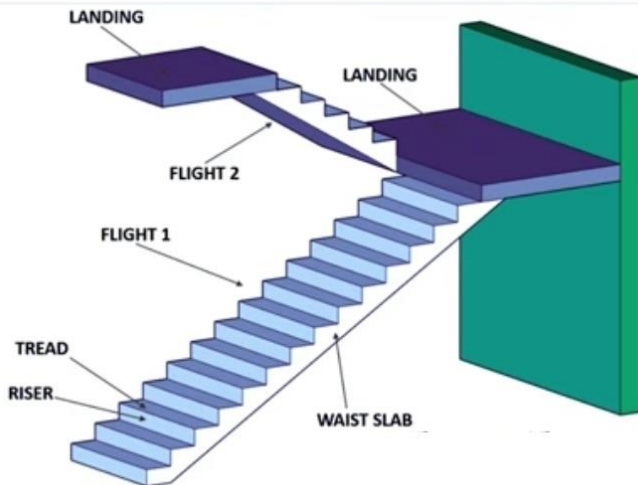


English Course2 Architecture Discipline

Eng. RAZAN AL BATAL



Minimum Space Required For A
staircase | How To Find The Length &
Width Of The Stair | Stair Design

What is a staircase?



A staircase is defined as a set of steps from one floor to another floor or a combination of the riser and treads to make easy transportation from one floor to another floor in a building.

Requirements of good stairs

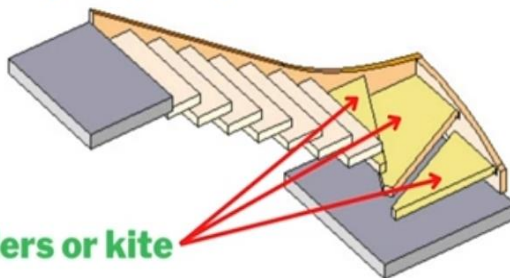
Width of Stair: It should not be less than 1m.

Length of flight: The number of steps in a single flight should not be more than 12 and should not be less than 3.

Pitch (Slope) of the stair: It should be between 25° to 40° .

Width of landing: The width of the landing should be always greater than the width of a stair.

Winders or kite steps: To build a safe and easy staircase, winders should be avoided, but if necessary, they may be provided at the lower end of the flight.



Winders or kite



Width of landing: The width of the landing should be always greater than the width of a stair.

Winders or kite steps: To build a safe and easy staircase, winders should be avoided, but if necessary, they may be provided at the lower end of the flight.

Handrails: They should be (0.75 to 0.85)m in height from the top of the respective step or landing.

Step proportions: The size of the rise and tread in a stair should be kept uniform throughout the whole stair

Headroom: The distance between the tread and soffit of the flight immediately above it, should not be less than (2.1 to 2.3) m. If it is short, one may get injured by colliding with it.



The following proportions are recommended

Generally: **Riser** (150 - 200)mm, **Tread** (250 - 300)mm

Residential buildings
Tread: 250mm
Riser: 160mm

Public buildings
Tread: 300mm
Riser: 150mm

Industrial buildings
Railway stations....
Tread: (250 - 300)m
Riser: (150 - 190)m

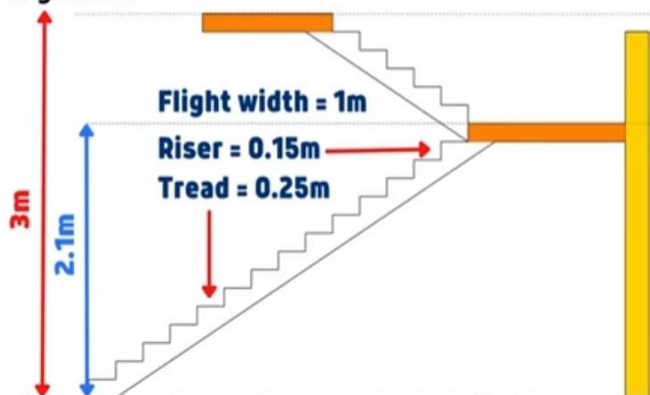
The above rules act as a guide but the actual sizes depend on the availability of space while planning stairs practical-fit

Example



Take the example of a home construction project where a staircase with a 3-meter floor height has to be built. It has a 15-centimeter-high riser, a 25-centimeter-wide tread, and a 1-meter-wide flight. The first flight is 2.1 meters high above the ground.

