

# DOORS

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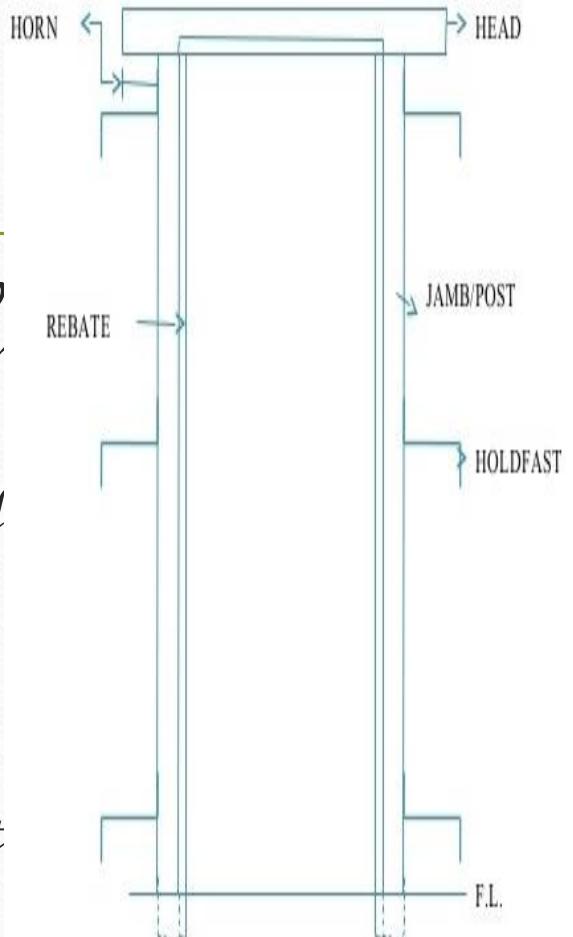
# DOORS

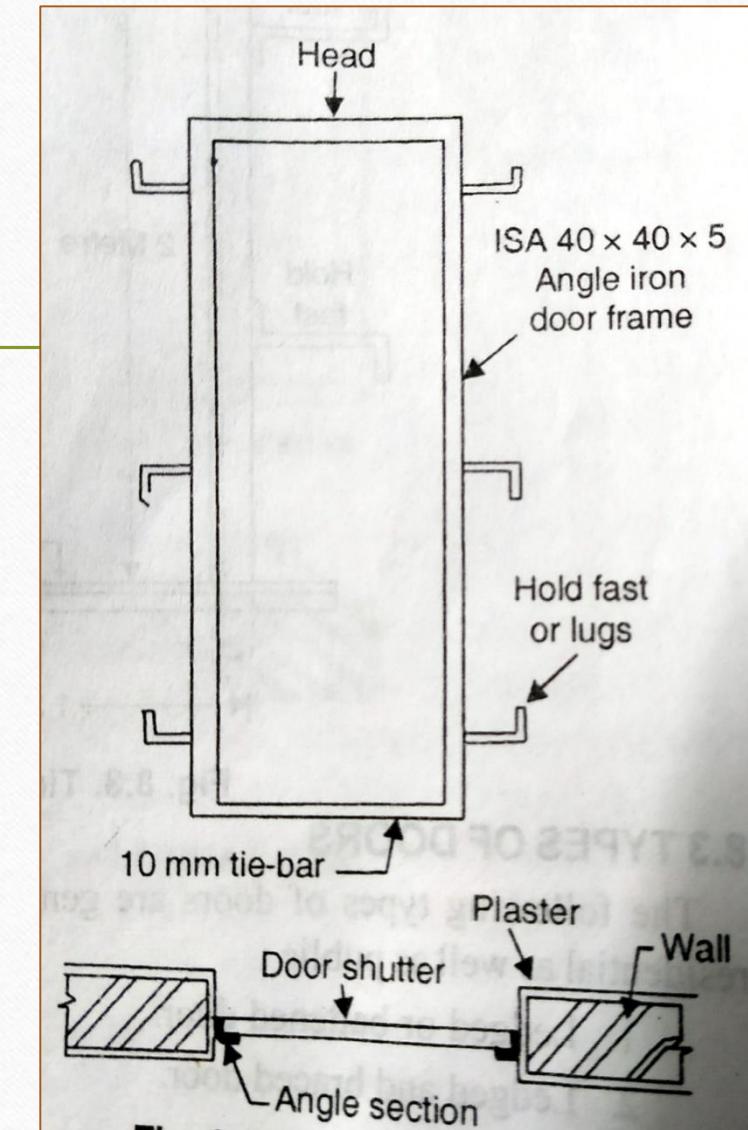
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- *Doors are opening in walls on the floor level for light, air and communication.*
- *Provide safety, security, privacy.*
- *It has two parts usually:*
  - *Door Frame*
  - *Door Shutter*

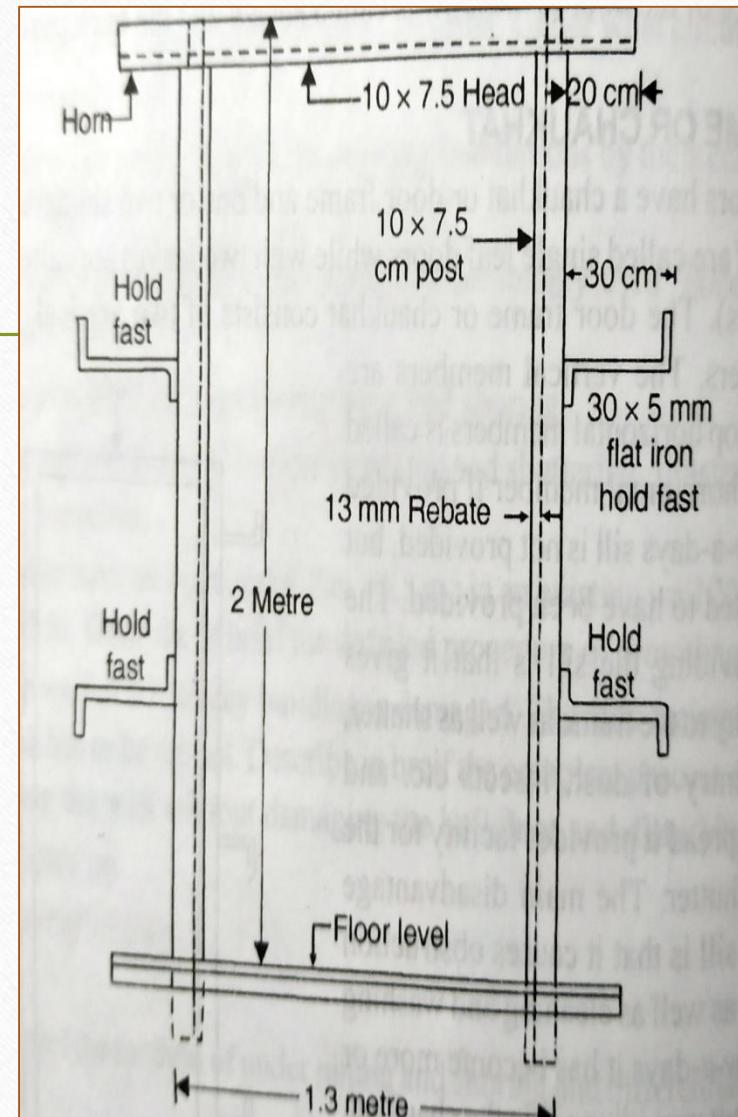
# DOOR FRAME/ CHAUKHAT

- Door Frame consists of two vertical members called *posts*, top horizontal members called *head* and bottom horizontal member called *sill*.
- To fix the frame with wall, angle irons or flats are provided called *holdfasts* (length varies from 20-22 cm).
- Door frames can be made of
  - *RCC*: not used usually
  - *STEEL*: Angle irons welded together. Strong, durable and most commonly used. Occupies less space.
  - *WOOD*: elegant





STEEL DOOR FRAME



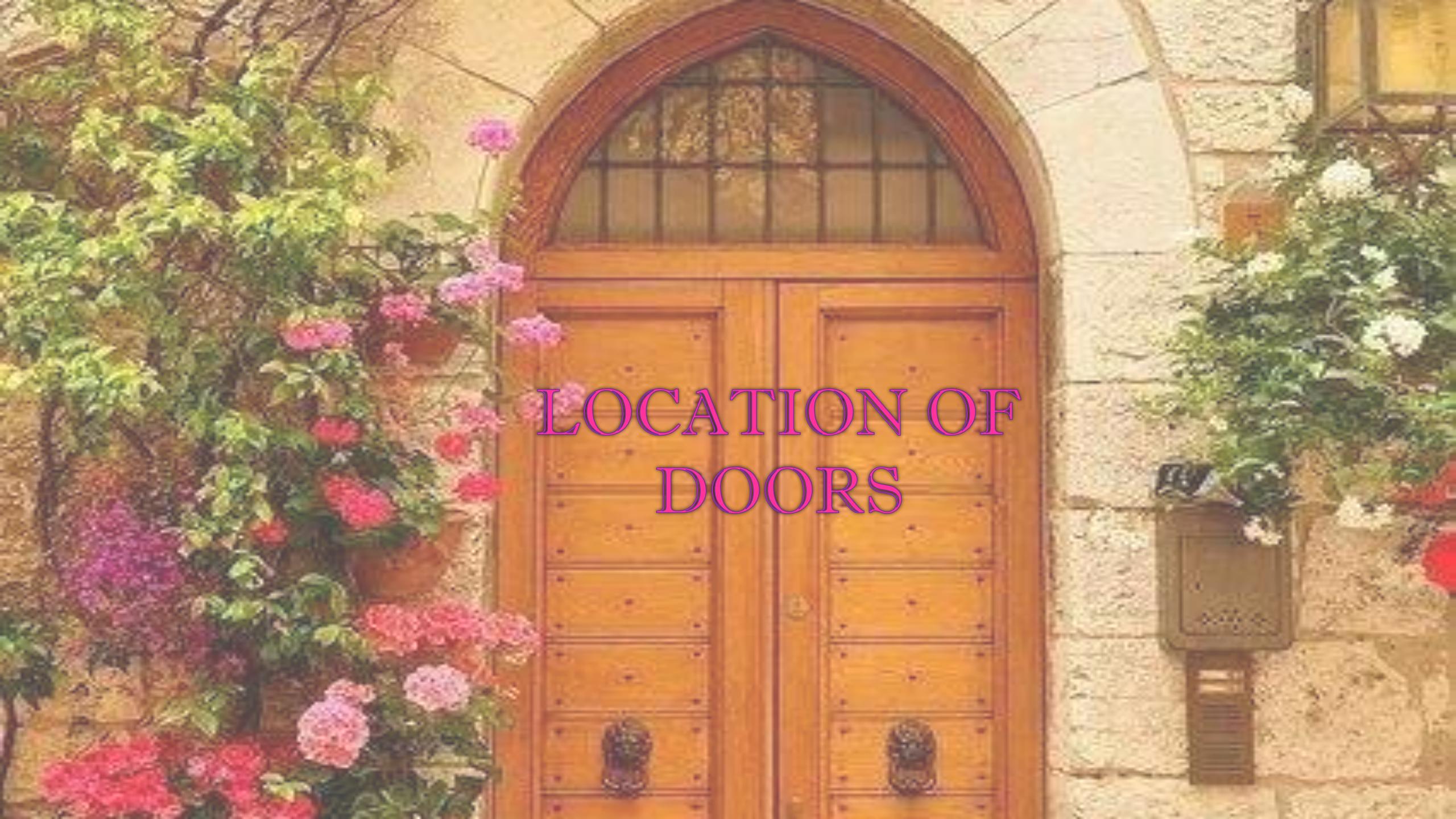
TIMBER DOOR FRAME

# DOOR SHUTTER

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- *Door shutters are the panels provided inside the door frame which can swing, roll or slide.*
- *Can be opened or closed.*
- *Movement can be restricted according to use*



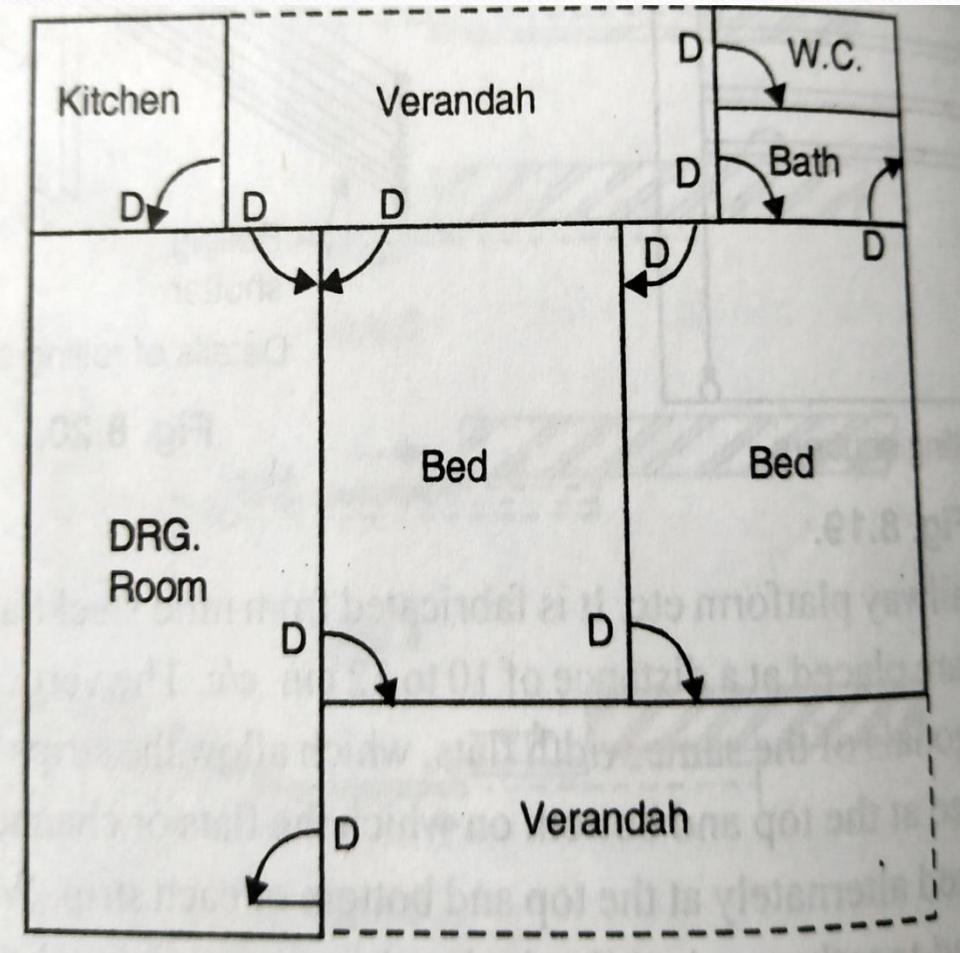
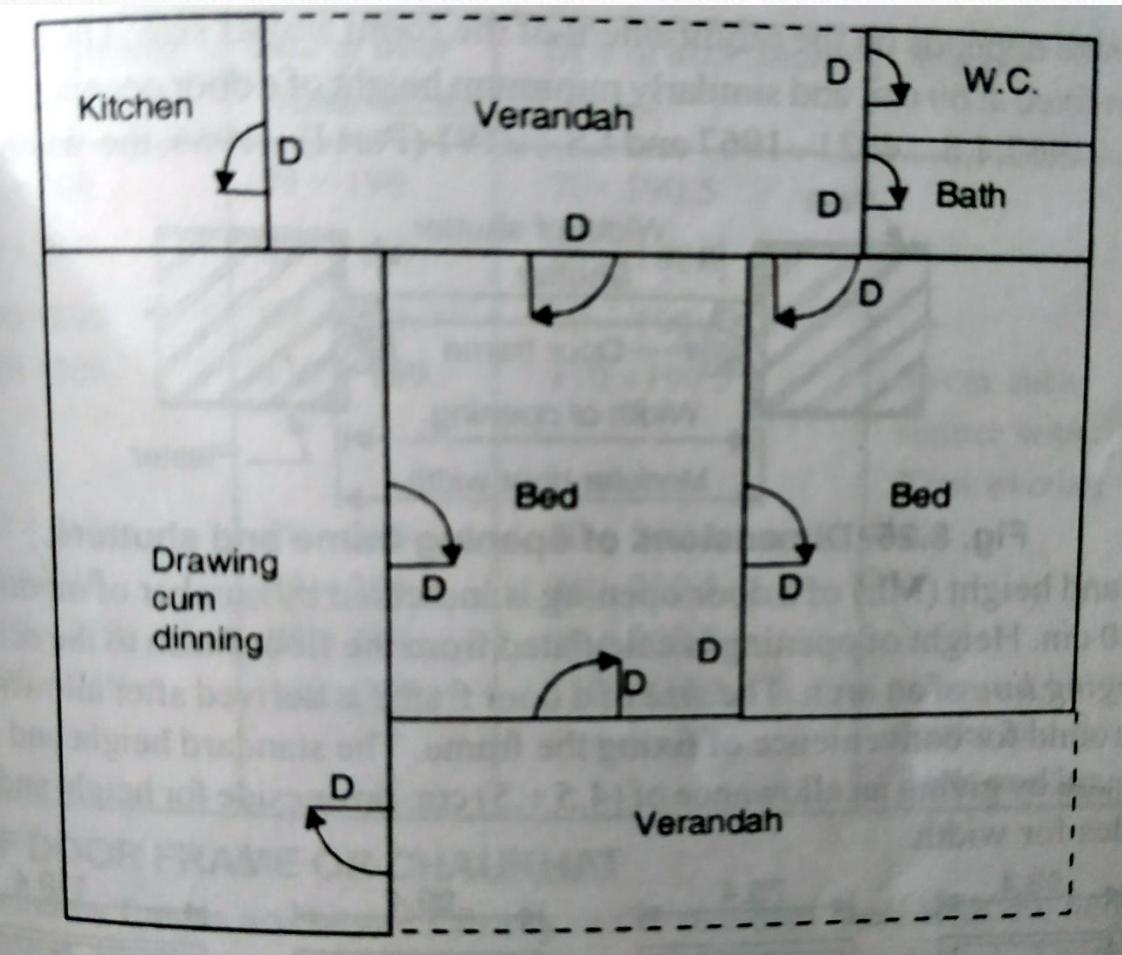


