

# STAIRCASE



MEANS OF TRANSPORTATION BETWEEN THE FLOOR

RAMP

LADDER

ESCALATOR

LIFT

STAIR



RAMP



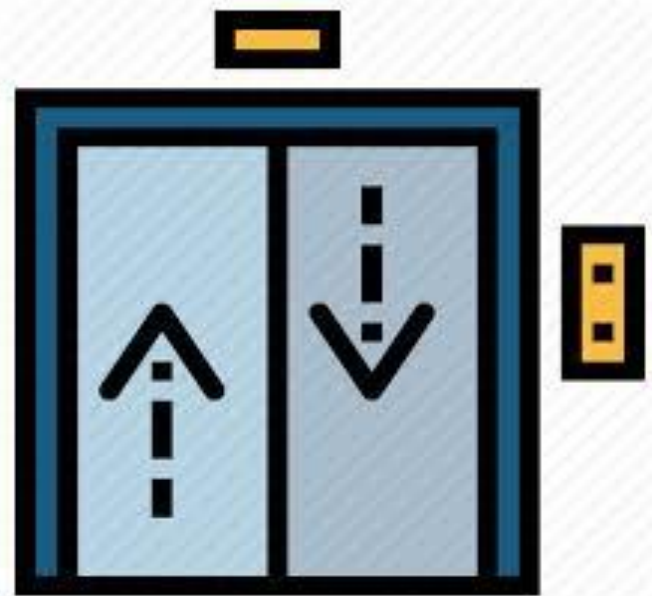
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LADDER



ESCALATOR



LIFT ELIVATOR

# STAIRS

**STAIRS** : A STAIR IS A CONVENIENT MEANS OF ACCESS BETWEEN THE FLOOR OF A BUILDING, IT IS CONSTRUCTED TO PROVIDE READY, EASY, COMFORTABLE AND SAFE ASCENT/DESCENT WITH SERIES OF STEPS.

A STAIR IS DEFINED AS A SERIES OF STEPS SUITABLE ARRANGED FOR THE PURPOSE OF CONNECTING DIFFERENT FLOORS OF THE BUILDING.

## TECH.TERMS

**TREAD** : The horizontal upper portion of steps

**GOING** : Horizontal distance between faces of two consecutive risers.

**RISER** : The vertical front member of the step.

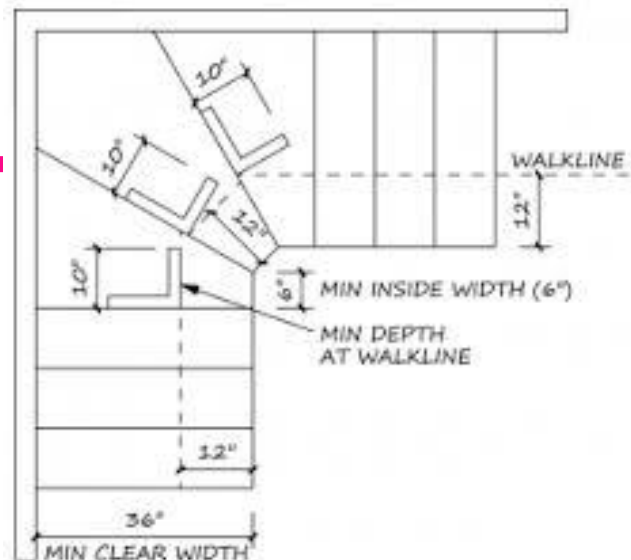
**RISE** : Vertical distance between two successive treads.

**FLIGHT** : Series of step between landing.

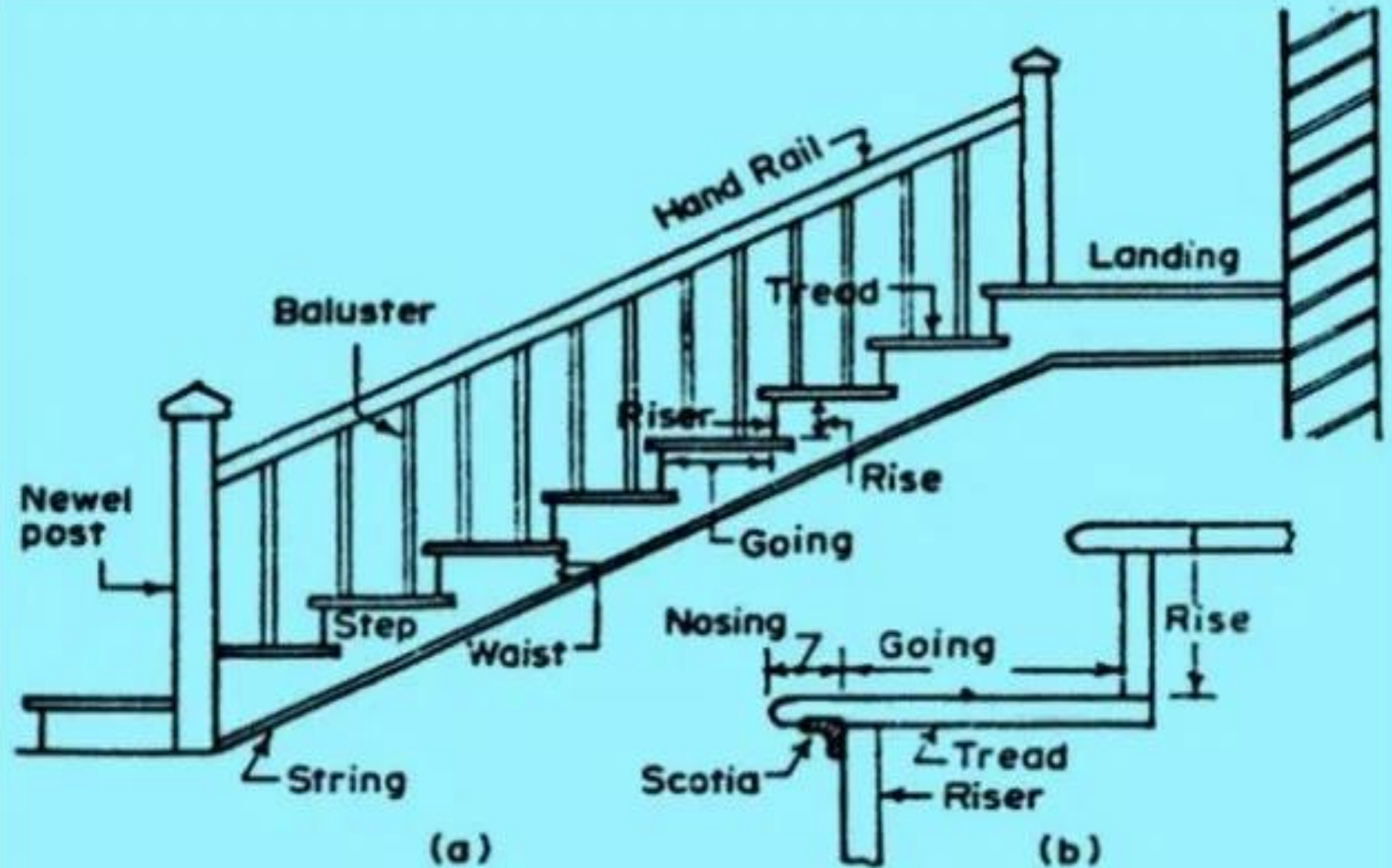
**NOSING**: The projecting part of the tread beyond the face of riser.

