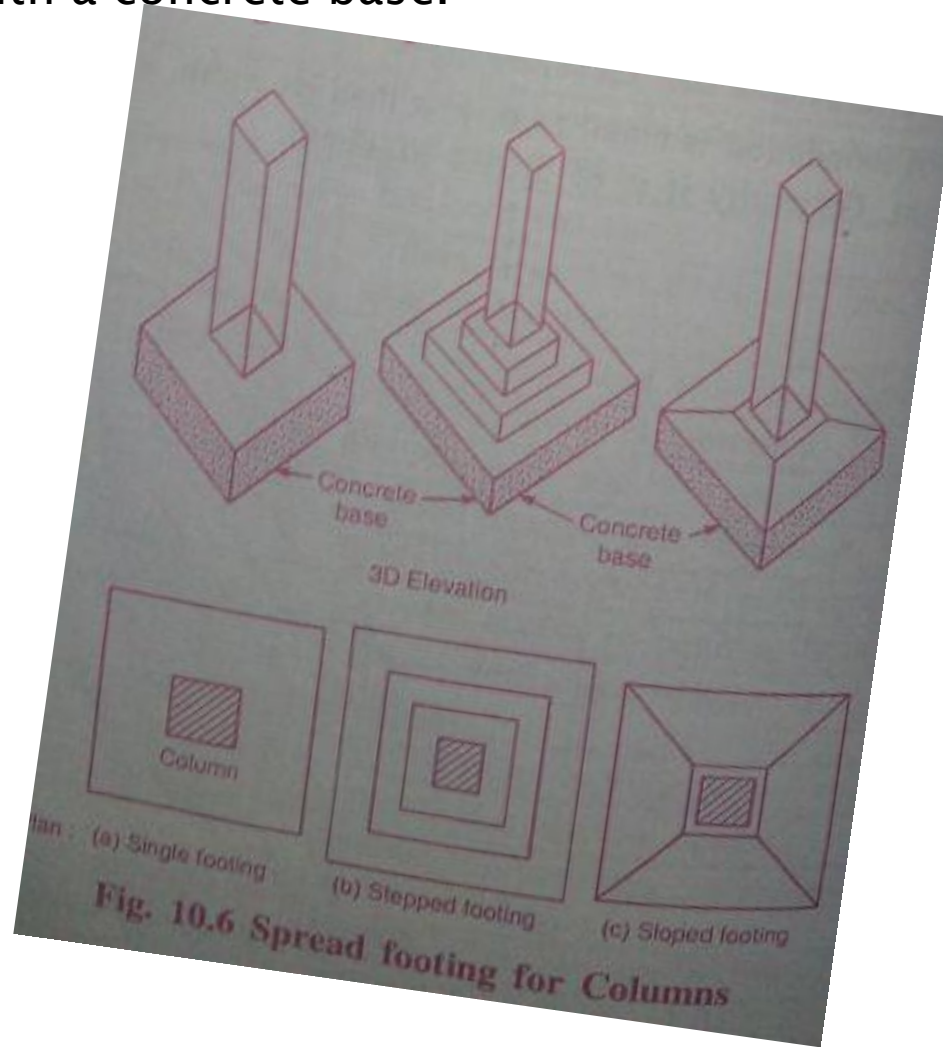


Fig. 10.6 Spread footing for Columns



**STRAP FOOTING** -- If the independent footing of two columns are connected by a beam

it is called a strap footing

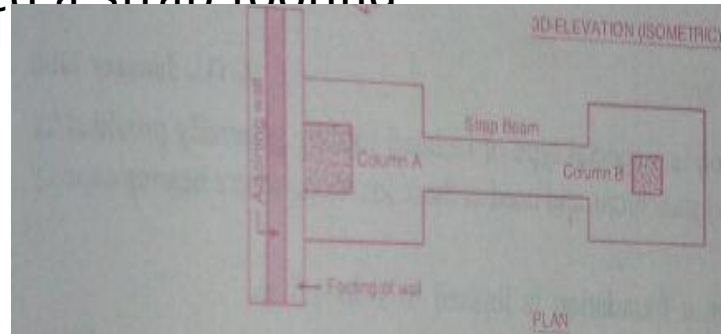