# LOCATION OF DOORS

# LOCATION OF DOORS

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- *A building must not have large number of external doors.*
- *Number of indoor doors should be minimum.*
- *Door must be located at the corner of rooms. Unless otherwise essential, door should not be placed at centre of wall of a room.*
- *Single leaf doors at one corner are best suited for internal rooms like bedroom, toilet, kitchen etc. so that it causes least obstruction .*



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- *Location of door should be such that it does not effect privacy of the inhabitants. E.g. Not much of the interior should be visible from dining or drawing rooms when door of interior room is open.*
  - *Provision of unnecessary doors must be avoided. E.g. a doorway without door is enough between a drawing and dining room or dining room and kitchen as opening and closing of doors not usually required.*



- *All external doors must be safe and strong against burglary. They should have proper locking arrangements and safety devices. They should open towards inside.*
- *If doors require ventilation along with safety like external door of kitchen, combination of doors like strong paneled door on inside of door frame and wire meshed or grilled door on the outside may be adopted. Inside paneled door can be opened and meshed door closed for provision of air and light. Strong glazed doors can also be provided.*

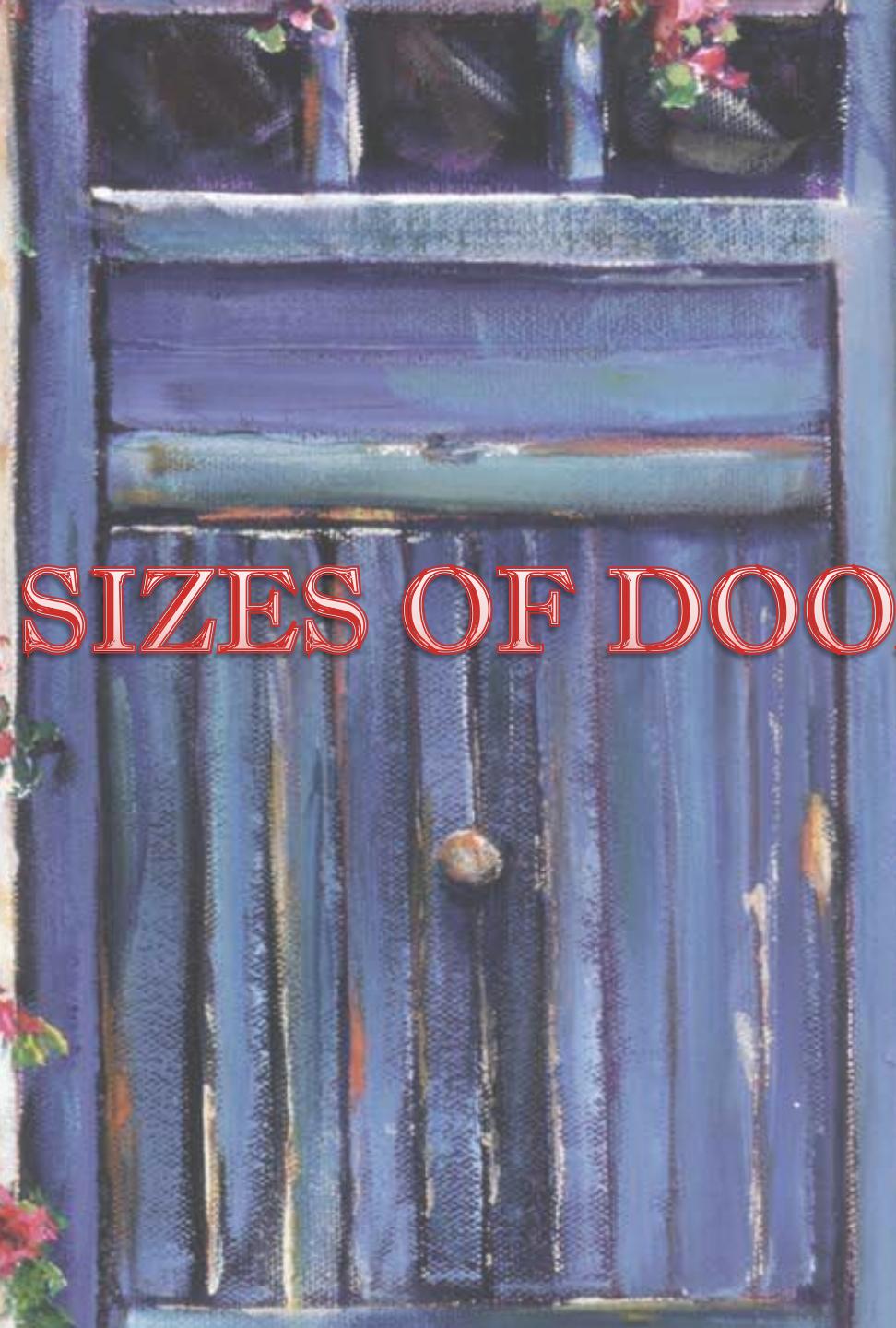


- *Axis of the doors should be on straight line.*
- *Location of door should match with the interior decoration of room*





# SIZES OF DOORS



# SIZES OF DOORS

- *Size of a door depends on size of rooms and its requirement.*
- *For residential buildings: lesser size doors, for public buildings: larger sized doors*
- *Min. width of door = 0.6 m and min. height = 2 m*

*Common sizes of doors used in residential buildings are:*

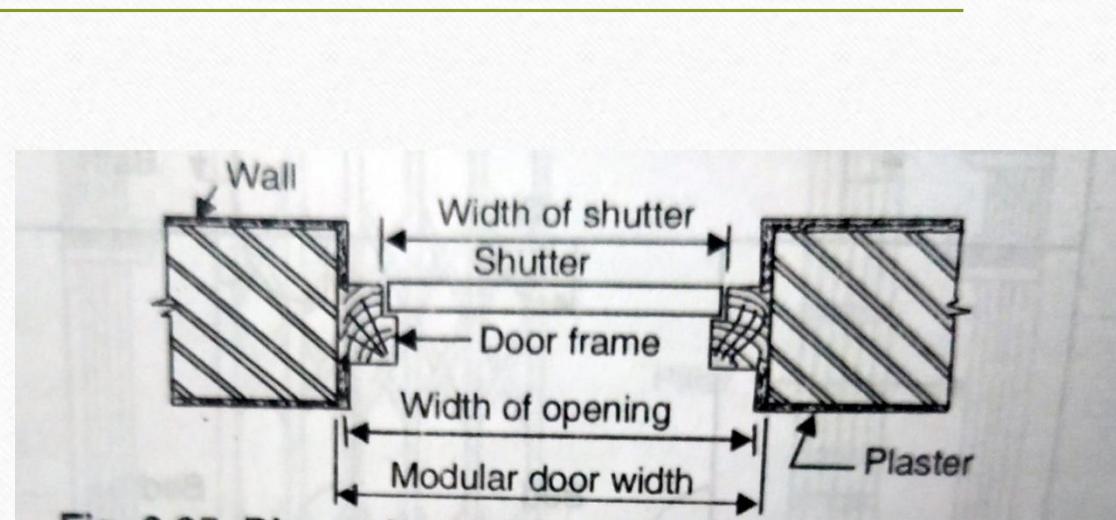
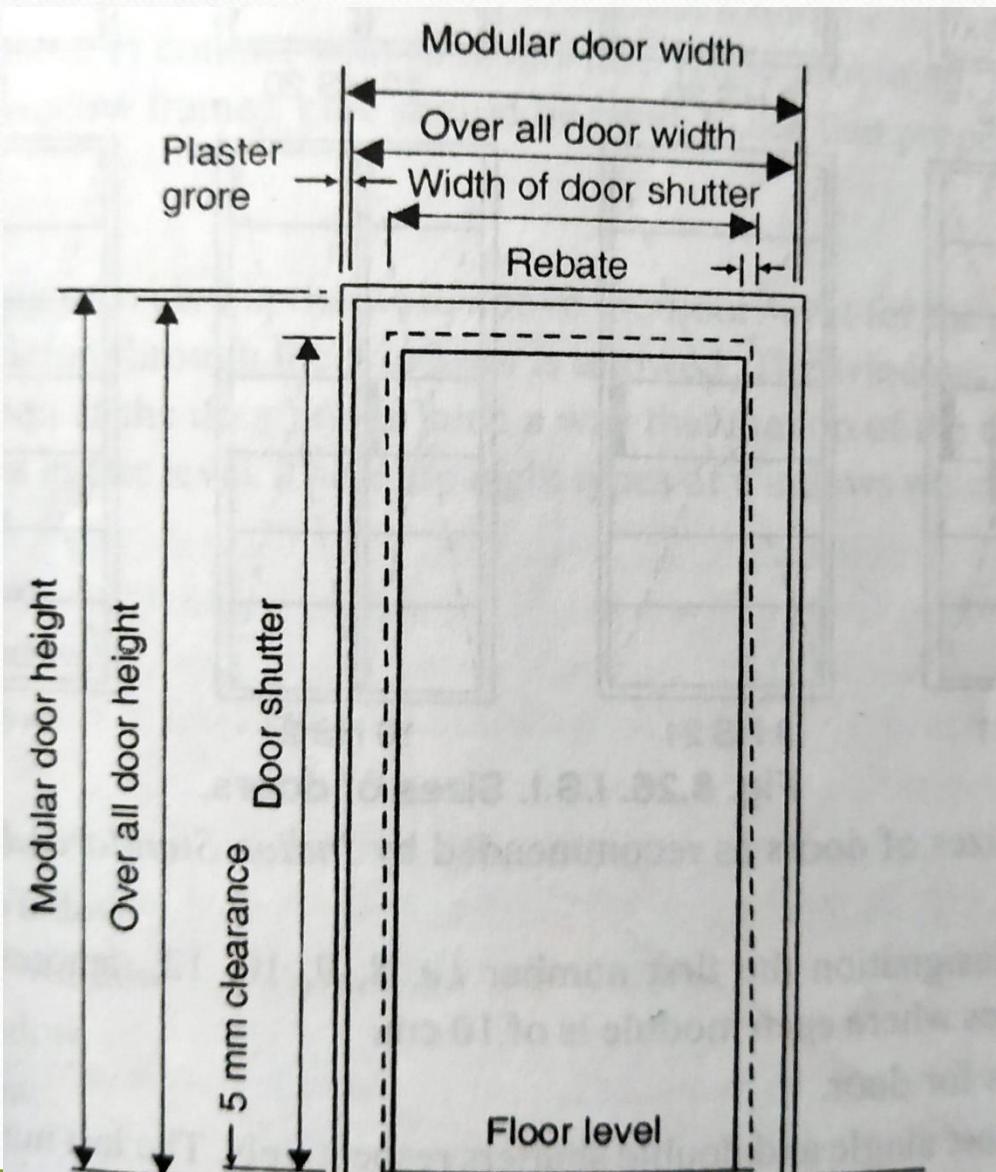
External Doors	1.00 m x 2.00 m
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Internal Doors	0.90 m x 2.00 m
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Toilet Doors	0.70 m x 2.00 m
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# DIMENSIONS OF DOORS

- Height of door calculated from floor finish to ceiling
- Size of door frame is derived after allowing margins of 5 mm all around for fixing.
- Standard height and width of shutter is derived by giving an allowance of  $5.5 + 0.5$  cm on one side for height and  $4.5 + 0.5$  cm both sides for width
- IS: 4351-1967, IS: 4021-1967, IS: 2191-1966



# INDIAN STANDARD SIZES OF DOORS

Designation	Size of opening in cm.	Size of door frame in cm.	Size of door shutter in cm.	Remark
8 DS 20	80 × 200	79 × 199	70 × 190.5	
9 DS 20	90 × 200	89 × 199	80 × 190.5	
10 DS 20	100 × 200	99 × 199	90 × 190.5	
12 DS 20	120 × 200	119 × 199	110 × 190.5	56 cm. each shutter with 2 cm. overlap
8 DS 21	80 × 210	79 × 209	70 × 200.5	
9 DS 21	90 × 210	89 × 209	80 × 200.5	
10 DS 21	100 × 210	99 × 209	90 × 200.5	
12 DS 21	210 × 210	119 × 209	110 × 230.5	56 cm. each shutter and 2 cm. overlap