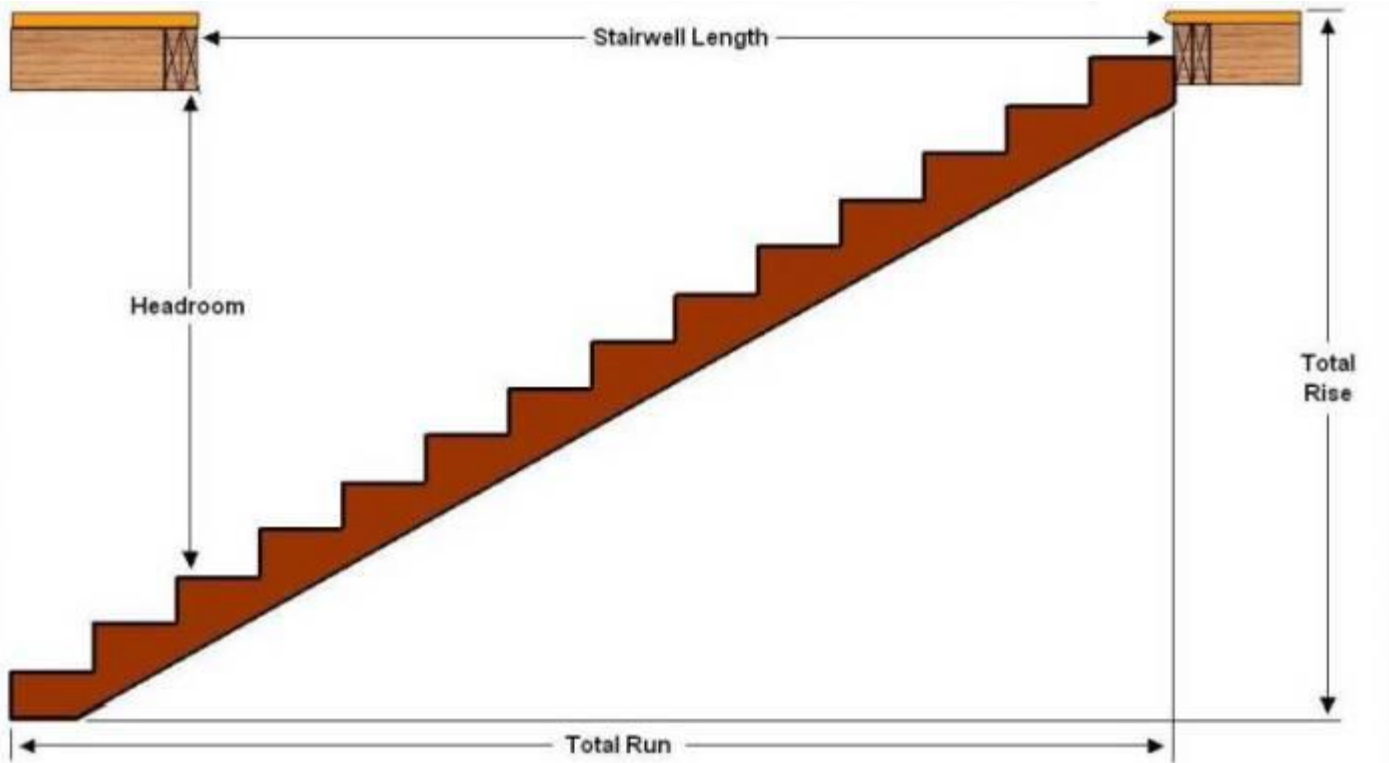
**SCOTIA** : Additional moulding provided under the Nosing to improve the elevation of step and to provide extra strength to nosing end.

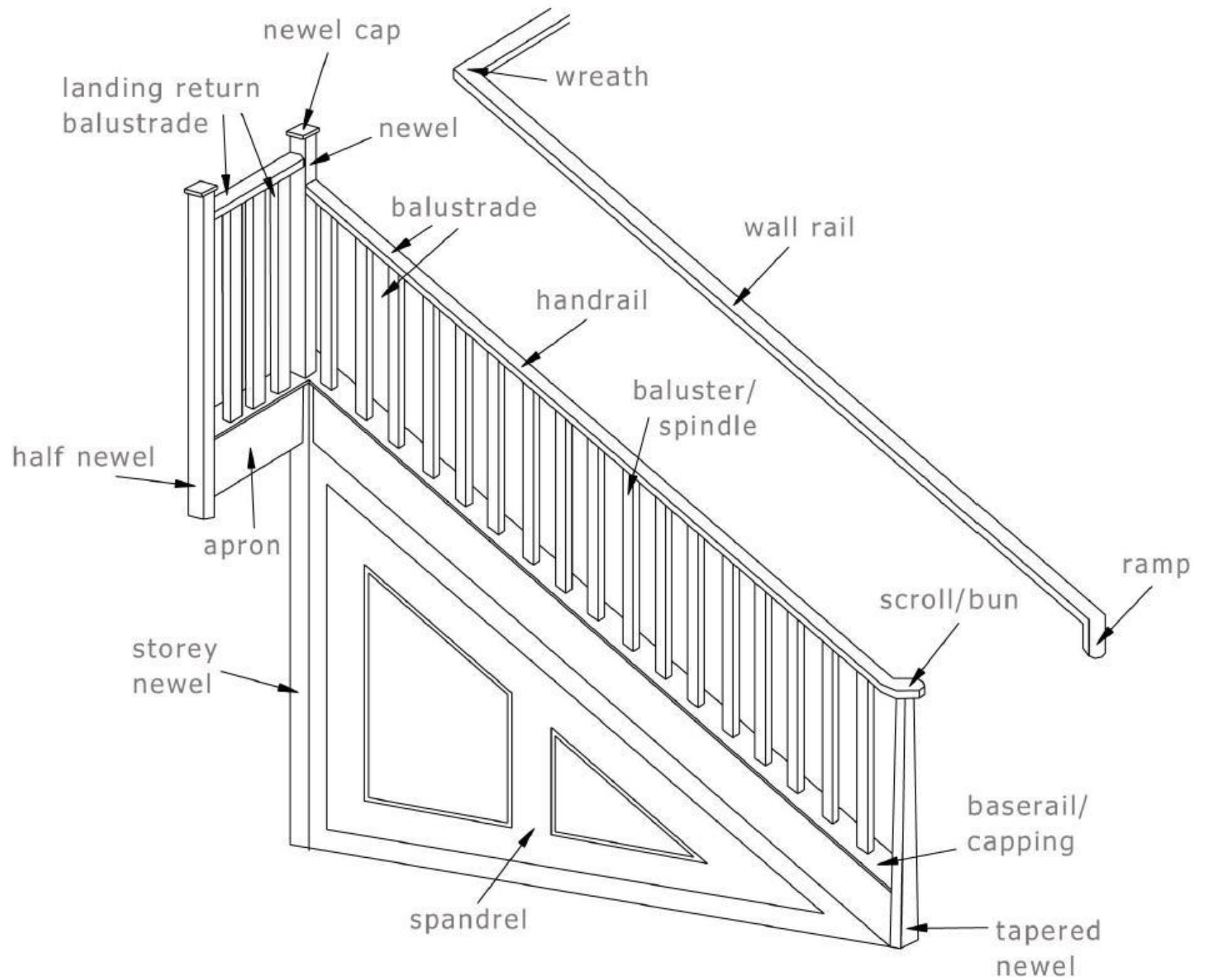
**WALKING LINE** : The approximate line of movement of people on a stair. It may be 45 cm. from the centre of handrail.



