



STAIRCASE

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INTRODUCTION

- Stairs is a set of steps which give access from floor to floor.
- The room or enclosure of the building, in which stair is located is known as staircase.
- Staircase provide access & communication between floors in multi-storey buildings and are a path by which fire can spread from one floor to another.
- Therefore it must be enclosed by fire resisting walls, floors, ceilings and doors.
- It must be designed to carry certain loads, which are similar to those used for design of the floors.
- Stairs may be constructed of Timber, Bricks, Stone, Steel or Reinforced Cement Concrete.



TECHNICAL TERMS

- **STEP:-** It is a portion of stair which permits ascent or descent. A stair is composed of a set of steps.
- **TREAD:-** It is a upper horizontal portion of a step upon which foot is placed while ascending or descending.
- **RISER:-** It is a vertical portion of a step providing support to the tread.
- **LANDING:-** It is level platform at the top or bottom of a flight between the floors.
- **FLIGHT:-** This is an unbroken series of steps between landing.



TECHNICAL TERMS

- **RISE:-** It is a vertical distance between two successive tread faces.
- **GOING:-** It is a horizontal distance between two successive riser faces.
- **NOSING:-** It is the projecting part of the tread beyond the face of riser.
- **SCOTIA:-** It is a moulding provided under the nosing to provide strength to nosing.
- **SOFFIT:-** it is the underside of a stair.
- **PITCH OR SLOPE:-** It is the angle which the line of nosing of the stair makes with the horizontal.