8 DS 20

Width of opening in modules, each module = 10 cm

Door

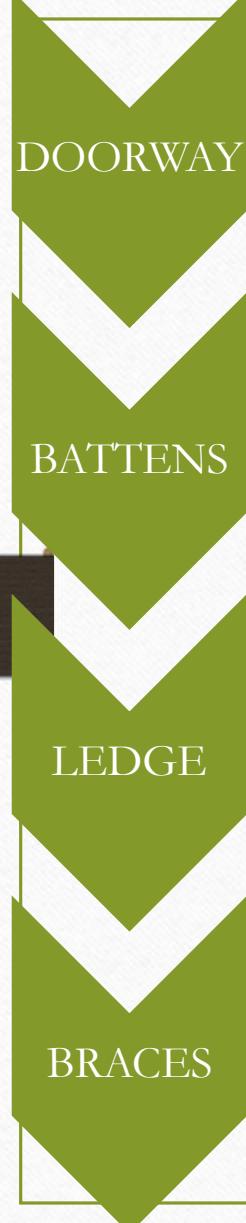
Height of opening in modules, each module = 10 cm

Single Shutter (T stands for double shutter)



# TECHNICAL TERMS OF DOORS





- Opening left in the wall to receive the door

- Thin wide planks of wood with thickness 20-25 mm and width 100-150 mm

- Horizontal members of wood which keep battens in position

- Inclined wooden members of door shutter used to provide stiffness





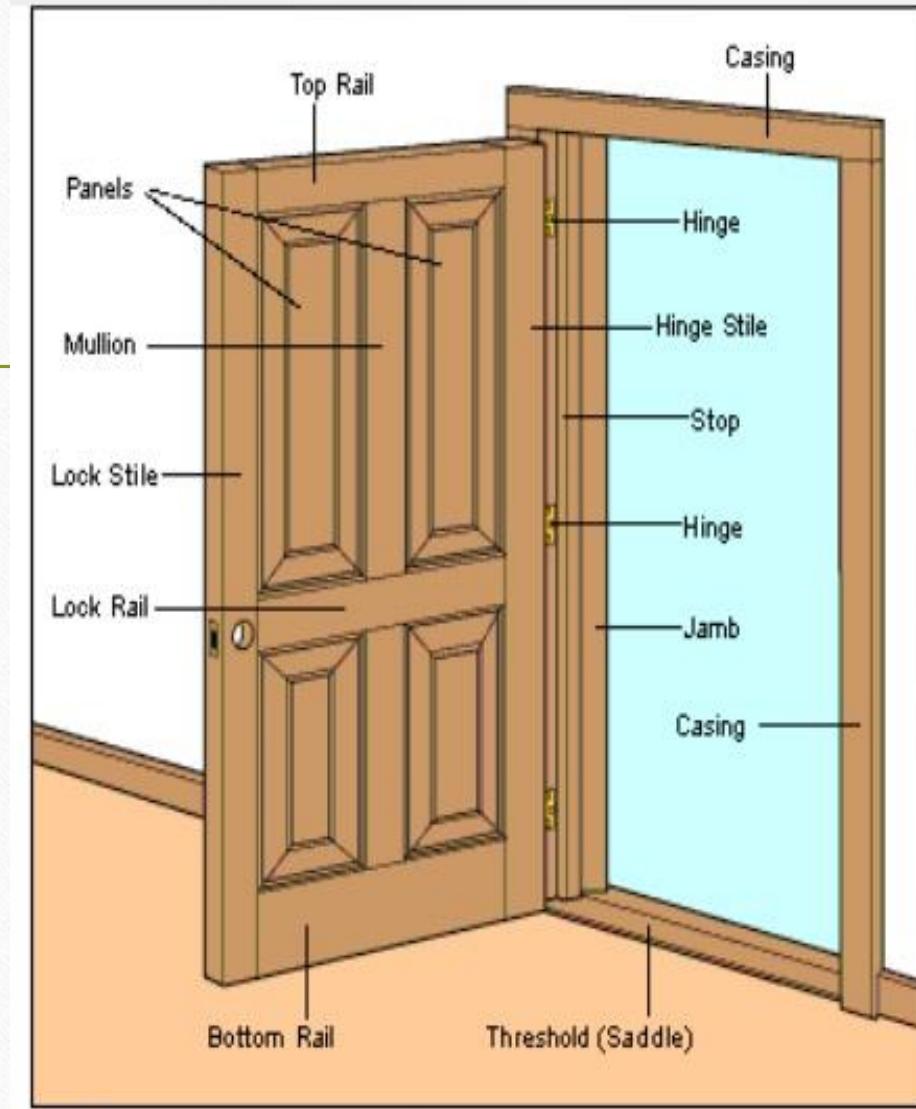
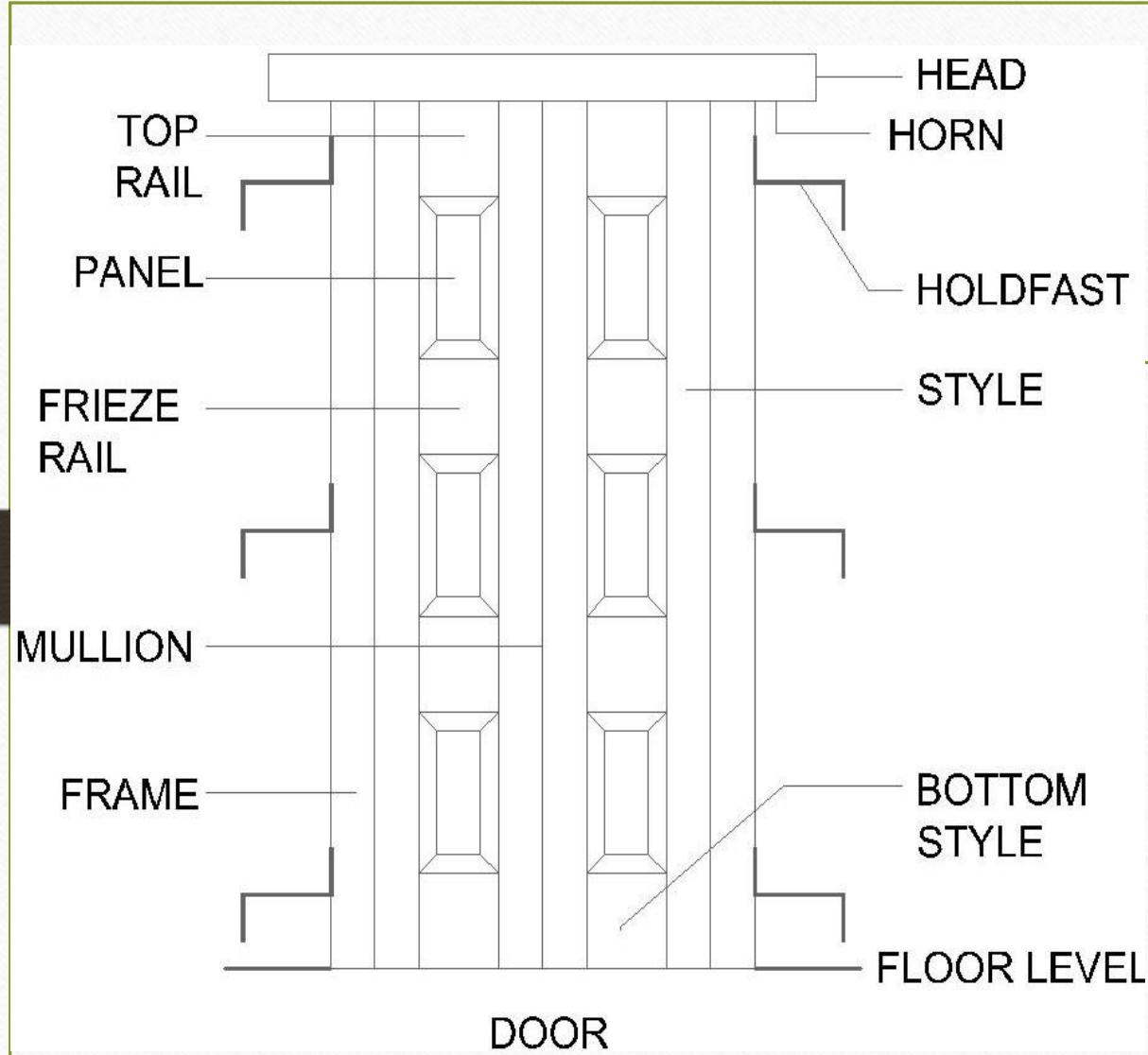
- Vertical members of a door shutter

- Bottom most horizontal member of shutter which connects two styles at bottom

- Top most horizontal member of shutter which connects two styles at bottom

- Horizontal member connecting two styles and provided at a height 70 cm above floor for fixing locking devices

- Intermediate rail provided between lock rail and top rail



PANEL

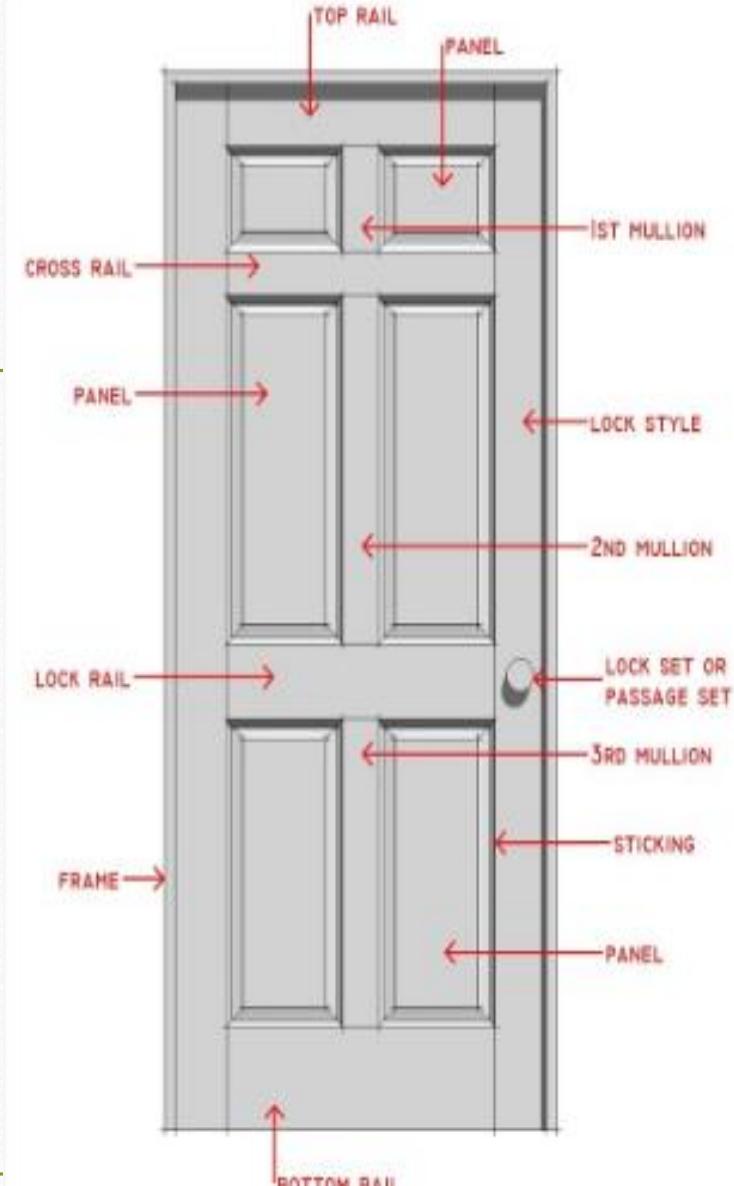
MUNTIN

MULLION

- Recess formed between framework of styles and rails/ can be filled with wooden plank, glass, louvers or plywood

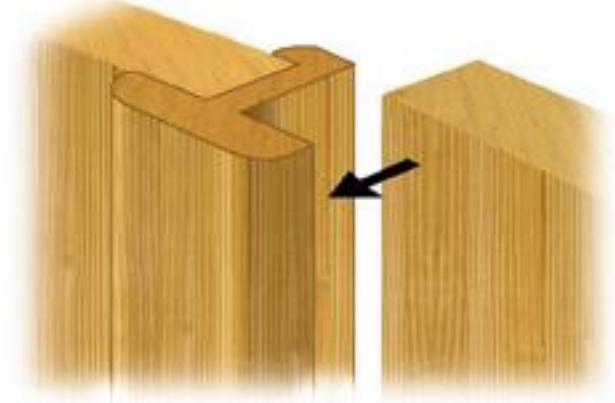
- Vertical member provided between bottom rail and lock rail to subdivide the panel

- Vertical member provided between top rail and lock rail to subdivide the panel



# REBATE

- A recess made in door frame to receive the shutter. Depth of rebate is equal to thickness of shutter



FAN  
LIGHT

- Glazed panel provided above door or window to receive adequate lighting inside the room

TRANSOM

- Horizontal member fixed between fan light and door or widow shutters



# SASH BAR

- Light wooden sections fixed horizontally and vertically to form panels in which glass panels are fixed.



## LOUVERS

- Inclined pieces of wood fixed in a panel of a door/ a tie member is provided at the rear connecting all louvers,



## ARCHITRAVE

- Ornamental wooden plank fixed around the door frame to improve appearance





a alamy stock photo



A collage of various doors and doorways decorated with flowers. On the left, a white arched doorway leads to a room filled with pink and purple flowers. In the center, a white wall features a large, vibrant floral arrangement of pink roses and purple hydrangeas. On the right, a dark blue door is framed by a massive, dense wall of pink and purple flowers. A small basket of flowers sits on a bicycle in the foreground.