# STAIR DETAILS









**HEAD ROOM** : The vertical distance between the nosing of one flight and the bottom of the flight immediately above.

**RUN** : Total length of stair in a horizontal plane. It includes the length of the landings also.

**SOFFIT** : The under surface of the of stair.

**WAIST** : The thickness if structural slab in case of RCC stair.

**STRiNGER** : Inclined member in wooden stairs acting as wooden beams to support the steps.

**STRING** : The inclined member of a stair which supports the ends of step is known as string.

i) Cut or open string

ii) Closed or housed string



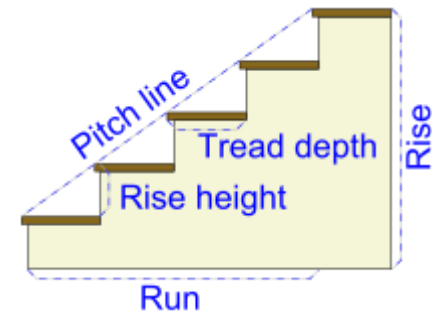
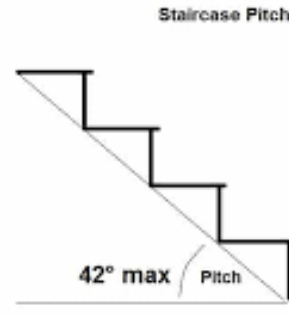


**Cut  
Stringer**



**Closed  
Stringer**

**PITCH** : The angle of inclination of stair with the floor.



**LANDING** : Horizontal platform between two flight to change of direction and to take rest for users.

**BALUSTER** : The vertical member fixed between string and handrail to give support to handrail.

**HANDRAIL** : The inclined rail over the string.

**NEWEL POST** : Vertical member placed at the end of flight to connect of string and handrail.

**BALUSTRADE** : The combined frame work of hand rail and  
Or **BARRISTER** baluster

## TYPES OF STEPS

**STEP** : The combined portion of Tread and Riser.

**FLIER** : Ordinary step of rectangular shape in Plan

**BULLNOSE STEP** : It forms a circular quadrant in plan and provided at the bottom of flight.

**COMMODORE STEP** : This step has a curved rise and tread.

**DANCING STEP** : Step do not radiate from common centre.

**ROUNDED END STEP** : Similar to bullnose step except that its ends are semicircular in plan.

**SPLAYED STEP** : One end or both ends splayed in plan.

**WINDER** : Tapering step and used to change the direction of flight.

## SPECIAL TYPES OF STEPS

Sometimes to emphasise the beginning of climbing, first two or three steps of the flight are designed differently, with little higher dimension and are detailed out specially. These steps can be classified as following:

### 1. BULL NOSE STEP:

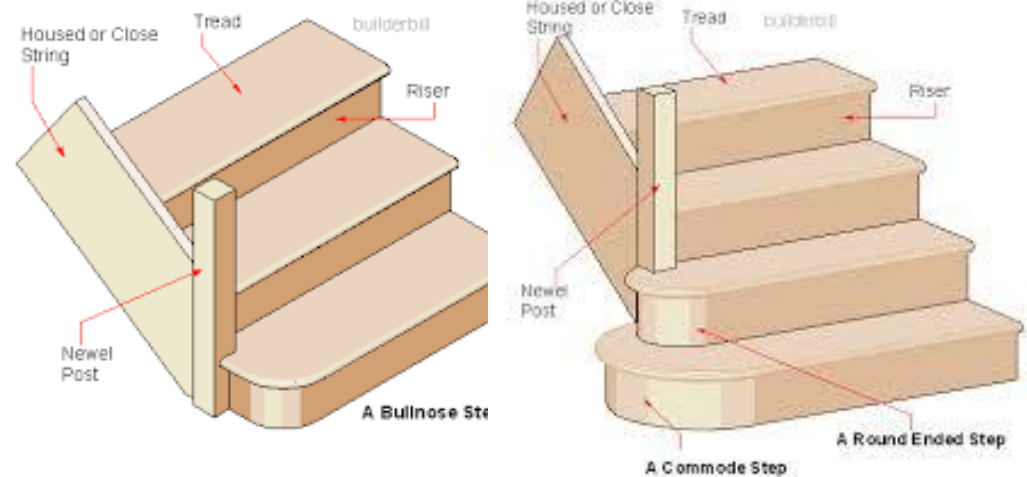
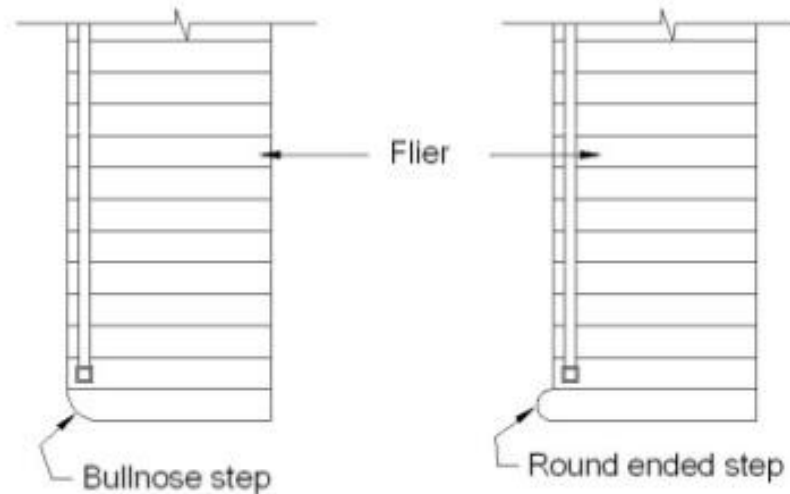
Generally provided at the bottom of flight. It projects in front of the newel post and its end forms a circular quadrant in plan.

### 2. ROUND-ENDED STEP:

Similar to bull nose step in plan, except that ends are semi-circular in plan.

### 3. FLIER:

This is an ordinary step of rectangular shape in plan.