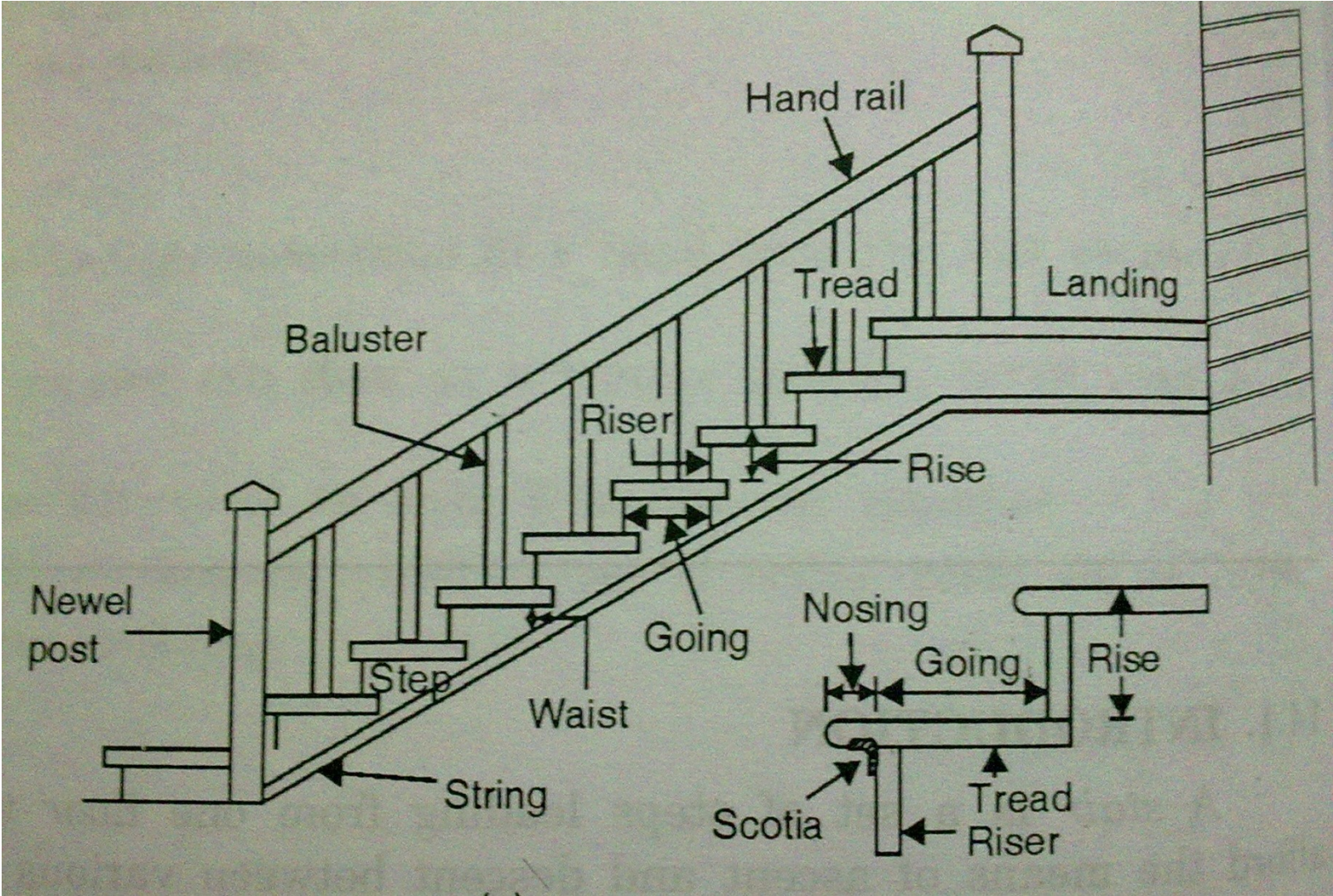


TECHNICAL TERMS

- **STRINGS OR STRINGERS:-** These are the slopping members which support the steps in a stair.
- **NEWEL POST:-** Newel post is a vertical member which is placed at the ends of flight to connects the ends of strings and hand rail.
- **BALUSTER:-** It is vertical member of wood or metal, supporting the hand rail.
- **HEAD ROOM:-** It is the clear vertical distance between the tread and overload structure.



TECHNICAL TERMS



REQUIREMENTS OF GOOD STAIRCASE

○ LOCATION

- (a) They should be located near the main entrance to the building.
- (b) There should be easy access from all the rooms without disturbing the privacy of the rooms.
- (c) There should be spacious approach.
- (d) Good light and ventilation should be available.



REQUIREMENTS OF GOOD STAIRCASE

○ WIDTH OF STAIR

- (a) It should be wide enough to carry the user without much crowd or inconvenience.
- (b) In Residential building, a 90 cm wide stair is sufficient while in public 1.5 to 1.8 m width may be required.

○ LENGTH OF FLIGHT

- (a) The number of steps should not be more than 12 & less than 3 from comfort point of view.



REQUIREMENTS OF GOOD STAIRCASE

○ PITCH OF STAIR

(a) Pitch should be limited to 30° to 45° .

○ HEAD ROOM

(a) Height of head room should not be less than 2.1 to 2.3 m.

○ BALUSTRADE

(a) Stair should always provided with balustrade.



REQUIREMENTS OF GOOD STAIRCASE

○ STEP DIMENSION

- (a) The rise and going should be of such dimensions as to provide comfort to users.
- (b) The going should not be less than 25 cm, though 30 cm going is quite comfortable.
- (c) The rise should be between 10 to 15 cm.
- (d) The width of landing should not be less than width of stair.

○ MATERIAL OF CONSTRUCTION

- (a) The material should have fire resistance and sufficient strong.



THUMB RULES FOR DIMENSIONS OF STEP

- (a) $(2 \times \text{Rise in cm}) + (\text{Going in cm}) = 60$
- (b) $(\text{Rise in cm}) + (\text{Going in cm}) = 40 \text{ to } 45$
- (c) $(\text{Rise in cm}) \times (\text{Going in cm}) = 400 \text{ to } 450$



TYPES OF STEPS

- (a) Flier
- (b) Bull Nose
- (c) Round Ended
- (d) Splayed
- (e) Commode
- (f) Dancing
- (g) Winders



CLASSIFICATION OF STAIRCASE

- Straight Staircase
- Turning Staircase
 - (a) Quarter Turn
 - (b) Half Turn (Dog-Legged & Open well Staircase)
 - (c) Three-Quarter Turn Staircase
 - (d) Bifurcated Staircase
- Continuous Staircase
 - (a) Circular Staircase
 - (b) Spiral Staircase
 - (c) Helical Staircase



STRAIGHT STAIRCASE

- If the space available for stair case is narrow and long, straight stairs may be provided.
- Such stairs are commonly used to give access to porch or as emergency exits to cinema halls.
- In this type all steps are in one direction.
- They may be provided in single flight or in two flights with landing between the two flights



STRAIGHT STAIRCASE



QUARTER TURN STAIRCASE



DOG-LEGGED STAIRCASE

- It consists of two straight flights with 180° turn between the two.
- They are very commonly used to give access from floor to floor.
- Photograph shows the arrangement of steps in such stairs.