# TYPES OF DOORS



Ledged and  
Battened Door



Ledged and  
Braced Door



Framed and  
Braced Door



Paneled Door



Glazed Door



Paneled and  
Glazed Door



Flush Door



Louvered  
Door



Revolving  
Door



Sliding Door



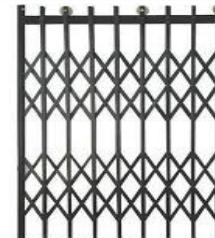
Folding Door



Sliding and  
Folding Door



Rolling  
Shutters



Collapsible  
Door

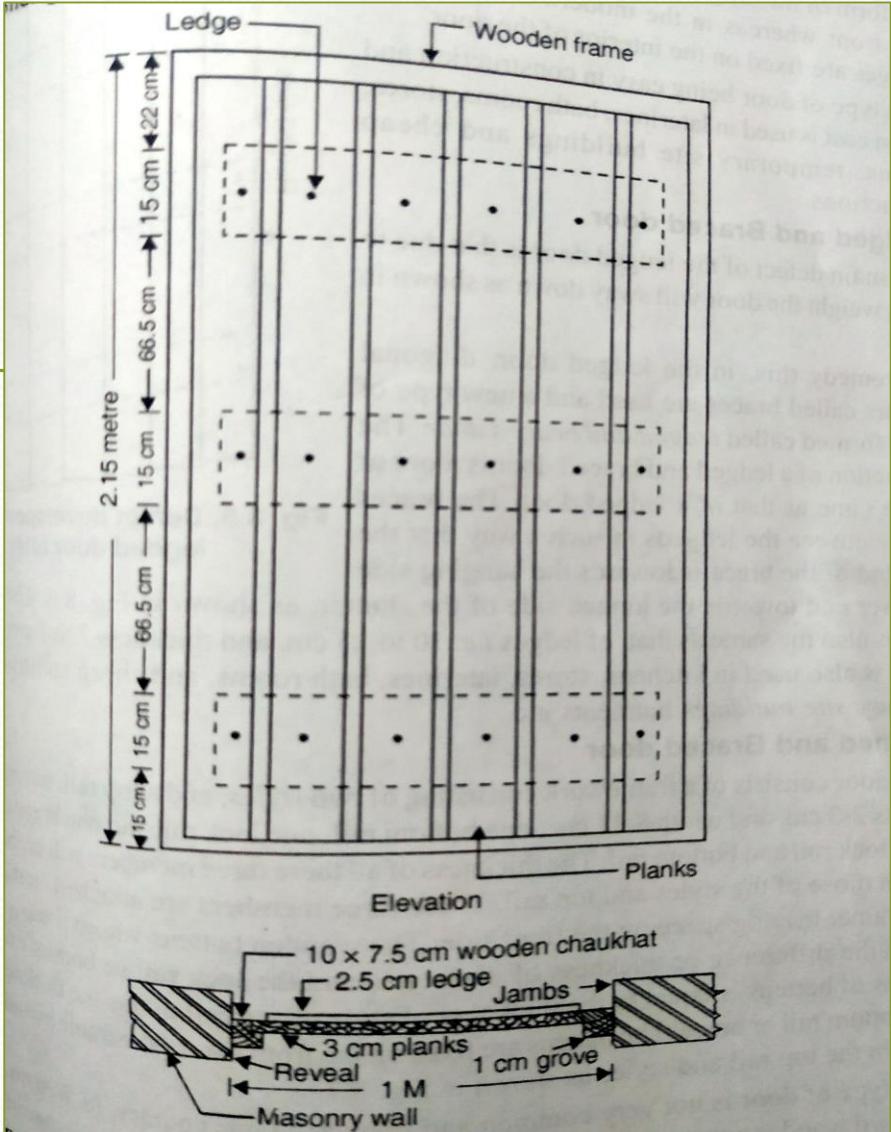
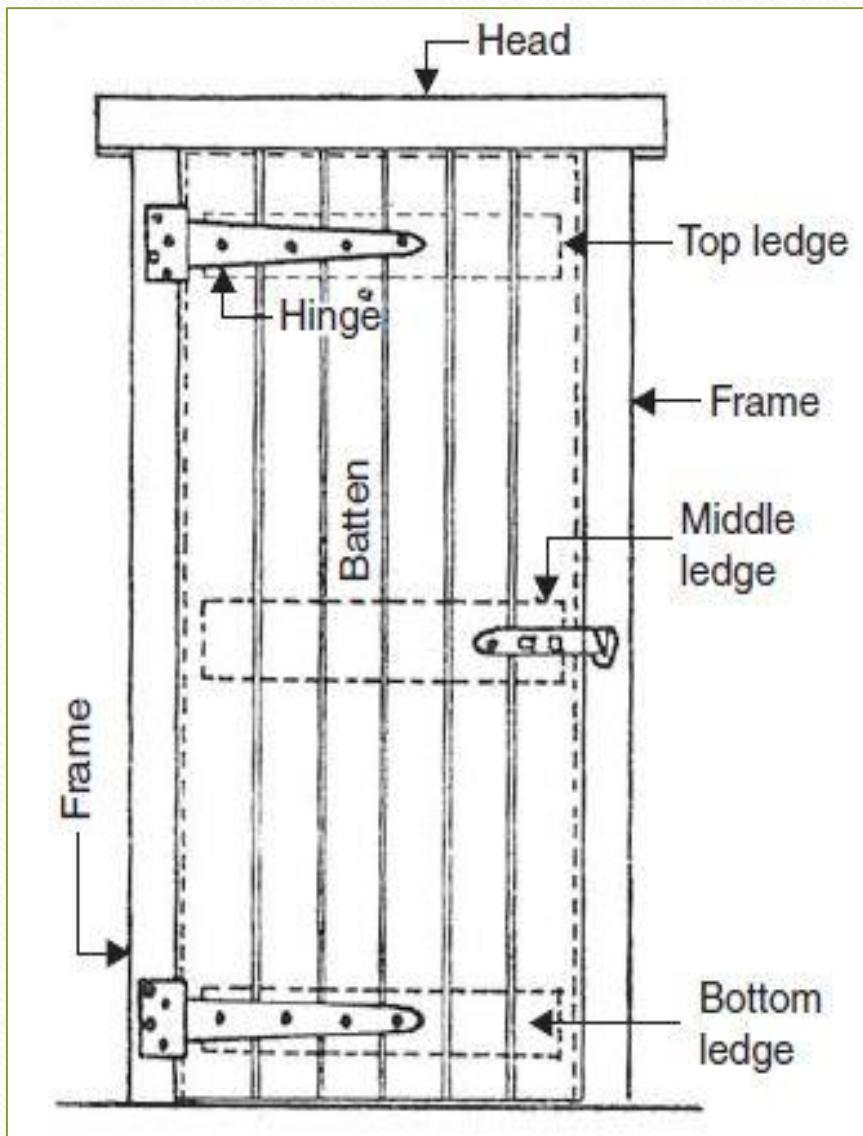
# LEDGED AND BATTENED DOOR

- Consists of wooden **battens** 15-22 cm, 2-3 cm thick joined together by three wooden members called **ledges**.
- Ledges are fixed at top, middle and bottom with the help of wood screw or nails.
- Ledges are fixed on the interior of the door nowadays.
- Easy in construction, cheap
- Can sway down due to its own weight.
- Used in bathrooms, stores, temporary buildings etc.



## Standard Sizes :

Battens:	100x20mm to 150x20 mm
Top Ledge:	100 x 30 mm
Middle and Bottom Ledge:	150 x 30 to 200 x 40 mm



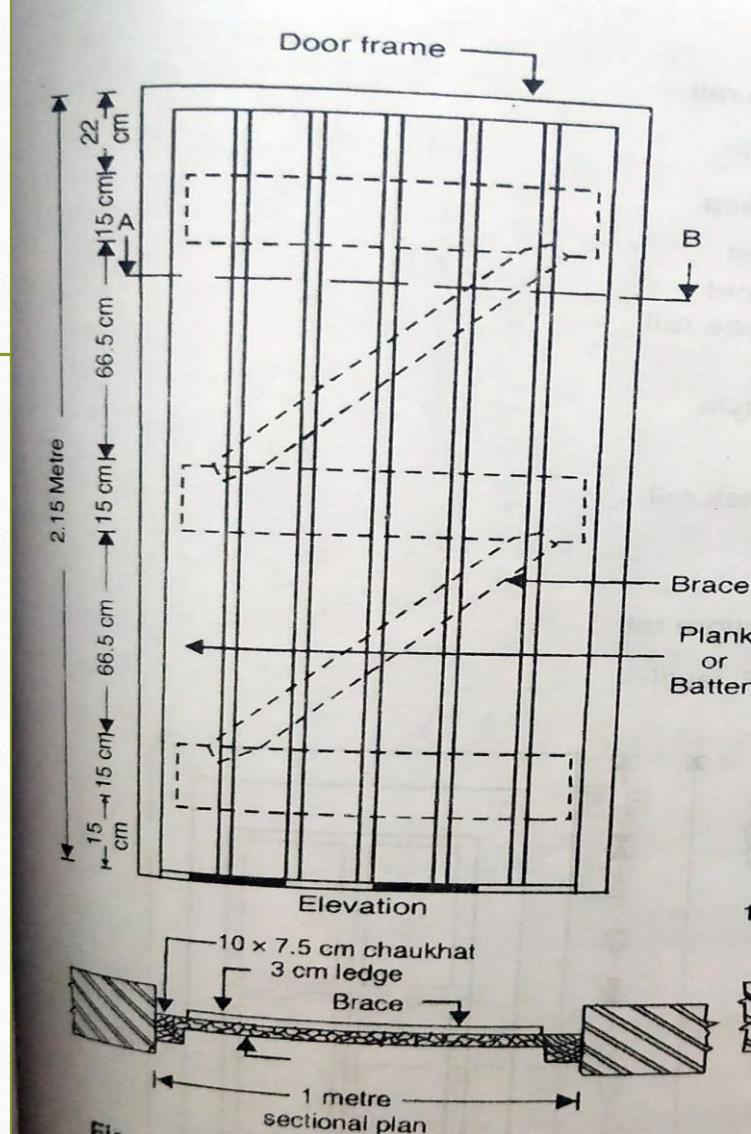
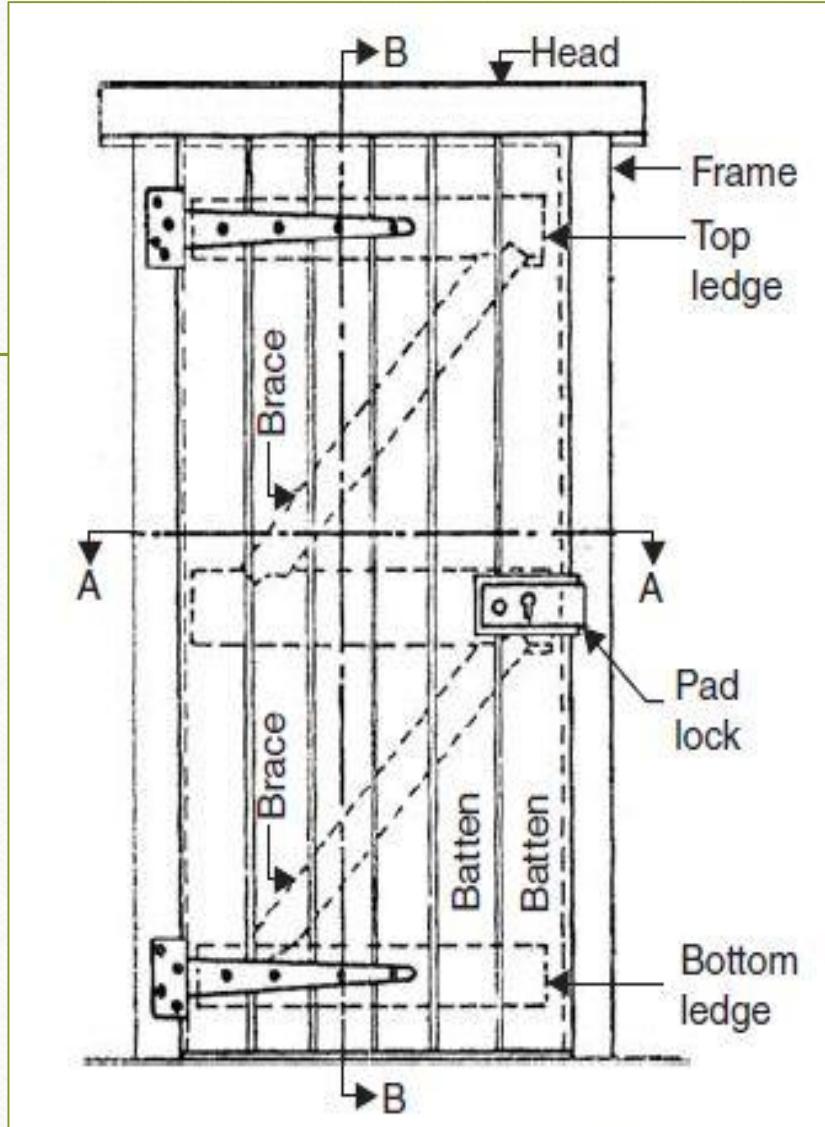
# LEDGED AND BRACED DOOR

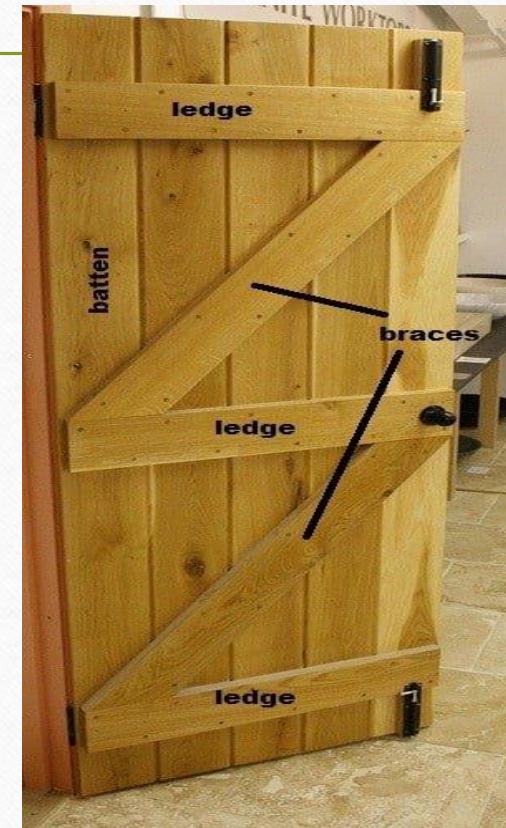
- Modification of ledged door
- Diagonal members called *braces* are used
- Upper end of brace is towards the hanging side and lower end is towards the hinged side of the shutter.
- Width of braces = 10-15 cm and 2-3 cm thick
- Used in kitchens, stores, bathrooms, temporary buildings



## Standard Sizes :

Battens:	100x20mm to 200x30 mm
Top Ledge:	100 x 30 mm
Middle & Bottom Ledge:	150 x 30 to 200 x 40 mm
Braces:	100x30mm to 150x40 mm