Given data:



The first flight



No. of risers = Hight of flight / Hight of riser

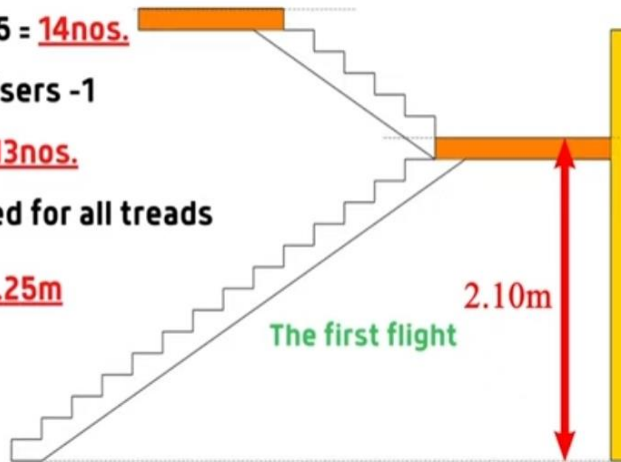
$$= 2.10 / 0.15 = \underline{14 \text{ nos.}}$$

No. of treads = No. of risers - 1

$$= 14 - 1 = \underline{13 \text{ nos.}}$$

The total length needed for all treads

$$13 \times 0.25 = \underline{3.25 \text{ m}}$$



The second flight



The second flight's height = Floor height - First flight height

$$= 3 - 2.1 = \underline{0.9 \text{ m}}$$

No. of risers = Hight of flight / Hight of riser

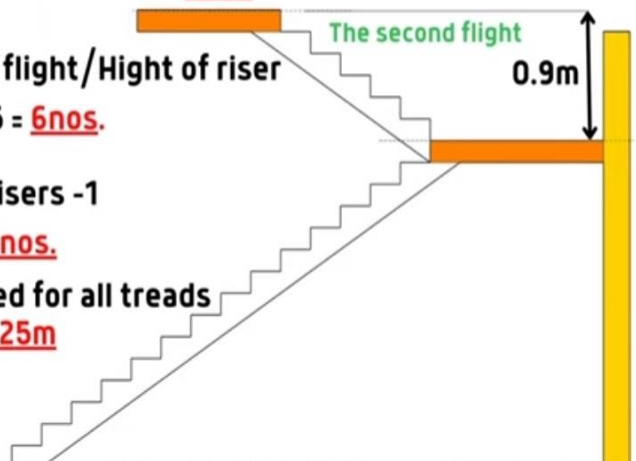
$$= 0.9 / 0.15 = \underline{6 \text{ nos.}}$$

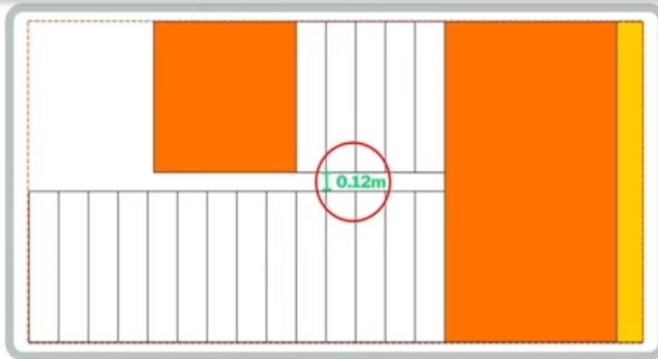
No. of treads = No. of risers - 1

$$= 6 - 1 = \underline{5 \text{ nos.}}$$

The total length needed for all treads

$$5 \times 0.25 = \underline{1.25 \text{ m}}$$





The spacing between flights must be **(0.11 to 0.15)m**, and we take **0.12m**.

The width of the stair landing **will be at least 1.0 meters** for the walkover on the stair, and we take **1.0m**.



L = Total tread length of Flight 1 + Width of Landing
 $= 3.25 + 1.0 = \mathbf{4.25m}$

B = Width of Flight 1 + Width of Flight 2 + Spacing
 $= 1.0 + 1.0 + 0.12 = \mathbf{2.12m}$