WINDER

# CLASSIFICATION OF STAIRS ACCORDING TO MATERIALS

BRICK  
STAIR

WOODEN  
STAIR

STONE  
STAIR

METAL  
STAIR

R.C.C.  
STAIR





**BRICK STAIR**



**WOODEN STAIR**



**STONE STAIR**



**METAL STAIR**

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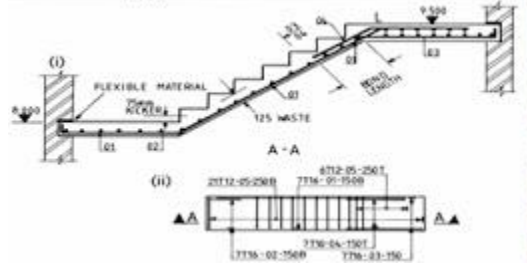
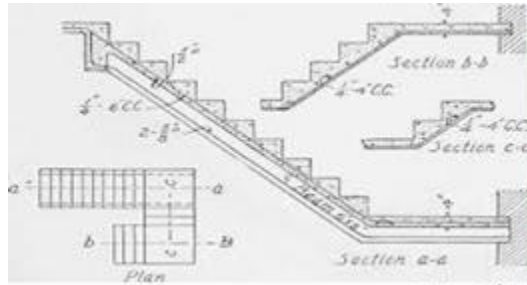


# RCC STAIRCASE









# DESIGN OF DOG-LEGGED STAIR

Name of work :- pkn

Stair hall measure

2.50 x 5.00

Available vertical space between floor

3.00 m

Horizontal Span of stair case

1.20 m

Risers

0.15 m

Treads

0.25 m

Concrete

M- 20

$\alpha_{cbc}$  7

$f_y$  415 N/mm<sup>2</sup>

Nominal cover 25 mm

1200 mm

150 mm

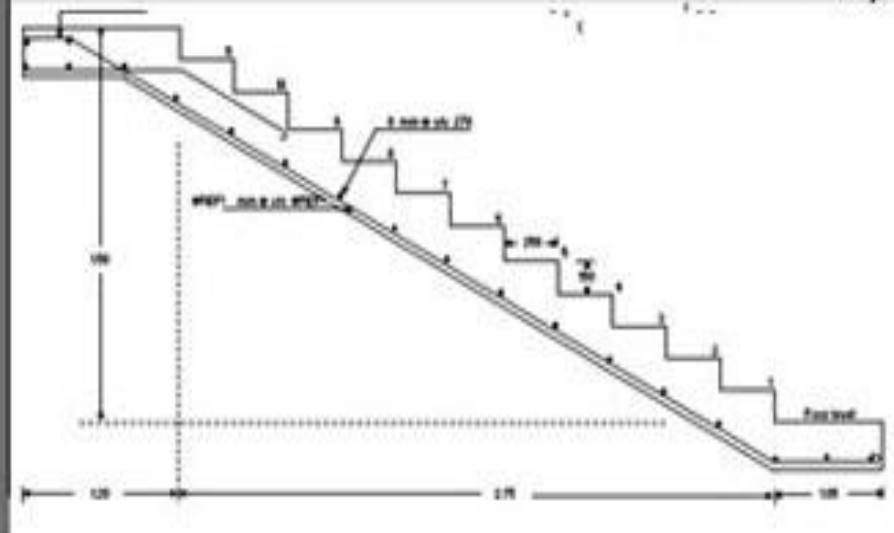
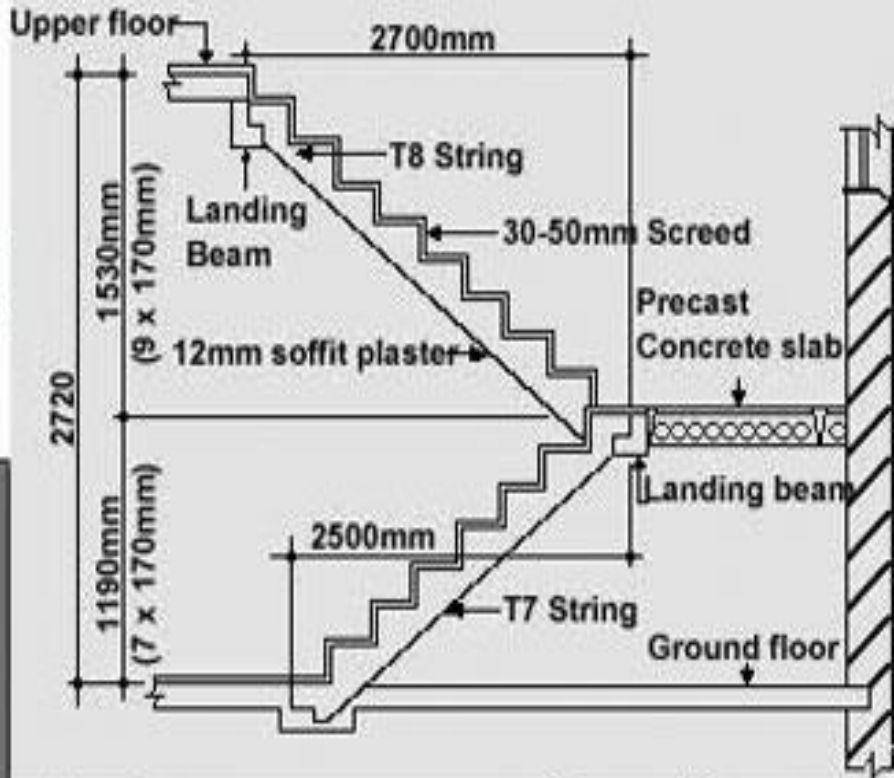
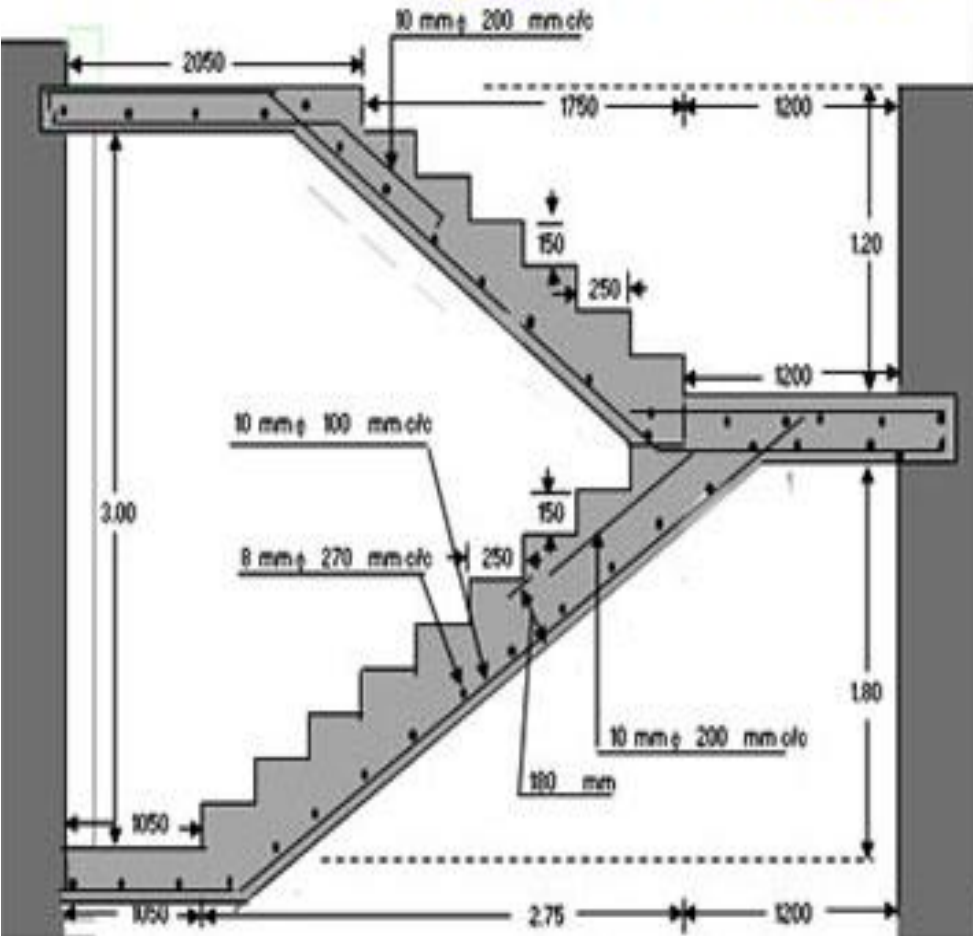
250 mm