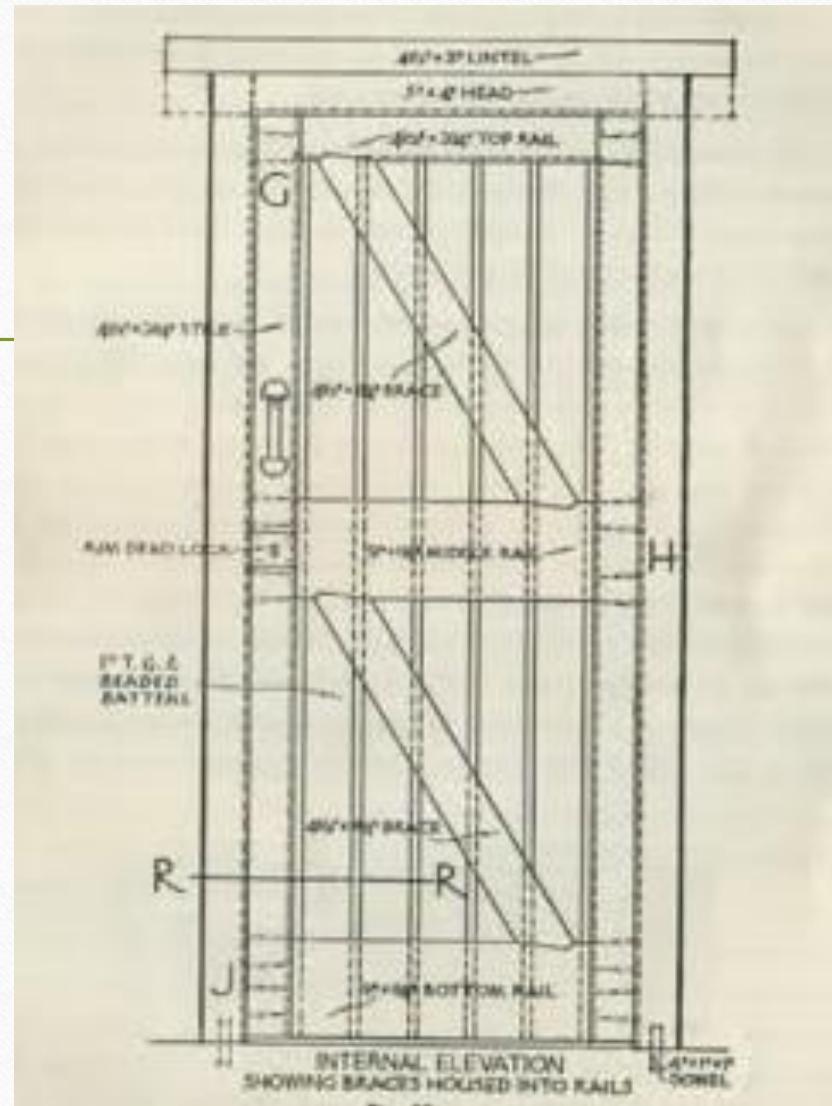
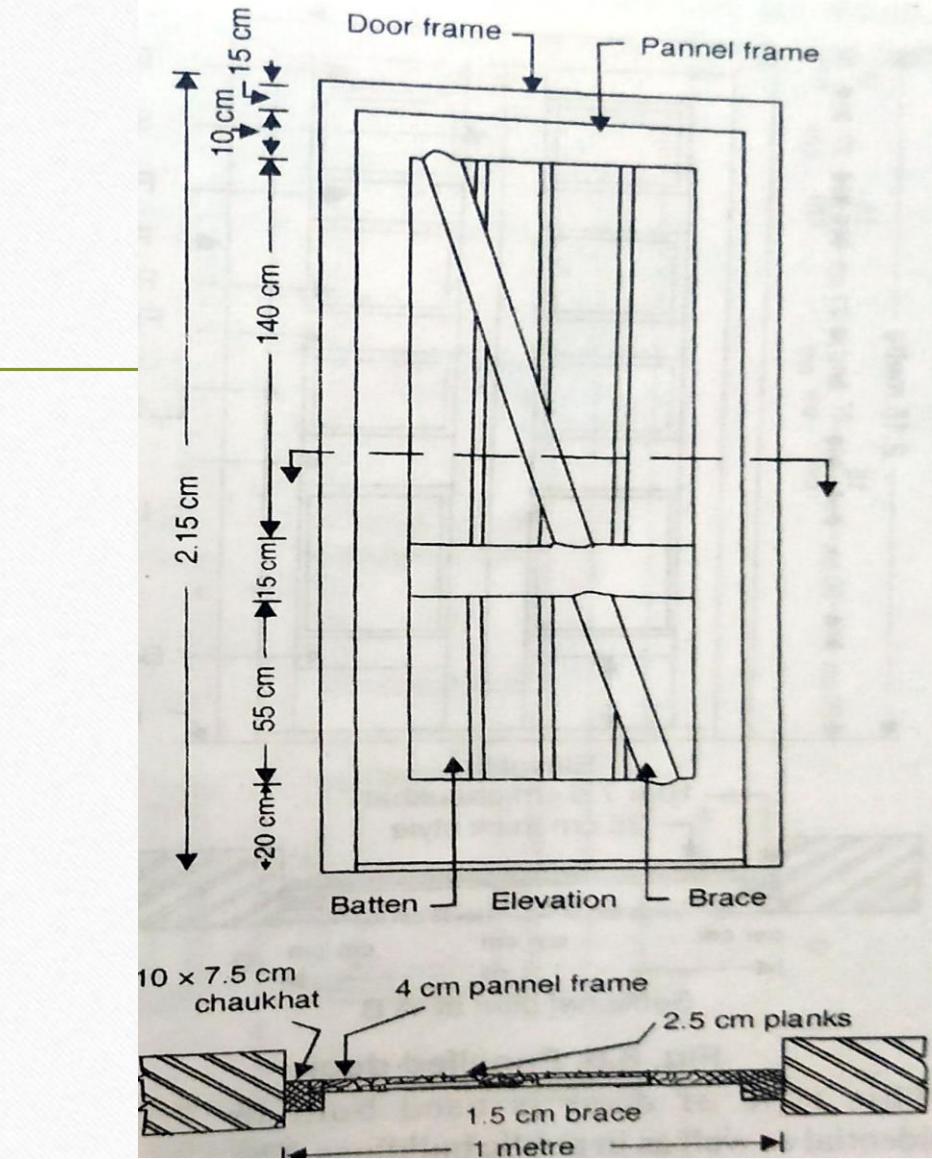
# FRAMED AND BRACED DOOR

- *Consists of frame work of two **styles** (vertical members of frame), a **top rail**, one **bottom rail**, one **lock rail**, **brace** connecting top, lock and bottom rail and vertical **battens**.*
- *Rails are attached on the rear side*
- *Thickness of battens = thickness of styles – thickness of rails*
- *Durable, strong*



## Standard Sizes :

Styles:	100x50mm to 150x50 mm
Top Rail:	80 x 50 mm
Middle & Bottom Rail:	120 x 30 mm
Braces:	80 x 30 mm
Battens:	100x20mm to 150x20 mm



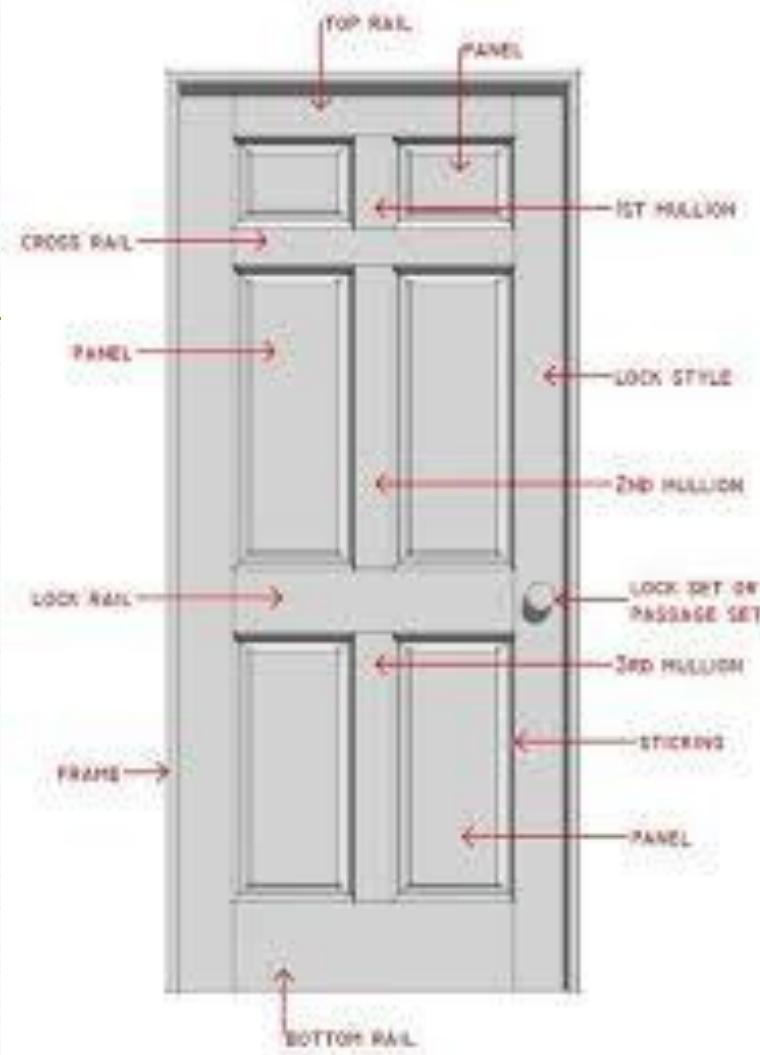
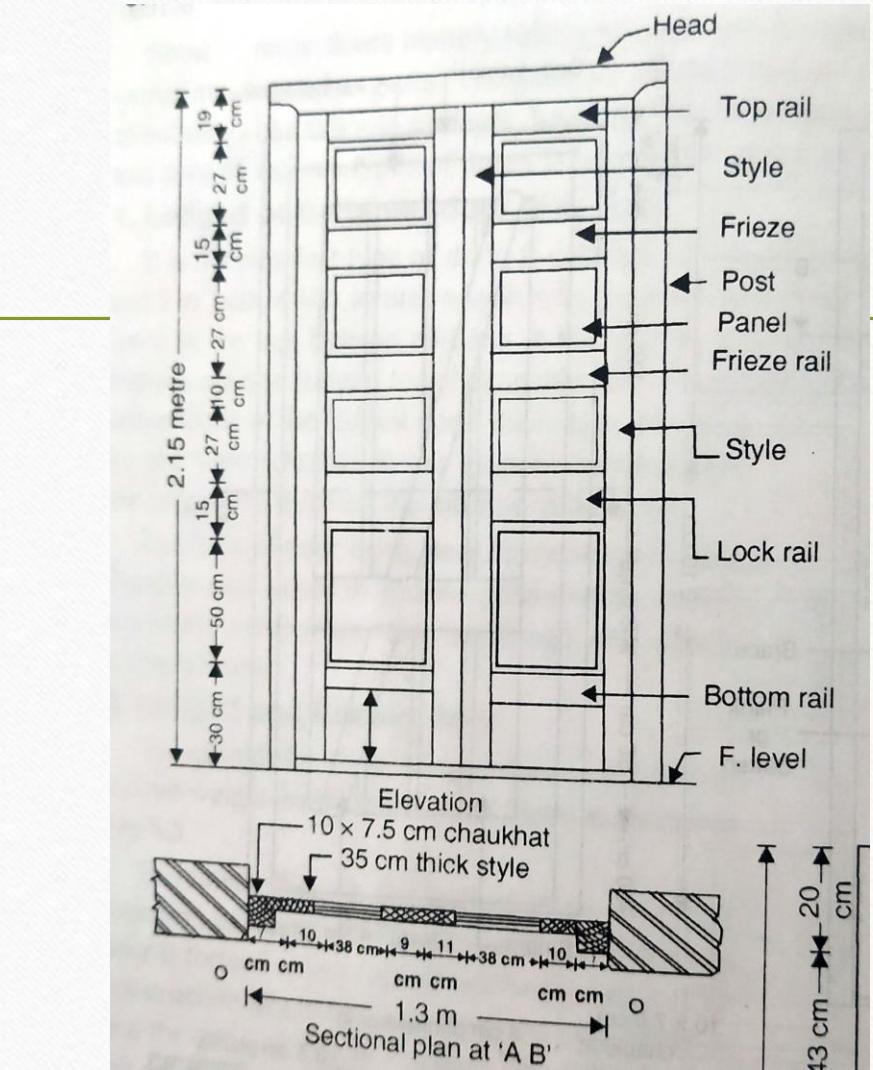
# PANELLED DOOR

- *Consists of a frame having two vertical (**styles**) and four to six horizontal members (**rails**). Sometimes middle vertical member is also provided called **mullion or muntin**.*
- *Rails fixed between lock and top rail are called **Frieze rails**.*
- *Lock rail fixed at a height  $1/3^{\text{rd}}$  from bottom rail.*
- *Width of styles, top rails frieze rail 8-11 cm, 2-3 cm thick, Width of bottom and lock rail 12-15 cm*
- *A groove is cut on the inner side of each member to fix **panels** (wooden boards, plywood boards, hardwood boards). Panels can be of different designs and types.*
- *Strong, durable, good in appearance.*
- *Used in Residential and public buildings.*



## Standard Sizes :

Thickness of shutter	30-40 mm
Styles	100x30 – 100x 40 mm
Top and Frieze rails	80x30 to 100x40 mm
Bottom and Lock rail	120x30 – 150x40 mm

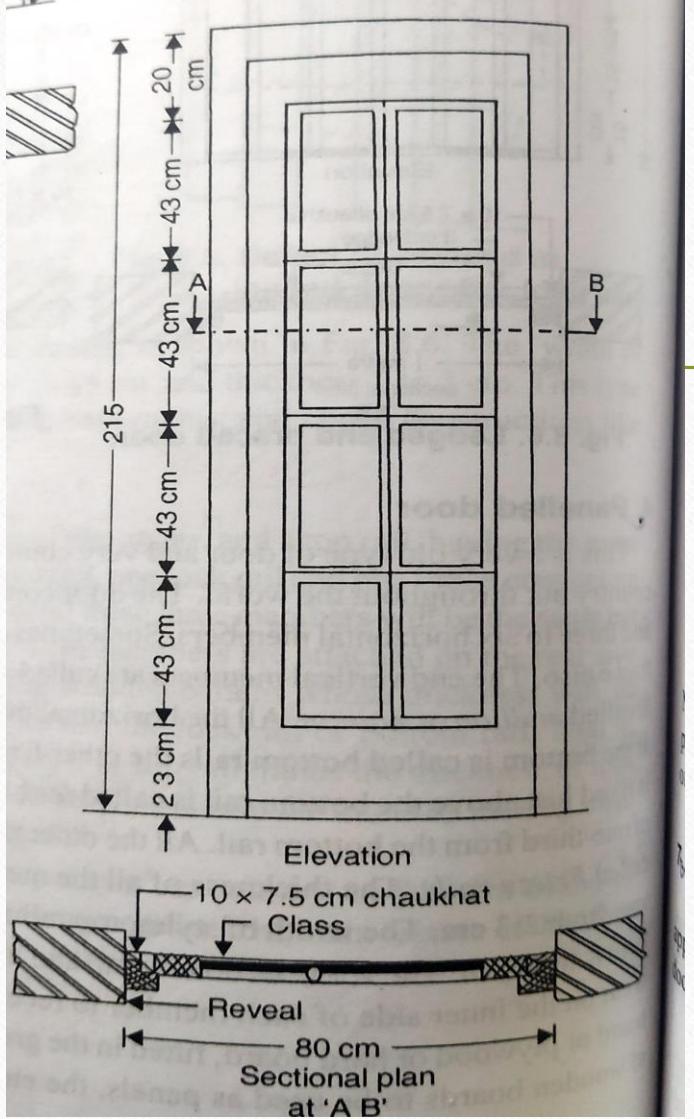




# GLAZED DOOR

- Same as paneled door. Consist of *styles*, *rails*, *glass panes* and *sash bars*.
- Glass panes are fitted instead of wooden or hardwood or plywood panels.
- To reduce use of glass panes, wooden members are also used known as *sash bars*.
- Glass panes are fixed to frame and sash bars with the help of nails and putty (paste of powdered chalk and linseed oil). Wooden strip beading is also nailed between rails and styles around the panel.
- Thickness of glass must be 2 mm for panel size upto  $150 \times 150$  mm, beyond that 5 mm
- Admit light.
- Fully glazed door usually used in public buildings and in selected rooms of high class residential buildings.
- Less security, less privacy.