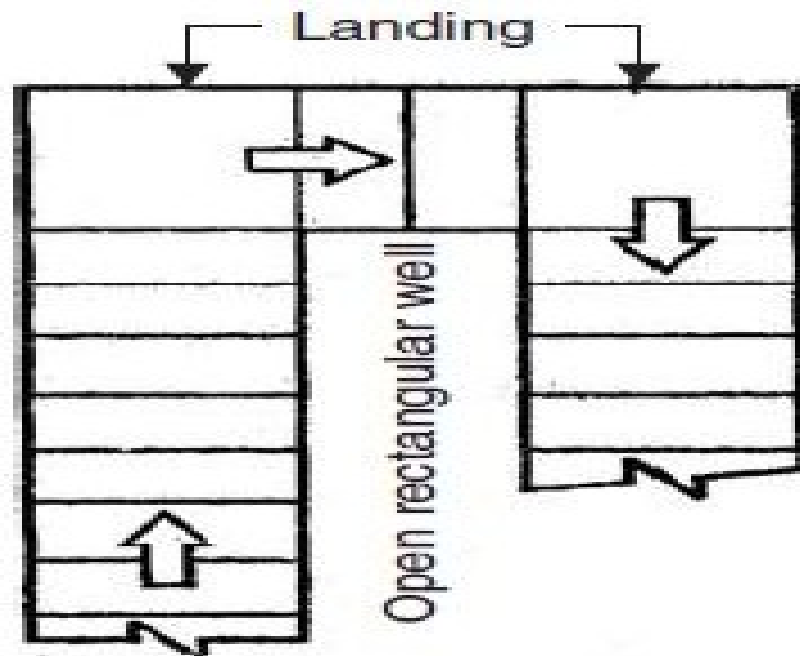


DOG-LEGGED STAIRCASE



OPEN WELL OR NEWEL STAIRCASE

- It differs from dog legged stairs such that in this case there is 0.15 m to 1.0 m gap between the two adjacent flights.