wt. of concrete 25000 N/mm<sup>2</sup>

m 13.33

$\alpha_{st}$  230 N/mm<sup>2</sup>

Effective cover 30 mm



R.C.C. STAIR

# CLASSIFICATION OF STAIRS ACCORDING TO THE SHAPE

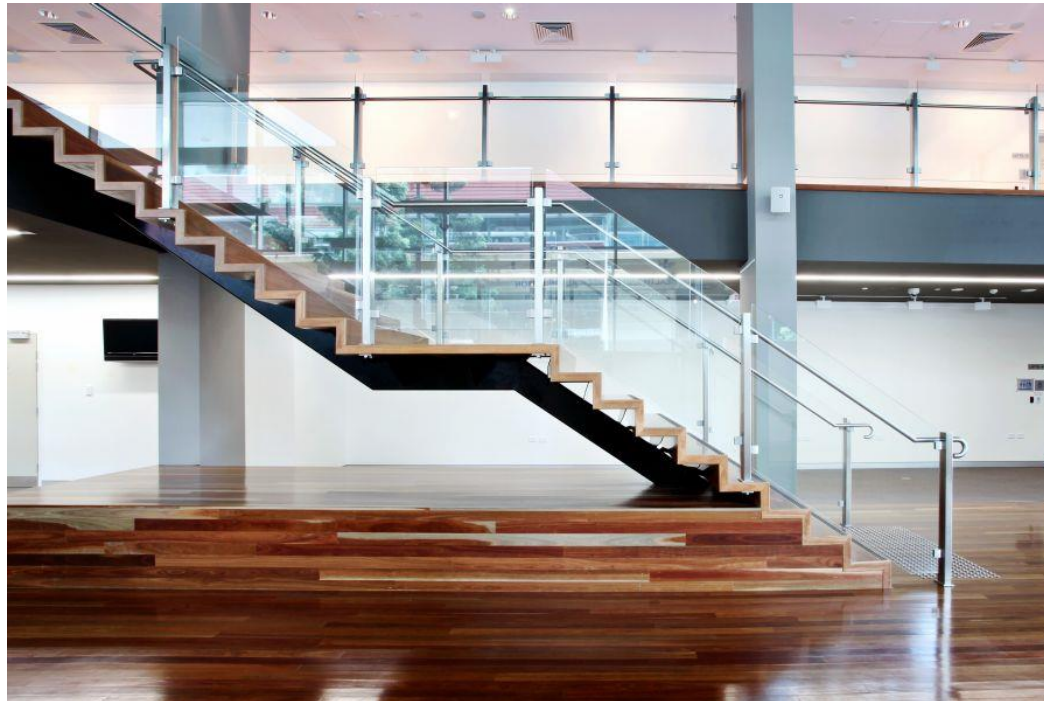
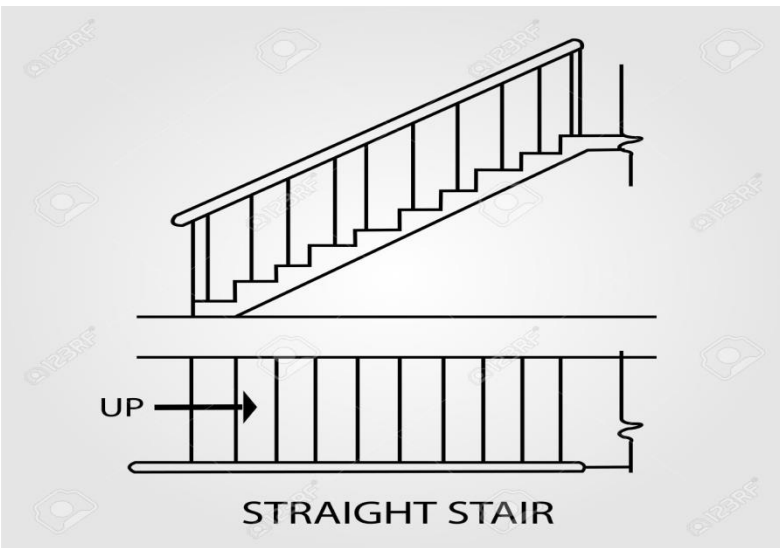
STRAIGHT  
STAIR