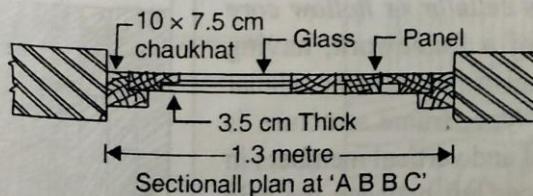
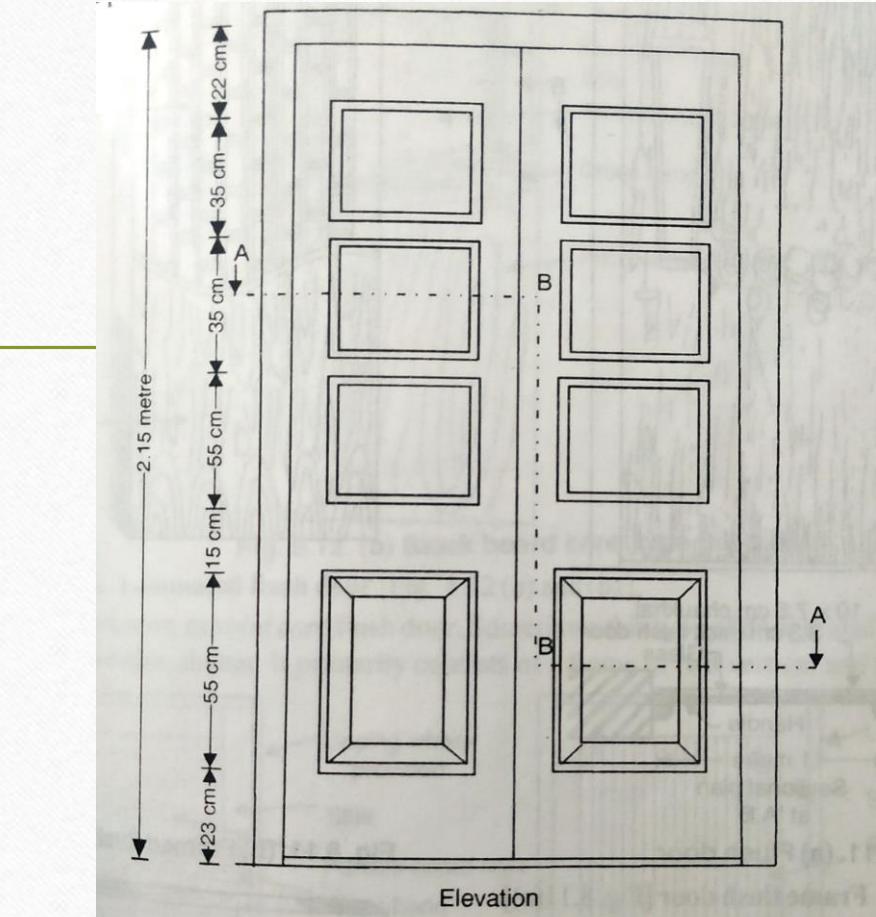


# PANELLED AND GLAZED DOOR

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- Combination of paneled and glazed door.
- Normally upper 1/3<sup>rd</sup> portion is glazed and remaining portion is paneled.
- Construction same as glazed and paneled doors.
- It admits light and provides security and privacy also.
- Used in residential and public buildings







# FLUSH DOOR

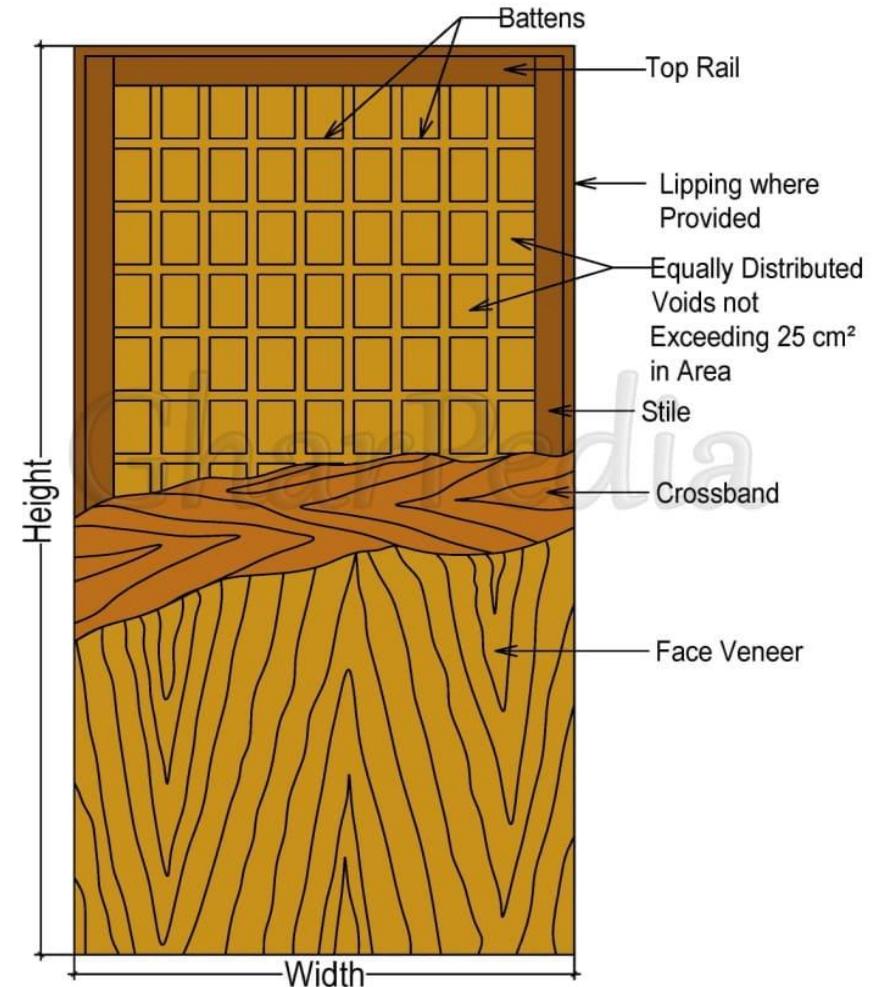
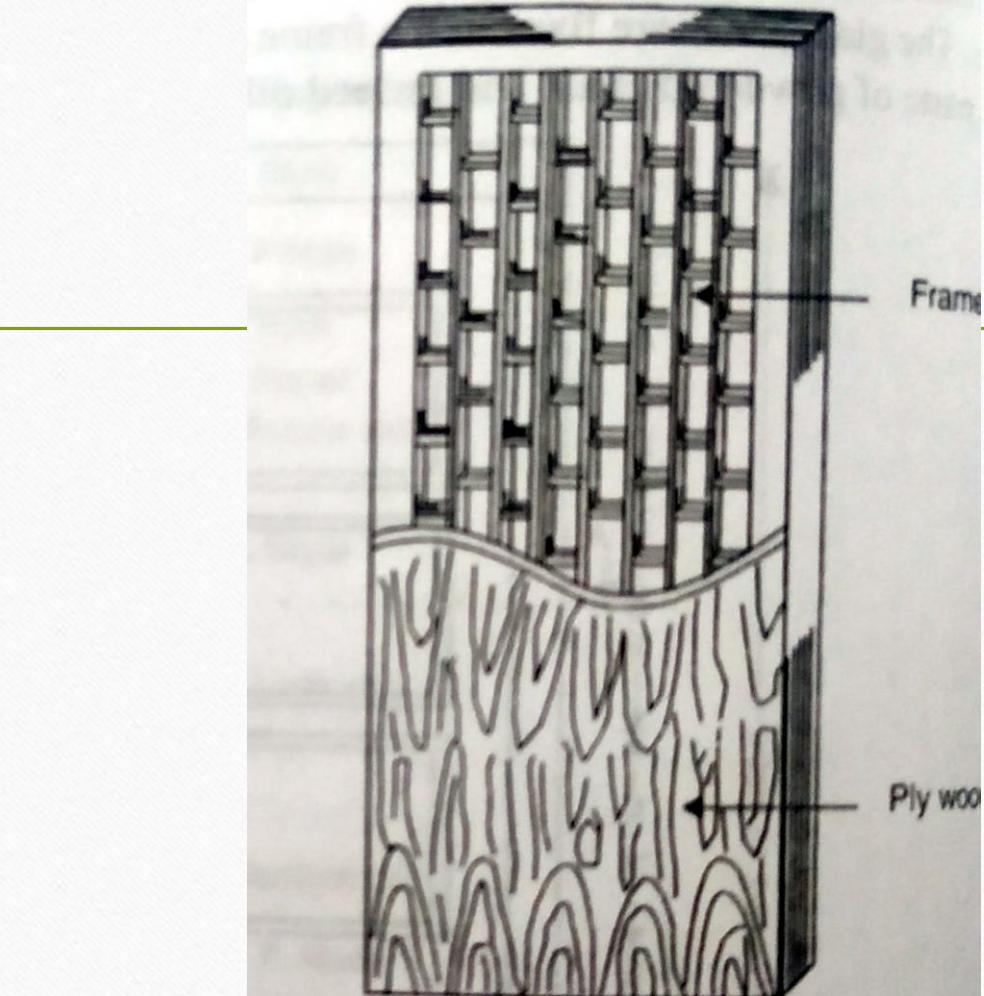
- It is a single leafed door made by covering solid or semi-solid frame work of wood with either plywood or combination of cross bands.
- Modern door. Most common.
- Elegant and neat in appearance, sturdy, durable, easy cleaning, jointless.
- Two types:
  - *Framed Flush Door*
  - *Laminated Flush Door*



## Framed Flush Door or Cellular Type or Hollow Core Type Flush Door

- It consists of framework with horizontal and vertical members.
- Cellular Type: a grid type framework of horizontal and vertical members is such that spaces left between the grids should not be more than  $25\text{ cm}^2$
- Hollow Core : a grid type framework of horizontal and vertical members is such that spaces left between the grids are bigger in area but should not be more than  $500\text{ cm}^2$
- Edges of framework are made of good quality wood and provision is made to fix mortice lock and fixing of hinges.
- Over the framework, plywood is fixed (thickness not more than 3mm) with glue. Face veneer of plywood can be commercial or decorative of thickness 0.5 to 1 mm.
- Hollow spaced between grid can be filled with insulating material such as cork, asbestos, wood wool, saw dust etc for heat and sound insulation,,
- Light in weight. Used in offices, hospitals, schools, colleges, hostels etc.

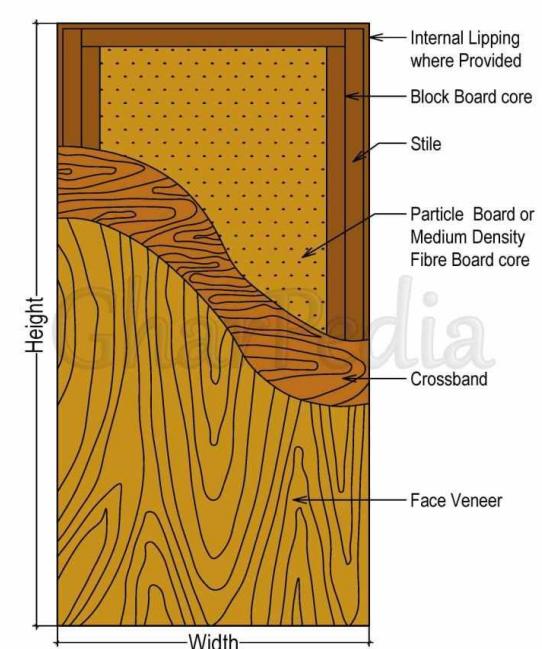




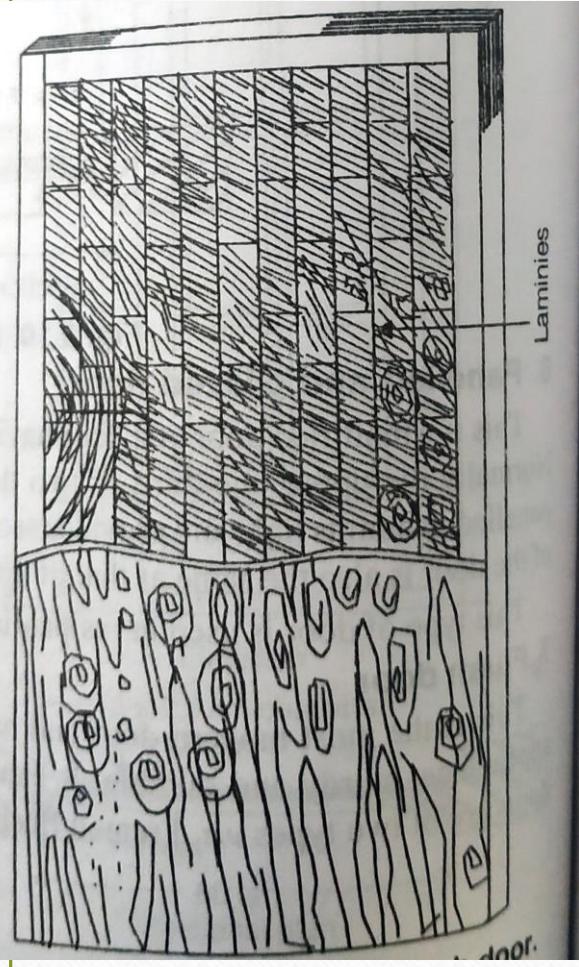
**Cellular Core Flush Door Shutter**

## Laminated Flush Door or Solid Core Flush Door

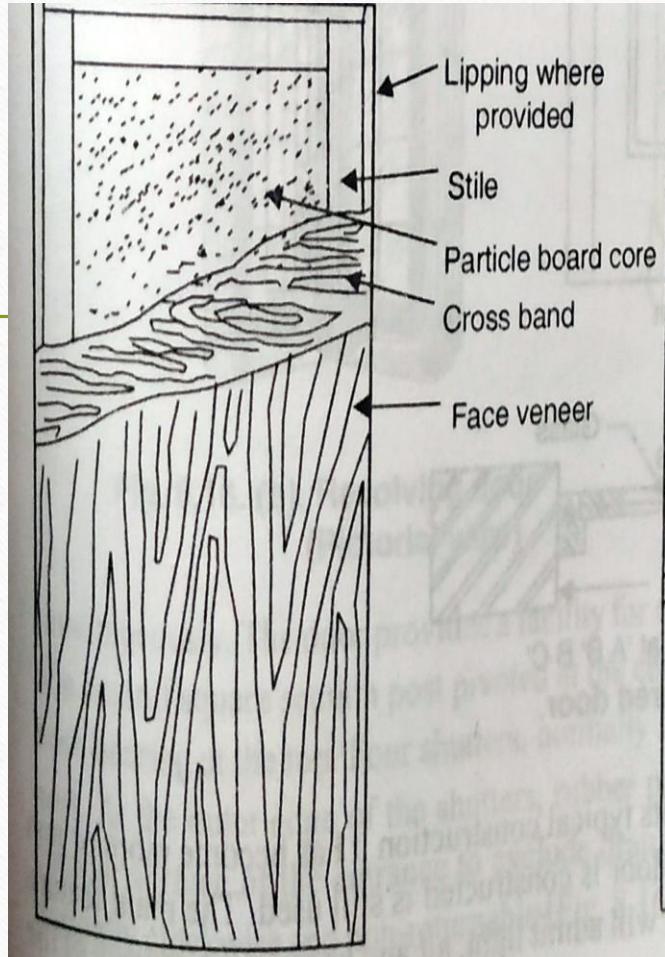
- It consists of a frame of two vertical and two horizontal members with or without lipping
- Core of frame is filled with
  - small wooden strips of soft wood called lamina which are 25 mm wide. Lamina are glued together. Plywood is glued under pressure on lamina on both sides.
  - Particle boards (IS 2202: 1996)
- Stronger, more durable, safer and more secure..