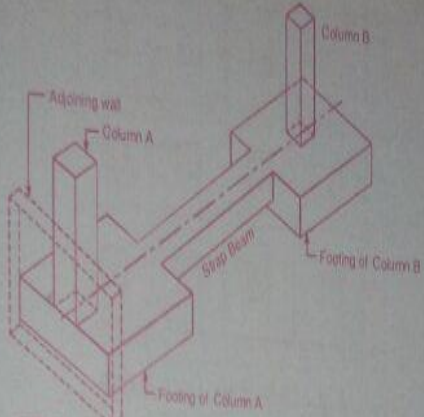


Fig. 10.7 Strap footing

**COMBINED FOOTING** -- A spread footing which support two or more colomuns is turend as..

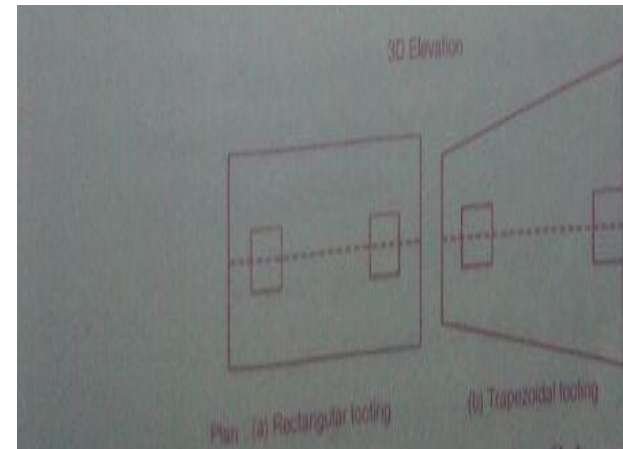
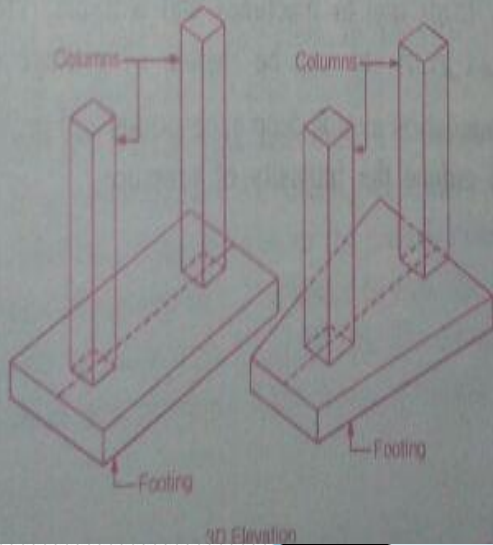