TURNING  
STAIR

CIRCULAR OR  
SPIRAL STAIR

GEOMETRICAL  
STAIR

1. QUARTER TURN STAIR
2. HALF TURN STAIR
3. THREE QUARTER STAIR



STRAIGHT STAIR

# CLASSIFICATION OF STAIRS ACCORDING TO THE SHAPE

QUARER TURN STAIR



BIFURCATED STAIR



HALF TURN STAIR



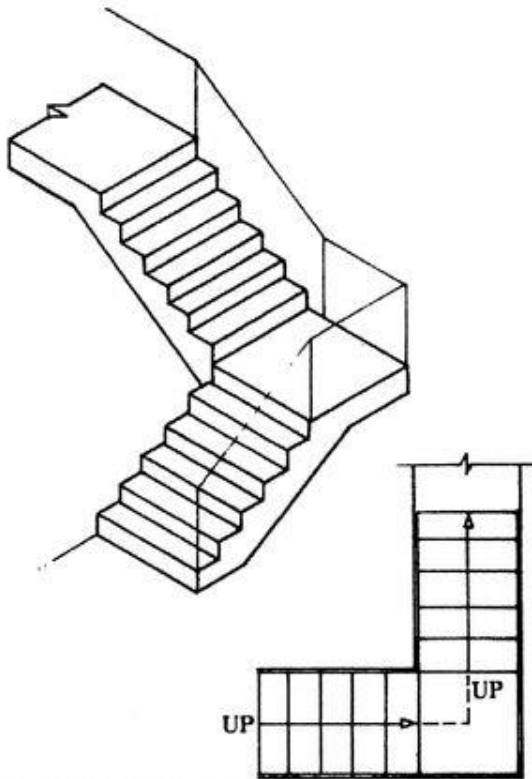
DOG-LEGGED STAIR



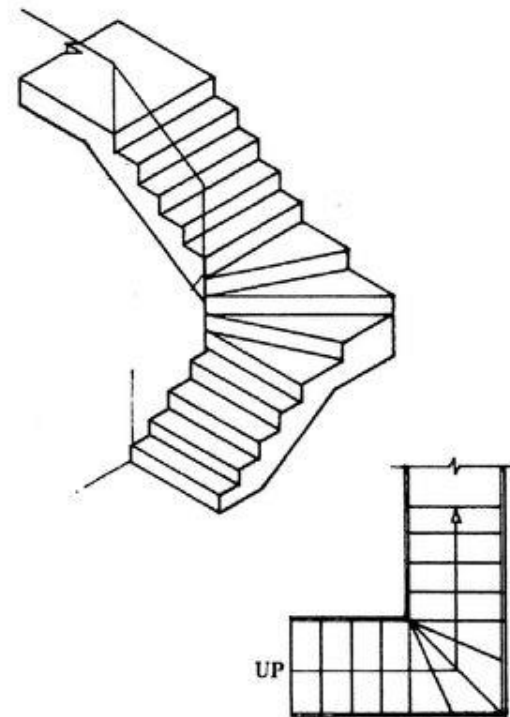
OPEN NEWEL STAIR

# Types of Stairs

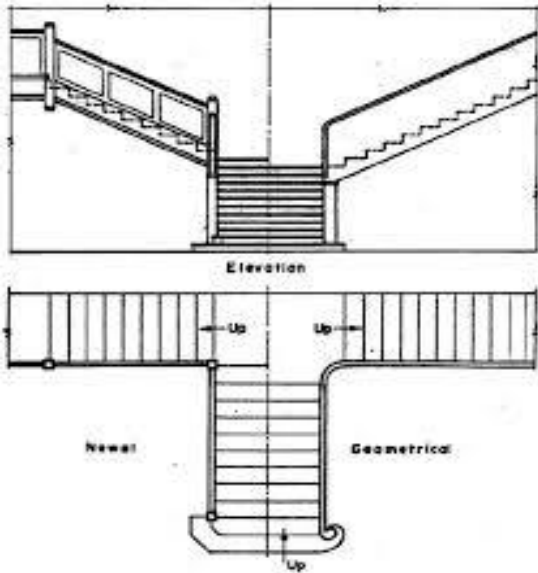
## Quarter-turn Stair With Landing



## Quarter-turn Stair With Winders



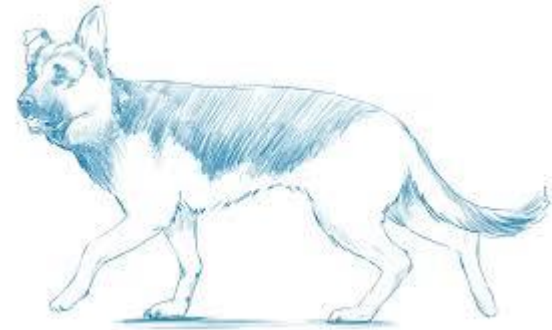
# QUARTER TURN STAIRCASE



# BIFURCATED STAIR

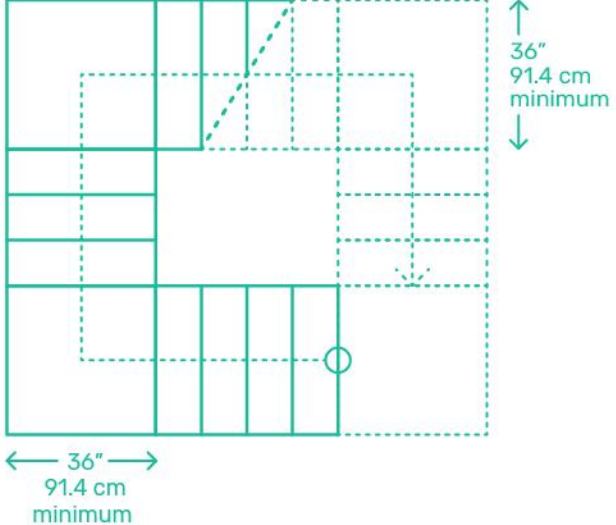
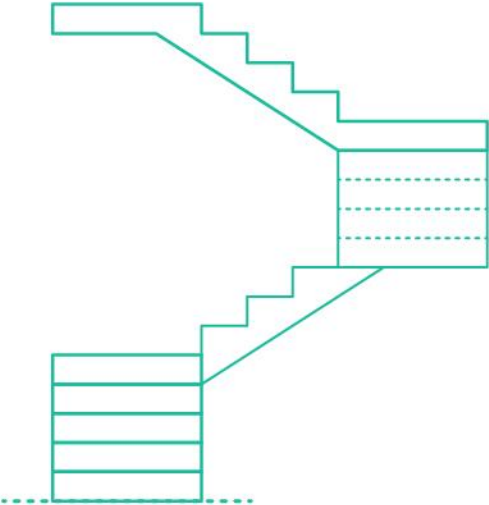
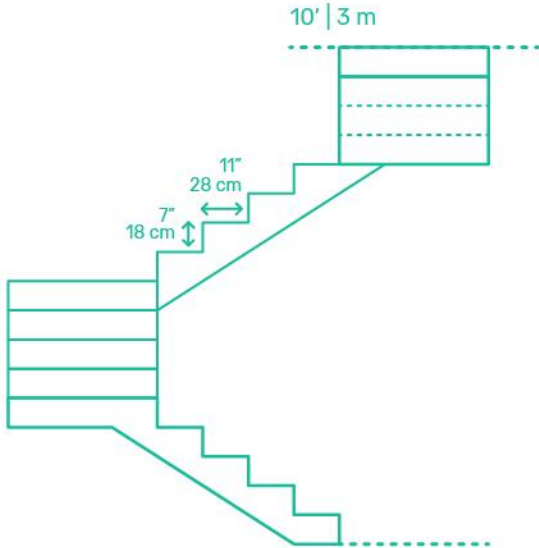


