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REINFORCED CONCRETE DESIGN 1

Design of Staircase

by

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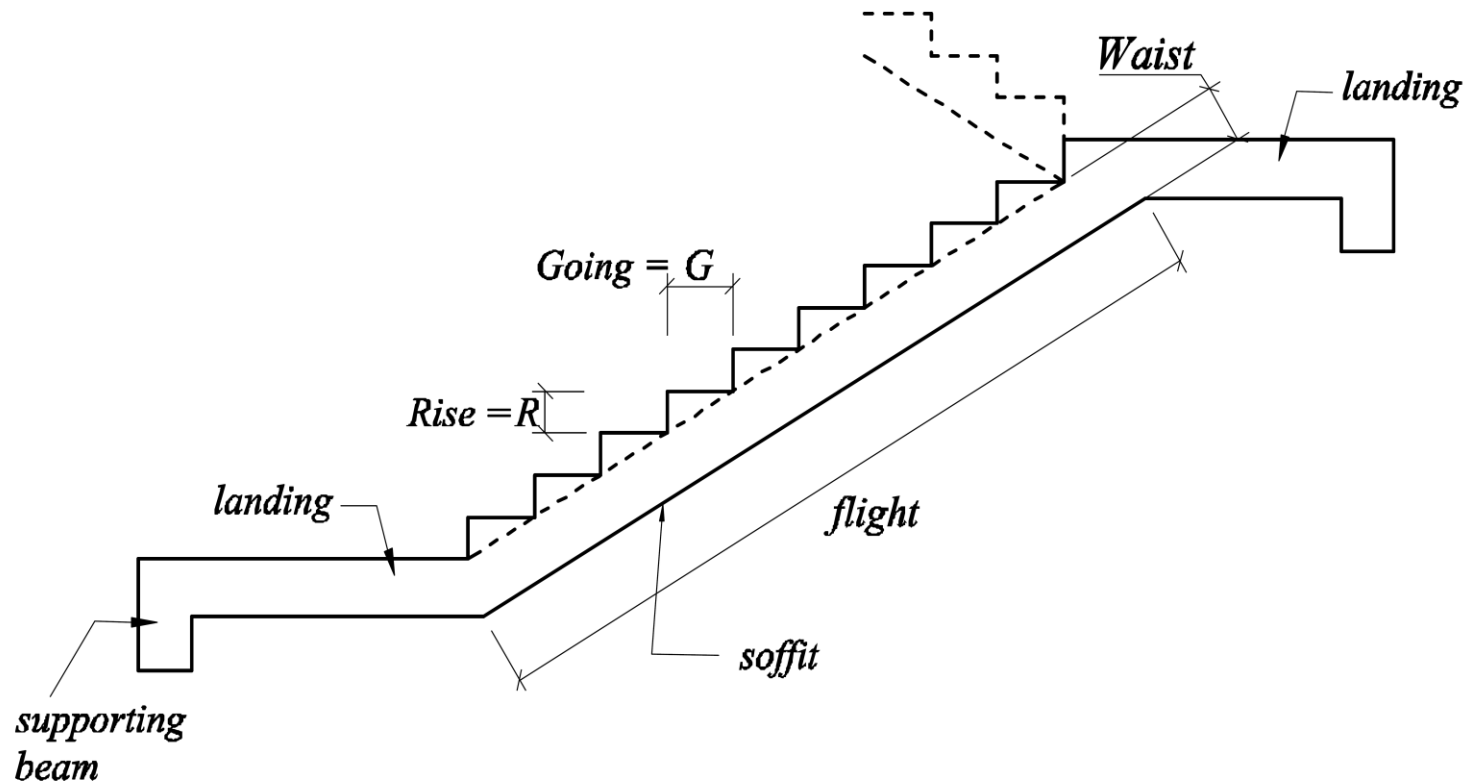
Lesson Outcome

- Identify the type of staircase
- Define and explain loading arrangement and method of analysis
- Define and calculate load distribution of analysis of staircase
- Design typical staircase

Introduction

- Stairs are essential part of every building since they lead from one floor to another and connect different levels.
- It consists of a flight of steps, usually with one or more intermediate landings provided between the floor levels.
- The dimension of the stair should give maximum comfort to the users, which depends to the use of the building; e.g. public buildings – riser ≤ 180 mm, private buildings – riser ≤ 200 mm.

Stairs terminology



Design of Staircase

- The reinforced concrete stairs should be designed similar to reinforced concrete slabs, otherwise stated.
- Considerations in staircase design:
 1. Loads
 2. Bending moments and shear forces
 3. Effective spans

Type of Stairs

Transversely supported (Transverse to the direction of movement)

- Transversely supported stairs include:
 - a) Simply supported steps supported by two walls or beams or a combination of both.
 - b) Steps cantilevering from a wall or beam.
 - c) Stairs cantilevering from a central spine beam.

Type of Stairs

Longitudinally supported (in the direction of movement)

- These type of stairs span between supports at the top and bottom of flight and are unsupported at the sides. Longitudinally supported stairs may be supported in any of the following manners:-
 - a) Beams or walls at the outside edges of the landings.
 - b) Internal beams at the ends of the flight in addition to beams or walls at the outside edges of the landings.
 - c) Landings which are supported by beams or walls running in the longitudinal direction.
 - d) A combination of (a) or (b) and (c).
 - e) Stairs with quarter landings associated with open-well stairs.

Examples and Tutorials