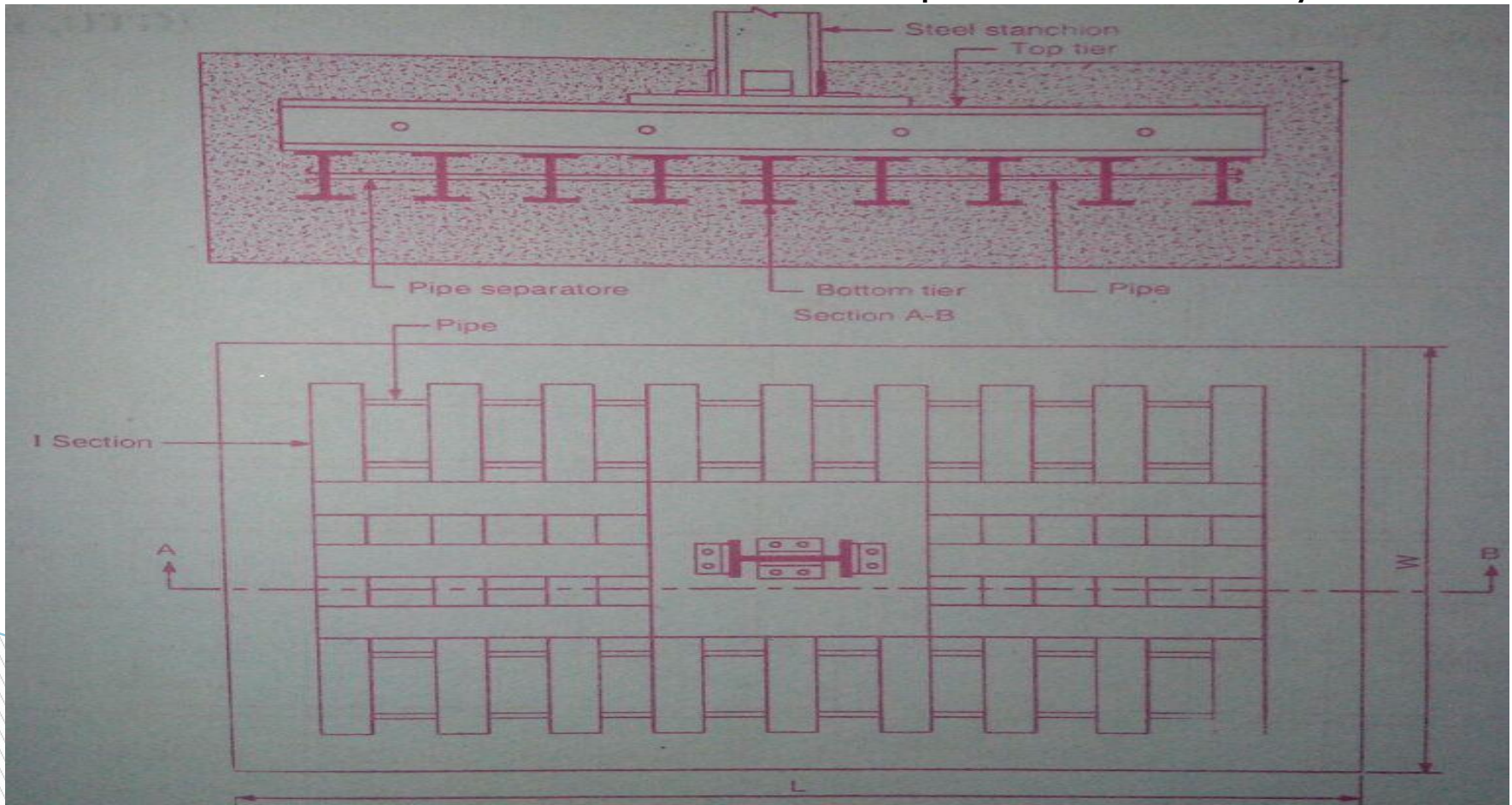
Fig. 10.8 Combined footing for Columns

**RAFT or MAT foundation** – It is a combined footing that covers the entire area

beneath a structure and supports all walls and columns.