# HALF TURN STAIRCASE: EX: DOG-LEGGED STAIR

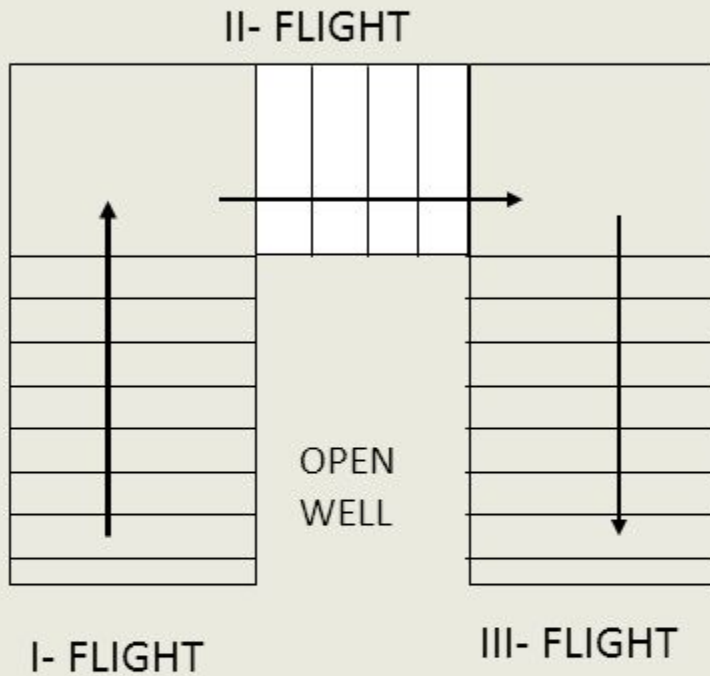


# Dimensions.Guide | Stairs

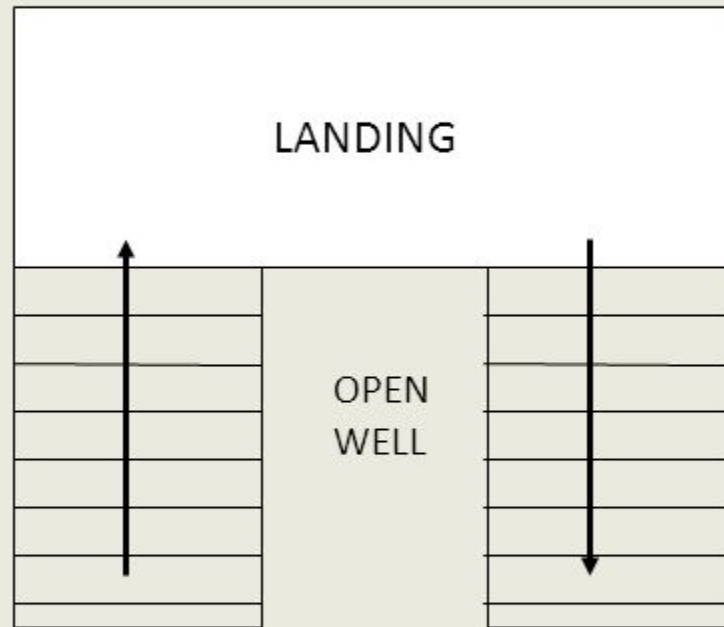
## Three-Quarter-Turn Stairs



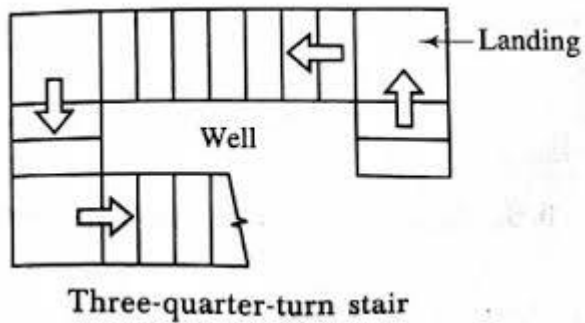
# Open Well or Newel stair cases



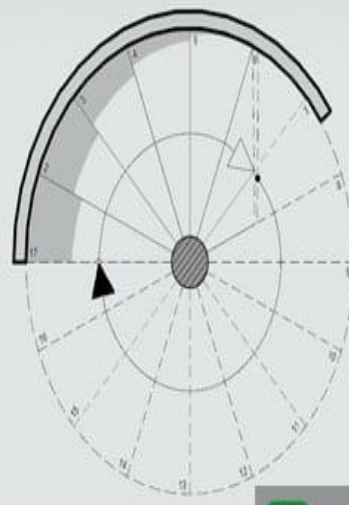
WITH INTERMEDIATE FLIGHT



WITHOUT INTERMEDIATE FLIGHT



## THREE QUARTER TURN STAIR



**b** BibLus



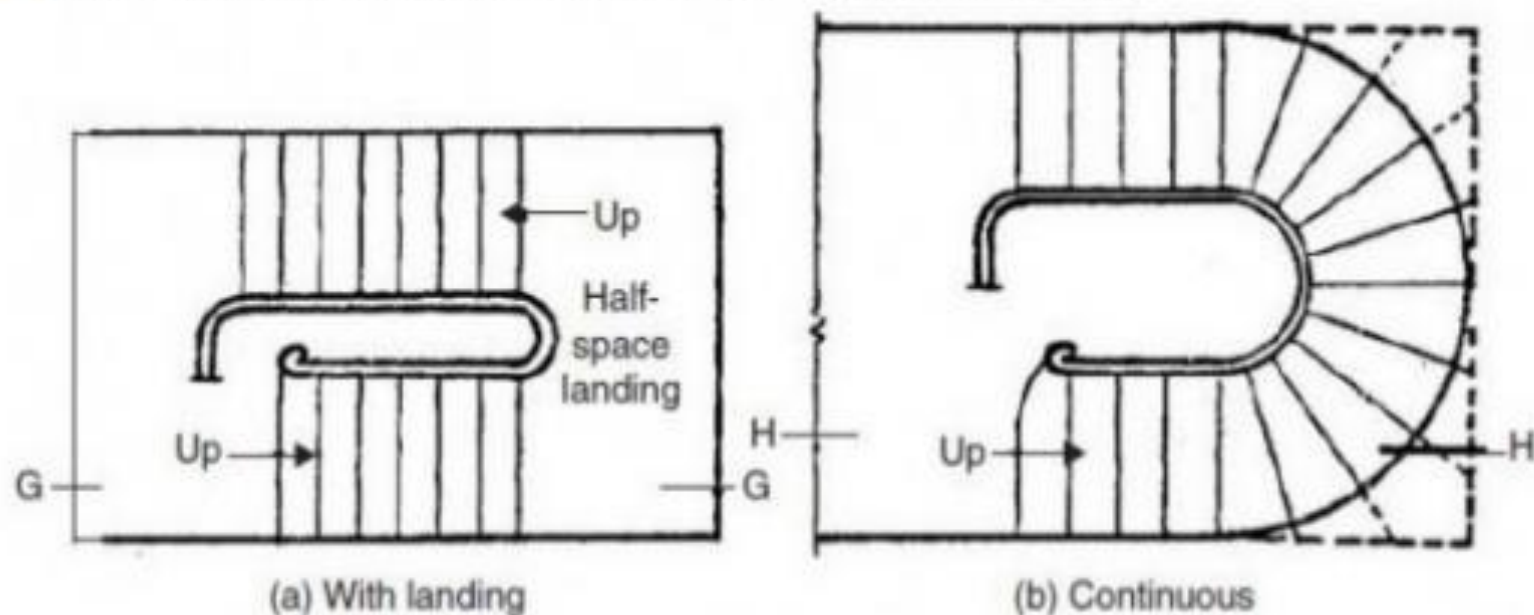
## SPIRAL STAIR



**CIRCULAR STAIR**

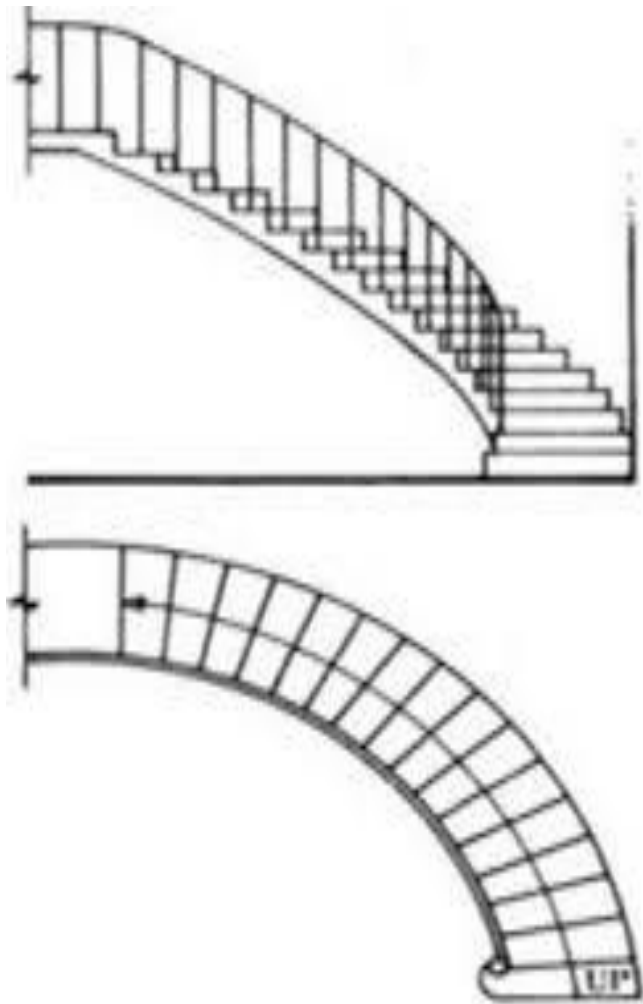
# GEOMETRICAL STAIRCASE

- 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 STAIR

## ➤ Requirement of good stairs:



### 1) Location:

- Sufficient light and ventilation should be available
- Should be Easy to access
- Should be located centrally on building geometry

2) **Material:** Good quality (Strength, Fire resistance) and should be constructed with good workmanship