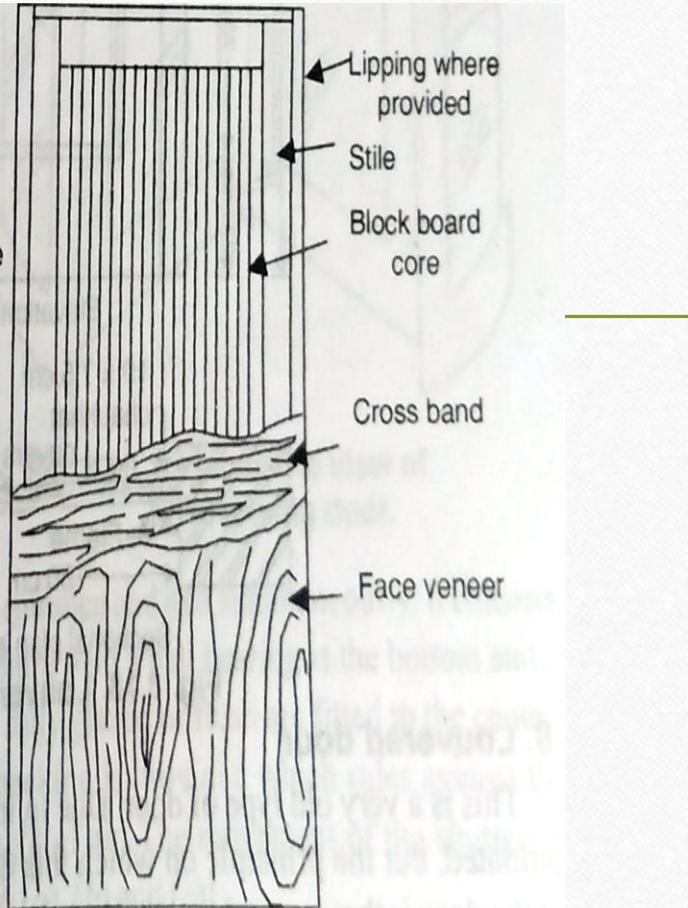
**Solid Core Flush Door Shutter**



Laminated flush door



Particle Board Type flush door



Block board Type flush door



Laminated flush door



Particle Board Type flush door

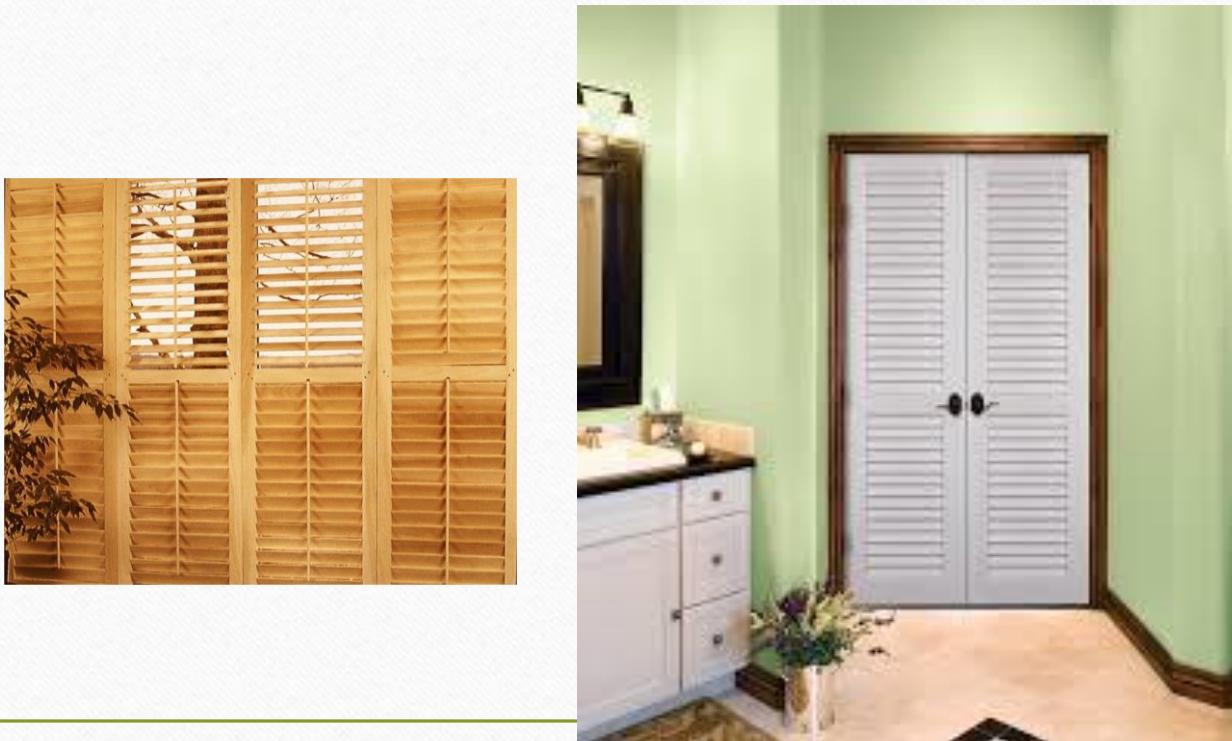
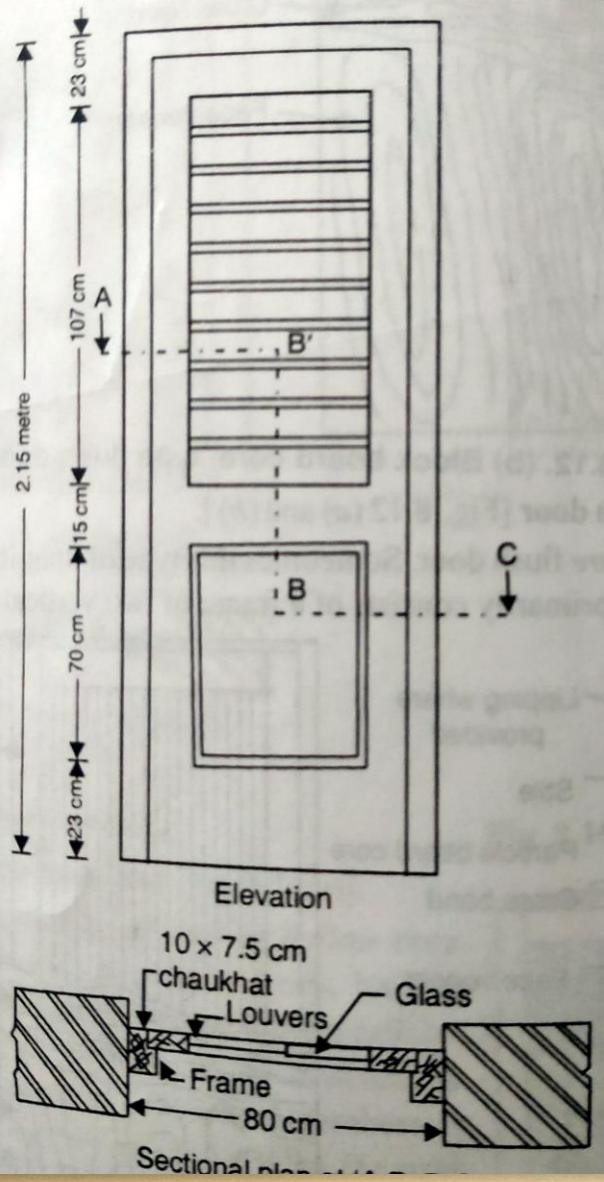


Block board Type flush door

# LOUVERED DOOR

- It admits light and air even when closed and also keeps privacy
- It consists of a frame having styles, rails, mullion etc.
- Lower  $1/3^{rd}$  portion is generally paneled and upper  $2/3^{rd}$  portion is louvered
- Louvers are wooden strips fixed or hinged to the frame at angle of  $45^{\circ}$  to  $60^{\circ}$
- Their upper ends are towards inner side of door
- Very less used for main interior or exterior doors. Outdated.
- Used in high class residential buildings, some rooms in public buildings.





# REVOLVING DOOR

- Special type of doors used in air-conditioned buildings, big offices, restaurants, hotels where incoming and outgoing traffic is too much and too simultaneously.
- Provides facility for entry and exit simultaneously.
- It consists of a central square section post pivoted at the centre with a ball bearing at bottom and a bush bearing at top.
- For shutters, normally glazed or flush are fitted to the central surface
- Movement of shutters is clockwise and non-returnable, usually.



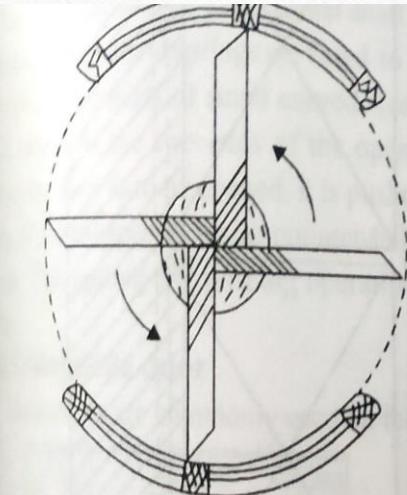


Fig. 8.16. (a). Plan of a revolving door.

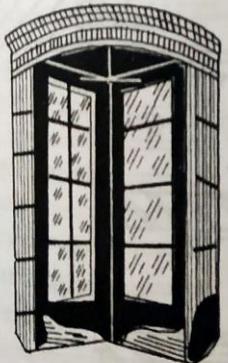


Fig. 8.16. (b). Revolving door  
(Pictorial view)

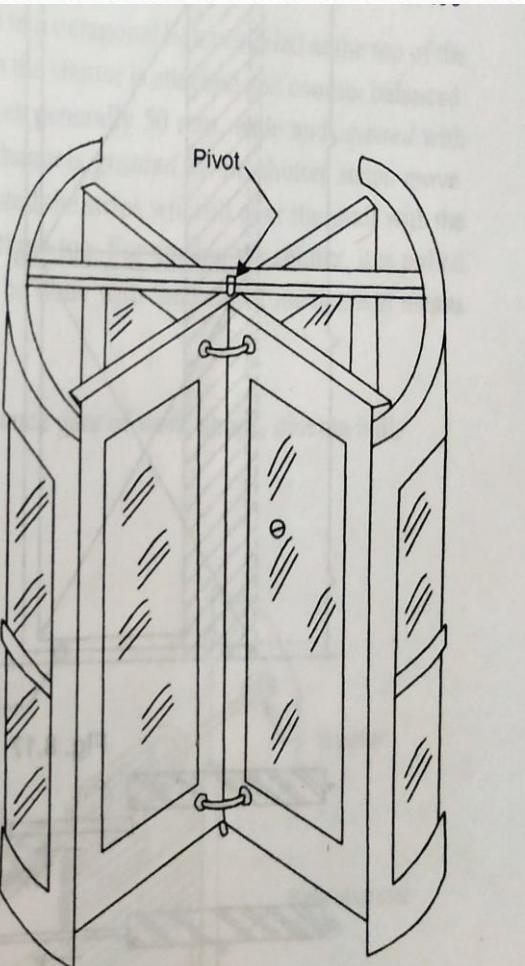
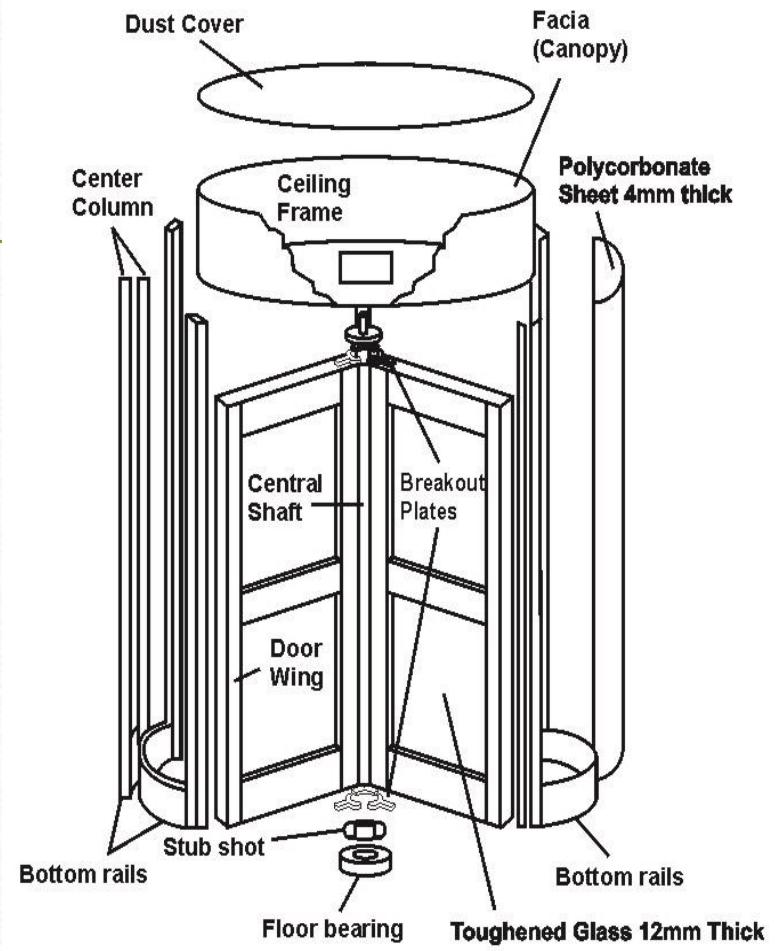
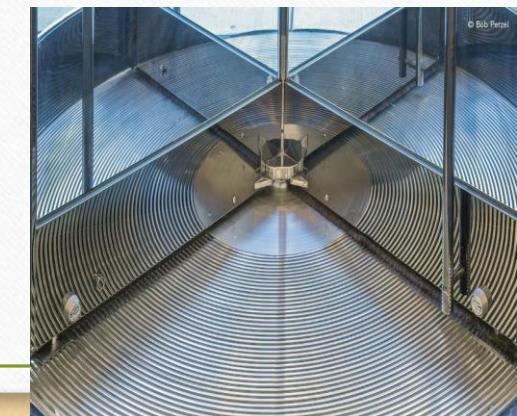
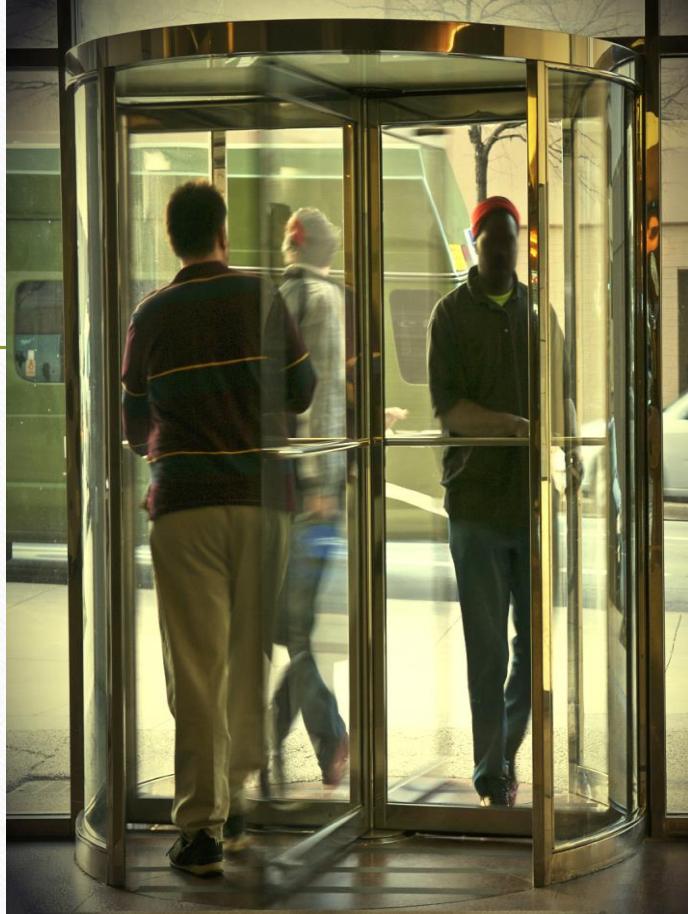


Fig. 8.16. (c) Isometric view of  
revolving door.