**GRILLAGE Foundation** – Grillage foundation is a special type of isolated footing

and it is provided for heavily loaded



# SUPER STRUCTURE

**(1) Plinth**

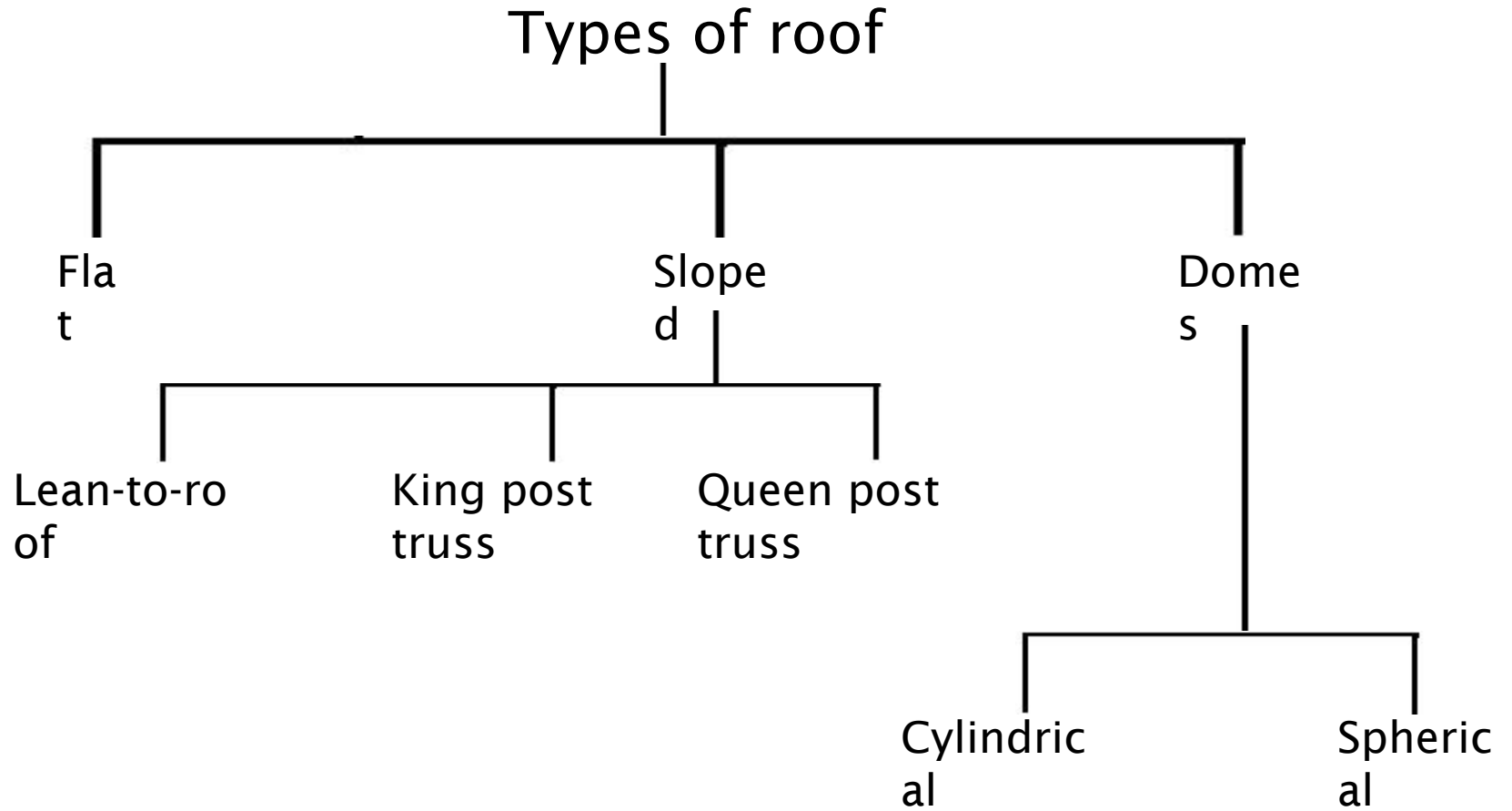
**(2) Wall**

(i) Load bearing ( 20,30,40 cm)

(ii) Non-load bearing (Partition wall – 10 )