3) **Width of Stair:** Should be sufficient width and at least 1m in residential building and more than one meter in case of public building

4) **Length of flight:** Not more than 12 steps and not less than 3 steps in single flight

5) **Pitch of stair:** Should not more inclined ( $30^{\circ}$  TO  $45^{\circ}$ )

6) **Head room:** should not less than 2 to 2.3m

### 7) Step Dimension:

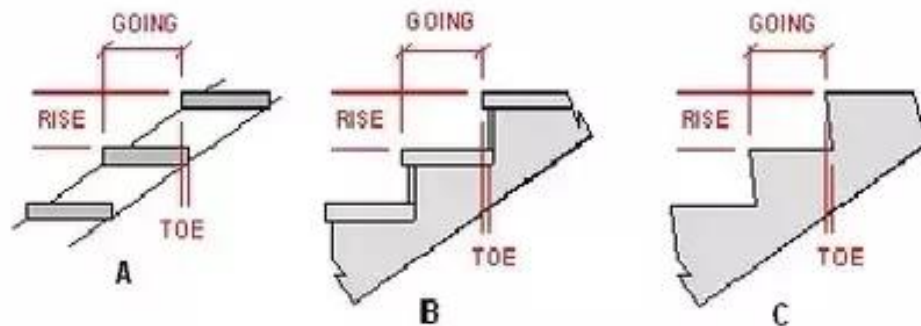
- Going or tread : should not less than 25cm
- Rise: should not more than 15cm
- The width of landing should not be less than the width of stair.

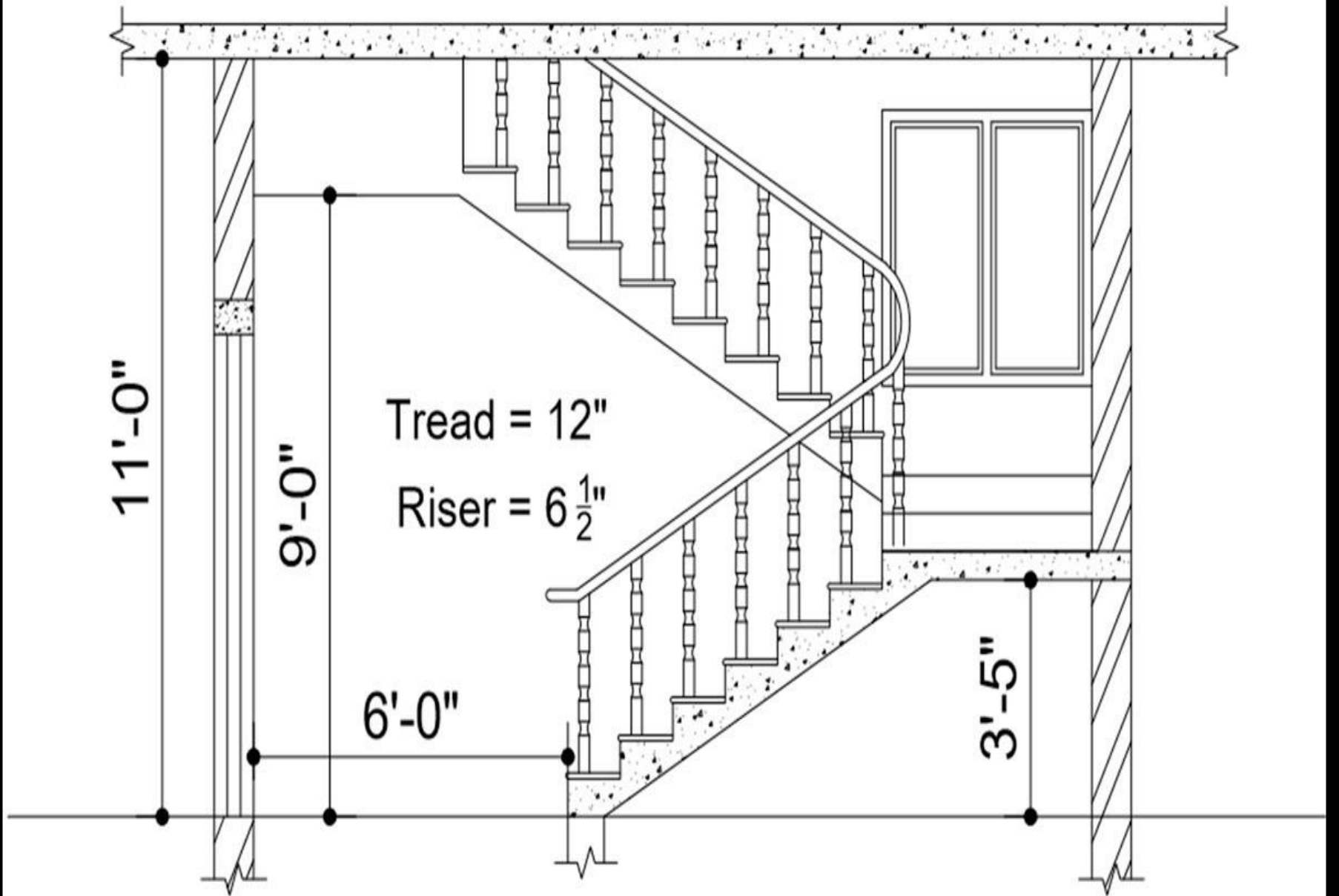


RISER (R)	GOING (G)	SLOPE RELATIONSHIP = $2R+G$
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MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM
190	115	355	240	700	550

The slope ratio of twice the RISE plus the GOING stops you from choosing a slope that is a bit extreme, like a maximum or minimum (G) and (R) together.





SECTION AT B-B