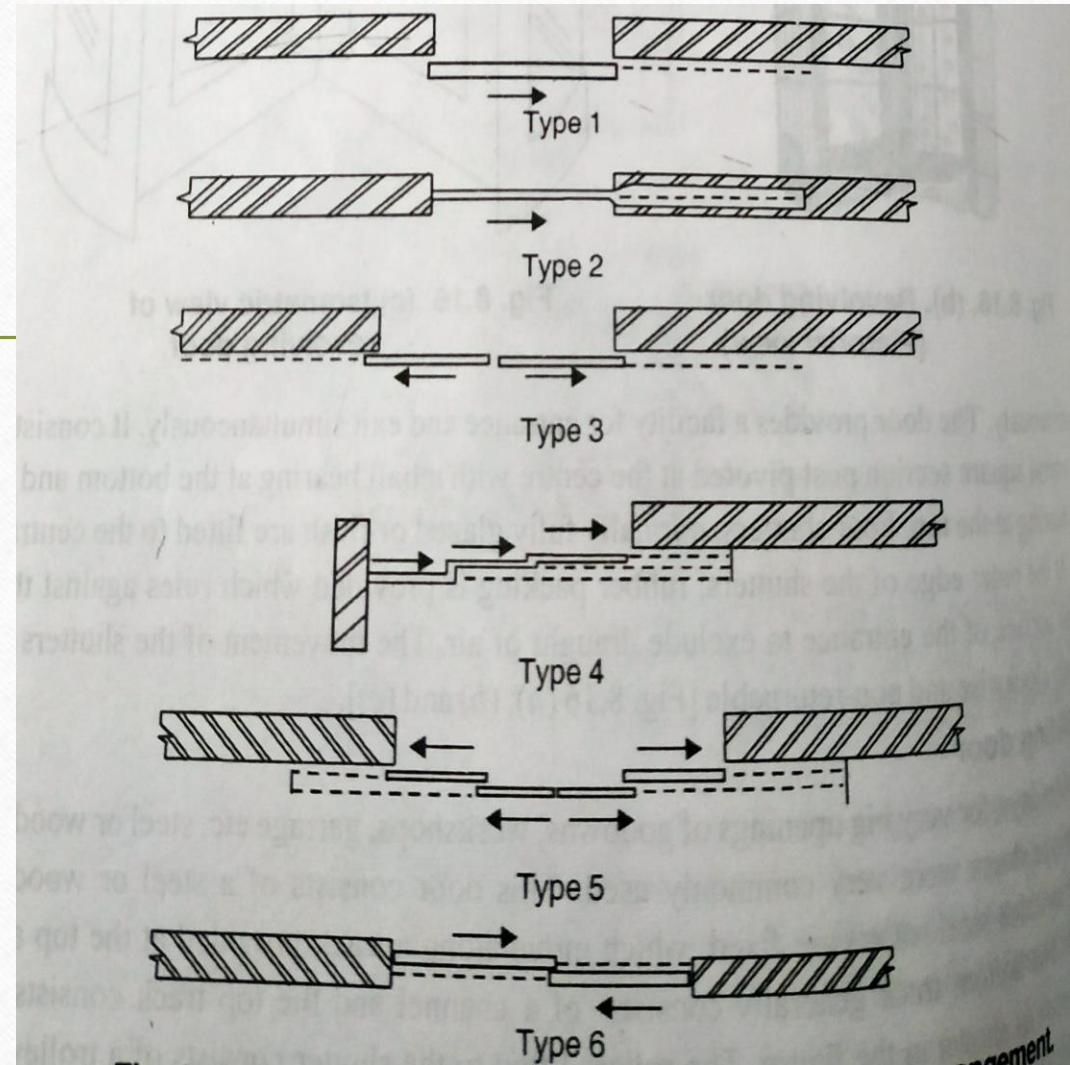
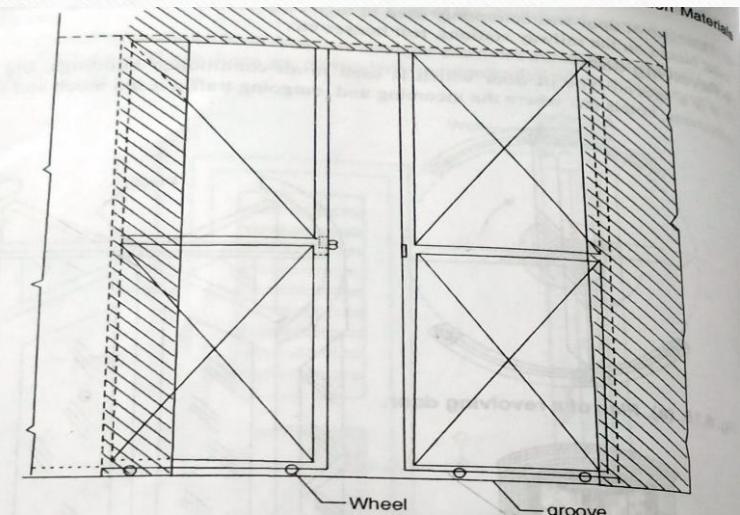




# SLIDING DOOR

- It consists of steel or wooden shutter to which steel rollers are fixed which move along a track provided at the top and bottom.
- Bottom track consist of a channel and top track consist of a folded plate.
- There may be one, two, three or four shutters.
- Different arrangements of shutters can be made.







# FOLDING DOOR

- A folding door is a type of door which opens by folding back in sections or so-called panels. Folding doors are also known as 'bi-fold doors', in spite of them most often having more than two panels. Another term is 'concertina' doors



# SLIDING AND FOLDING DOOR

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- A sliding and folding door is a type of door which opens by folding back in sections or so-called panels and can slide on rails provided on top and bottom.
- Allow movement between indoor and outdoor without much barriers.
- Made of aluminum mostly.
- Different sliding arrangements of shutters can be made
- Usually used for large openings (100% opening)
- More light, more ventilation
- If not operated properly, hardware can get damaged and stuck.





# ROLLING SHUTTER

- Used in shops, workshops, godowns, factories, stores, garages etc,
- Cheap, economic , strong. Do not occupy any space on floor when opened. Used in large openings.
- It consists of a horizontal shaft fitted in an octagonal box provided at top.
- Two helical springs are fitted to which shutter is attached and counterbalanced.
- Shutter consists of small curved steel plates 50 mm wide and seamed with each other.
- At two ends of openings, channels grouted in shutter strips move.
- When door is to be opened, it is pushed up and strips will roll over the shaft wit the help of springs. For closing the shutter it is pulled down.
- Pushing and pulling can be done wit the help of mechanical means also.



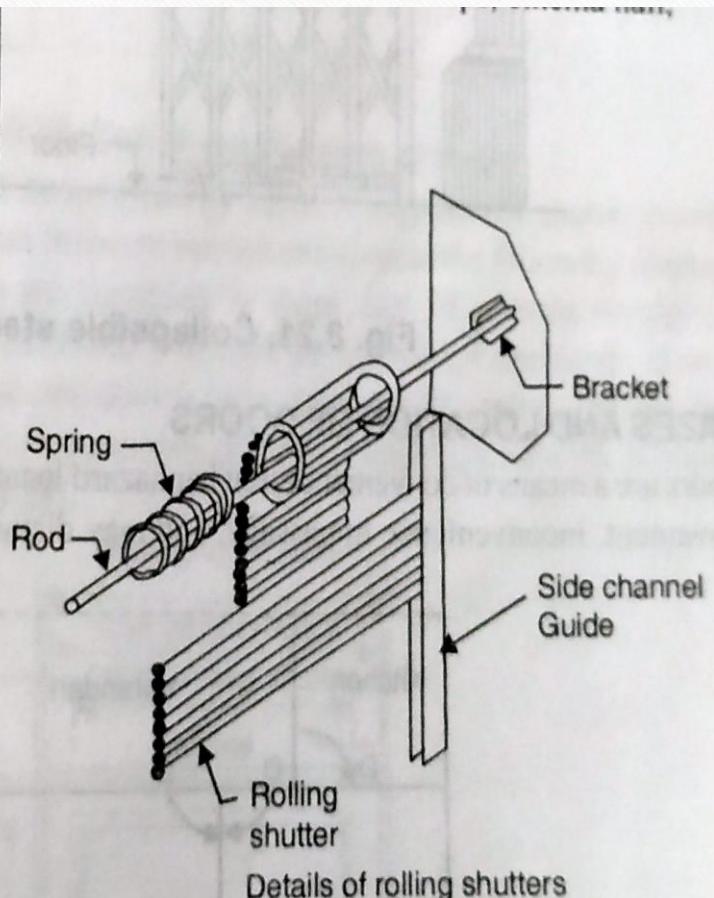
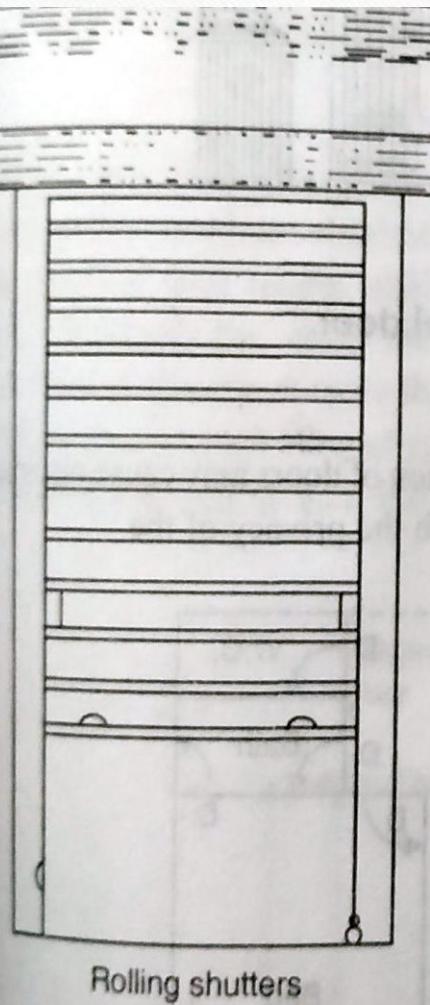
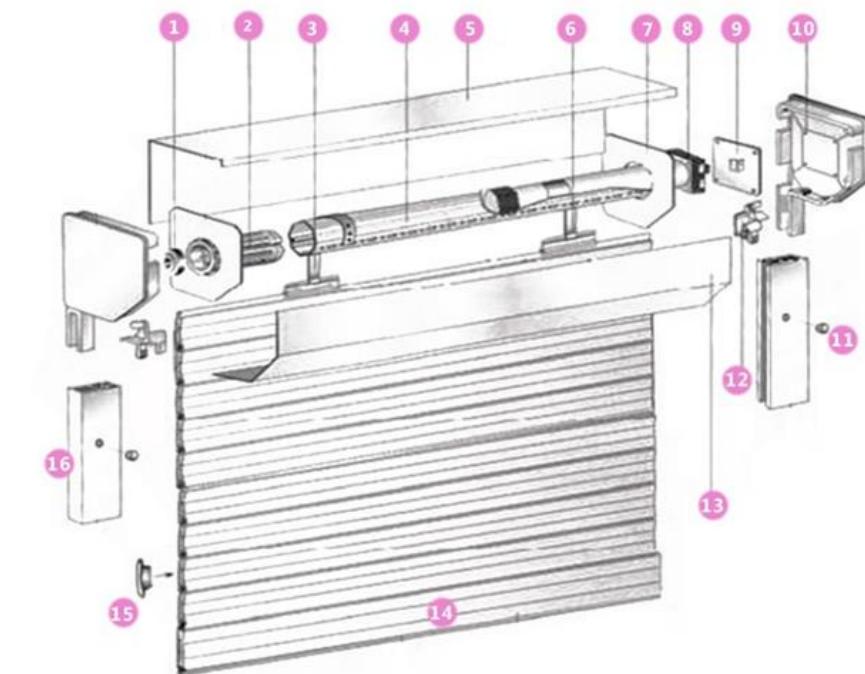


Fig. 8.20.



- |   |            |   |           |   |              |   |            |
|---|------------|---|-----------|---|--------------|---|------------|
| ① | side plate | ⑤ | cover box | ⑨ | motor plate  | ⑬ | bottom box |
| ② | bracket    | ⑥ | fastener  | ⑩ | side plate   | ⑭ | panel      |
| ③ | fastener   | ⑦ | plate     | ⑪ | hole cap     | ⑮ | side clip  |
| ④ | axie       | ⑧ | motor     | ⑫ | guide insert | ⑯ | guide rail |

# COLLAPSIBLE DOOR

- It consists of vertical and braced members which allow the door to stretch or fold.
- Used in workshops, cinema halls, schools, colleges, railway platforms etc.
- It is fabricated with vertical mild steel flats or channels 16-20 mm wide placed at a distance of 10-12 cm. c/c.
- Vertical flats or channels are braced by diagonals of same width flats which allow strips to stretch or fold.
- Two T-sections are fixed at top and bottom on which flats or channels move with the help of rollers fixed alternatively at top and bottom of each strip.
- Strips are folded together while opening and stretched while closed.
- All connections are done by pins.