Open well (newel) stair

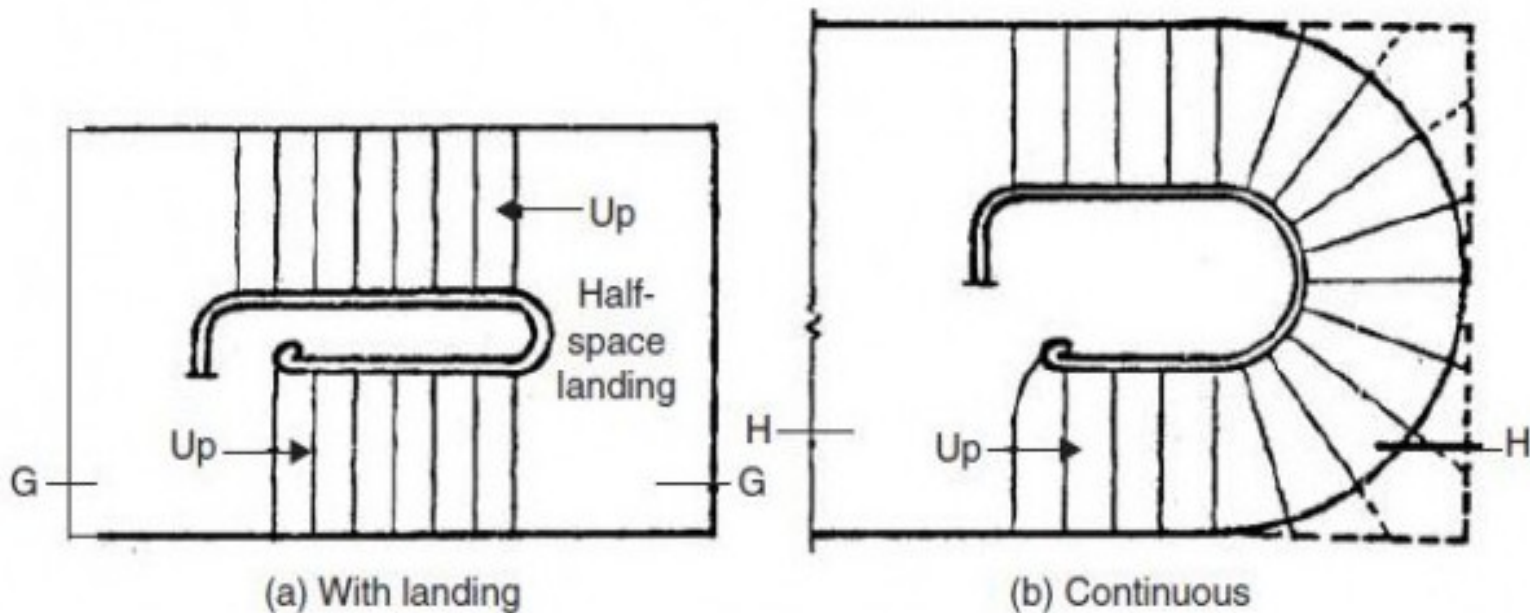


OPEN WELL OR NEWEL STAIRCASE



GEOMETRICAL STAIRCASE

- This type of stair is similar to the open newel stair except that well formed between the two adjacent flights is curved.
- The hand rail provided is continuous.



Geometric stairs



GEOMETRICAL STAIRCASE



BIFURCATED STAIRCASE

- Apart from dog legged and open newel type turns, stairs may turn in various forms.
- They depend upon the available space for stairs. Quarter turned, half turned with few steps in between and bifurcated stairs are some of such turned stairs.
- Figure shows a bifurcated stair.



BIFURCATED STAIRCASE



BIFURCATED STAIRCASE

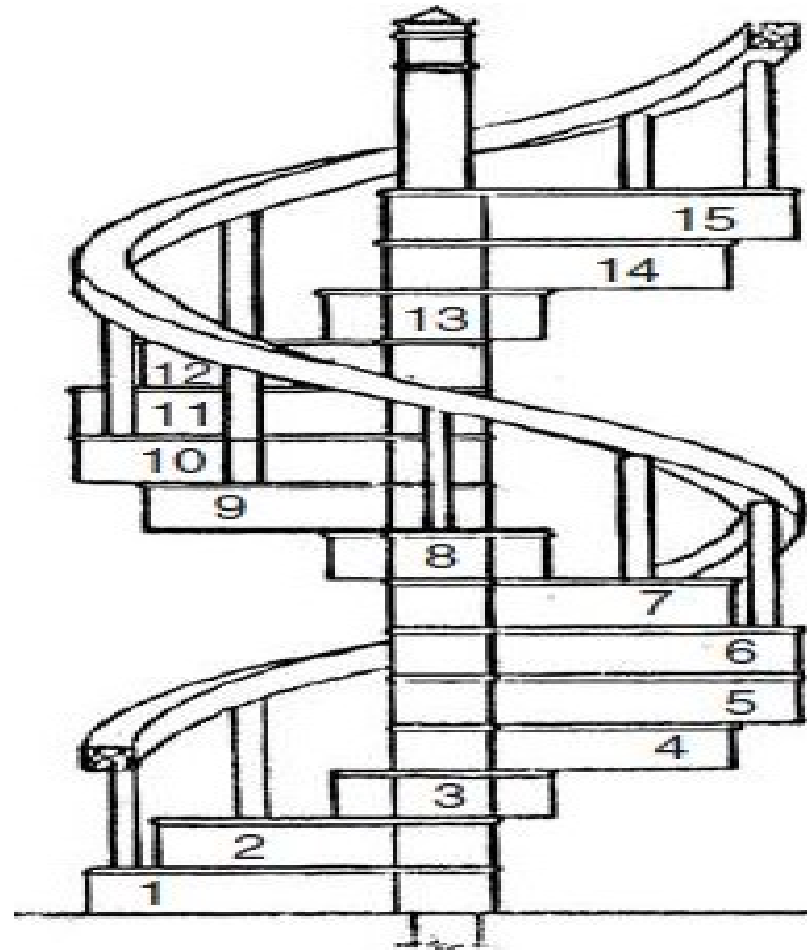


SPIRAL STAIRCASE

- These stairs are commonly used as emergency exits.
- It consists of a central post supporting a series of steps arranged in the form of a spiral.
- At the end of steps continuous hand rail is provided.
- Such stairs are provided where space available for stairs is very much limited.
- Figure shows a typical spiral stair. Cast iron, steel or R.C.C. is used for building these stairs.



SPIRAL STAIRCASE



Spiral stairs



SPIRAL STAIRCASE



MATERIALS USED IN CONSTRUCTION OF STAIRCASE

- Timber
- Metal
- R.C.C.
- Stone
- Glass



TIMBER STAIRCASE



METAL STAIRCASE



R.C.C. STAIRCASE



STONE STAIRCASE



GLASS STAIRCASE



Thank You !!!