- Brick Masonry Wall

# (3) Roof --



# (i) RCC SLAB WITH BEAM

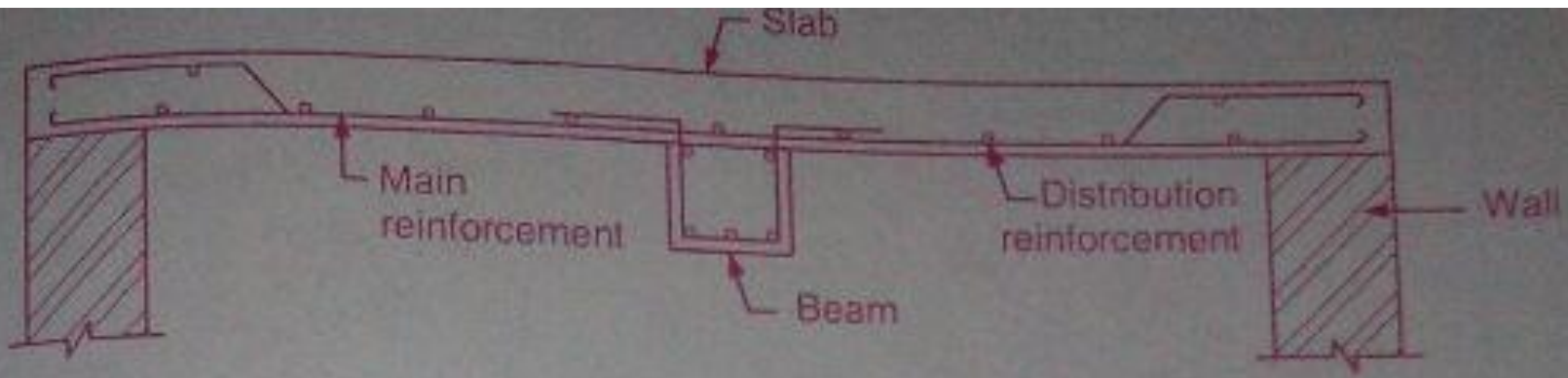


Fig. 10.13 RCC slab with beam

(GTU, June 2011)

# (ii) LEAN TO ROOF

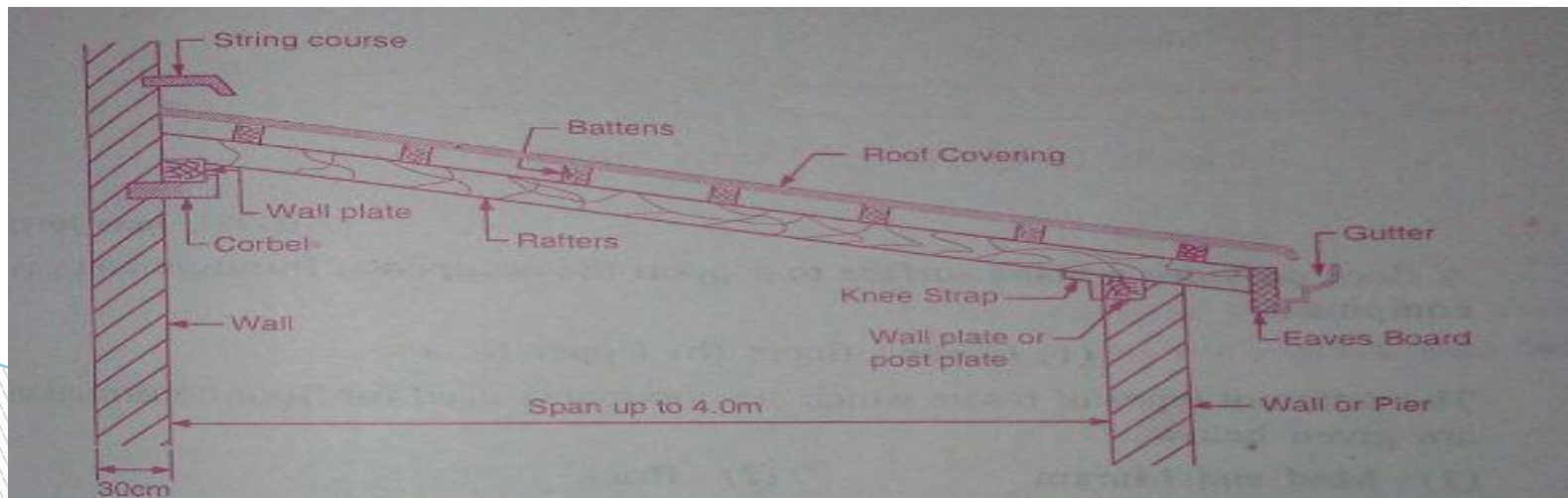


Fig. 10.14 Lean-to-roof

(4) FLOOR -- A floor provides a plane surface to support the occupants, furniture and any equipment.

•TYPES OF FLOOR

(1) Ground floors

(2) Upper floors  
The different types of floor which are commonly used for floor floors constuction is

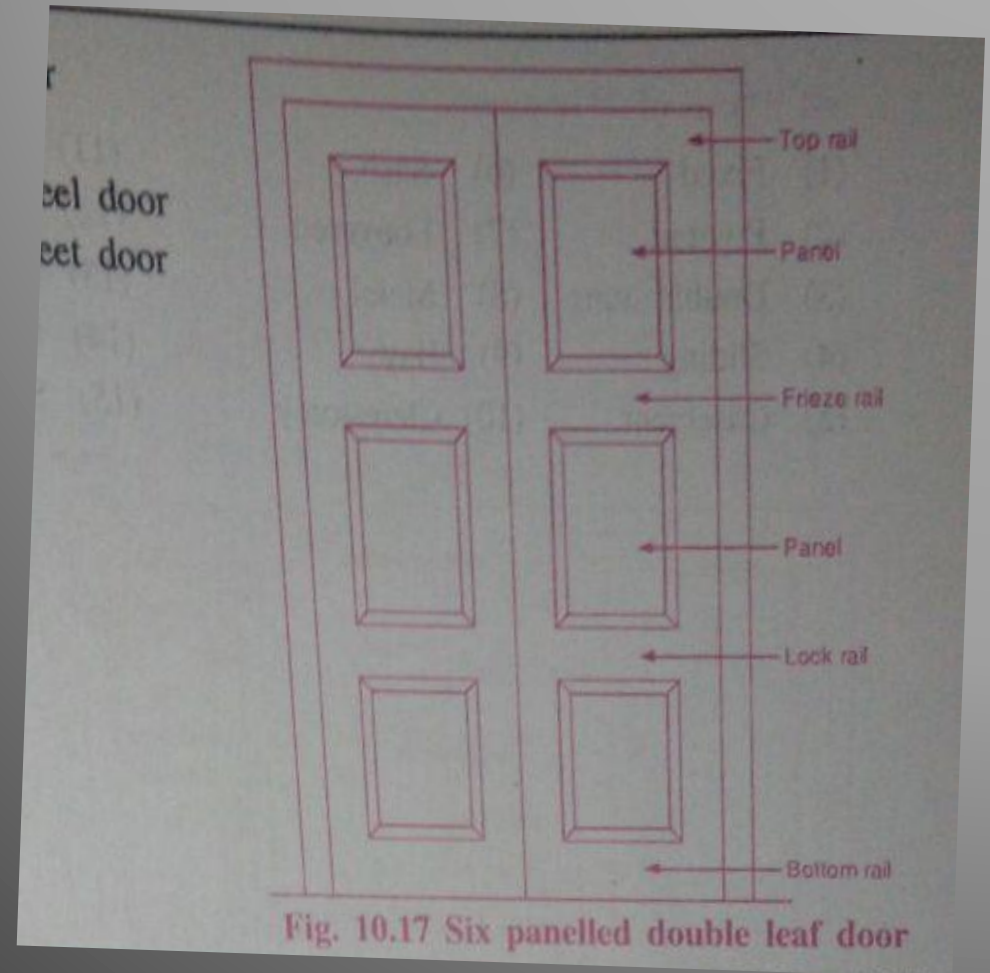
- (1) Mud and Muram
- (2) Flag stone
- (3) Terrazzo
- (4) Tiles
- (5) Timber
- (6) Rubber
- (7) Cor
- (8) Plastic or PVC

- (9) Brick
- (10) C.C
- (11)Marble
- (12)Asphalt
- (13)Glass
- (14)Granite
- (15)Mosaic tiles

# Doors & Window

## (A) Types of Door

- (1) Battened and ledged door
- (2) Framed and panelled door
- (3) Flush door
- (4) Revolving door
- (5) Swing door
- (6) Collapsible steel door
- (7) Mild steel sheet door
- (8) Glazed door



Thank you ...

