

Technical Module – IV - AR 0403

# **CONSTRUCTION AND DETAILS**

## REFERENCE BOOKS

1. Building Construction Illustrated - Francis D. K. Ching
  2. Building Structures Illustrated: Patterns, Systems, and Design - Francis D. K. Ching
  3. The construction of Buildings – R. Barry
  4. Structures or Why things don't fall down – J. E. Gordon
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## **COURSE OBJECTIVE**

To understand assembly as a method of construction, while developing larger understanding into the materials that follow these methods of construction. Also the course aims at developing a know-how of working with materials in terms of connections.

## **COURSE CONTENT**

Material – Steel / Timber / Concrete / Bamboo / Ferro cement / Mud

Technologies – Frame / Shells / Precast

Elements – Circulations + Floors + Roofs

Case study – Site documentation + Model making

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# LEARNING OUTCOME

Understanding of assembly as a method of construction and exploration of connections within the members – understanding the case study – Staircase + floors + roofs.

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# CIRCULATIONS

Circulation is movement of people and goods between interior spaces in buildings and to entrances and exits. **SAFE, CONVENIENT, RAPID** circulation is essential for all buildings under both normal and emergency conditions.

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# CLASSIFICATION OF VERTICAL CIRCULATION

## CLASS I

Movement of both people and goods

Ramps

**Stairs**

Escalators

Elevators

## CLASS II

Movement of goods

Dumbwaiters

Vertical Conveyors

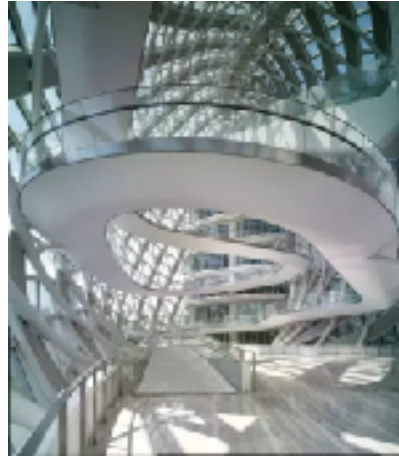
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# 1. RAMPS

Sloping surface connecting various levels or floors. Provide alternative to stairs for wheelchair users, people with mobility issues and people with prams, bicycles and other wheeled items



SOURCE: <https://www.designingbuildings.co.uk/wiki/Ramps>



SOURCE: [https://www.architectmagazine.com/design/buildings/phoenix-international-media-center-designed-by-biad\\_o](https://www.architectmagazine.com/design/buildings/phoenix-international-media-center-designed-by-biad_o)



SOURCE: <https://twistedsifter.com/2012/06/ramps-blended-and-integrated-into-stairs/>



SOURCE: <https://www.detail-online.com/magazine/stairs-ramps-lifts-27576/>

The gradient, slope or steepness of a ramp is the angular relationship between its rise or vertical height and its horizontal projection or length (run), often expressed as a ratio.

## 2. STAIRCASE

Stairs give access from floor to floor. The space/room housing stairs is called staircase. Stairs consists of a number of steps arranged in a single flight or more number of flights

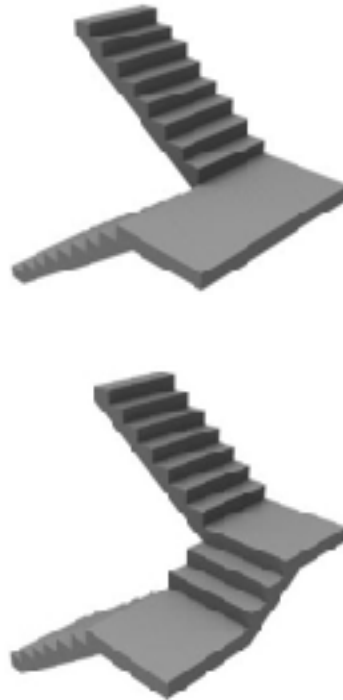
**STRAIGHT  
STAIRS**



**L - SHAPED  
STAIRS  
(QUARTER TURN  
STAIRS)**



**U - SHAPED  
STAIRS  
(HALF TURN STAIRS)**



**WINDER  
STAIRS**



**SPIRAL  
STAIRS**

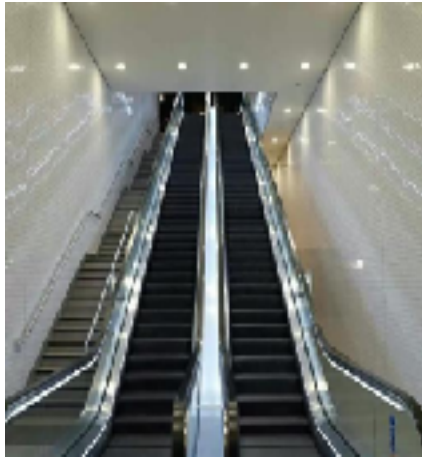


**CURVED  
STAIRS**



# 3. ESCALATOR

Escalators are powered stairs (conveyer transport), used to move large number of people from floor to floor.



SOURCE: <https://www.indiamart.com/proddetail/cleat-type-escalator-14755884973.html>



SOURCE: <https://www.indiamart.com/proddetail/spiral-type-escalator-9388652588.html>



SOURCE: <http://www.tvchain.cn/Danye.aspx?ID=20>

An escalator consists of articulated, grooved treads and risers attached to a continuous chain moved by a driving machine and supported by a steel truss framework. The installation also includes a handrail on each side of the steps that moves at the same speed as the steps; balustrades, or guards, that enclose the steps on each side and support the handrails; brakes; control devices; and threshold plates at the entrance to and the exit from the tread way. The purpose of the threshold plates is to facilitate smooth passage of passengers between the tread way and landing



# 4. ELEVATOR

An elevator is a hoisting and lowering mechanism equipped with a car or platform that moves along guides in a shaft, or hoist way, in a substantially vertical direction and that transports passengers or goods, or both, between two or more floors of a building.



SOURCE: <https://www.smithsonianmag.com/innovation/elevators-are-going-green-180968907/>



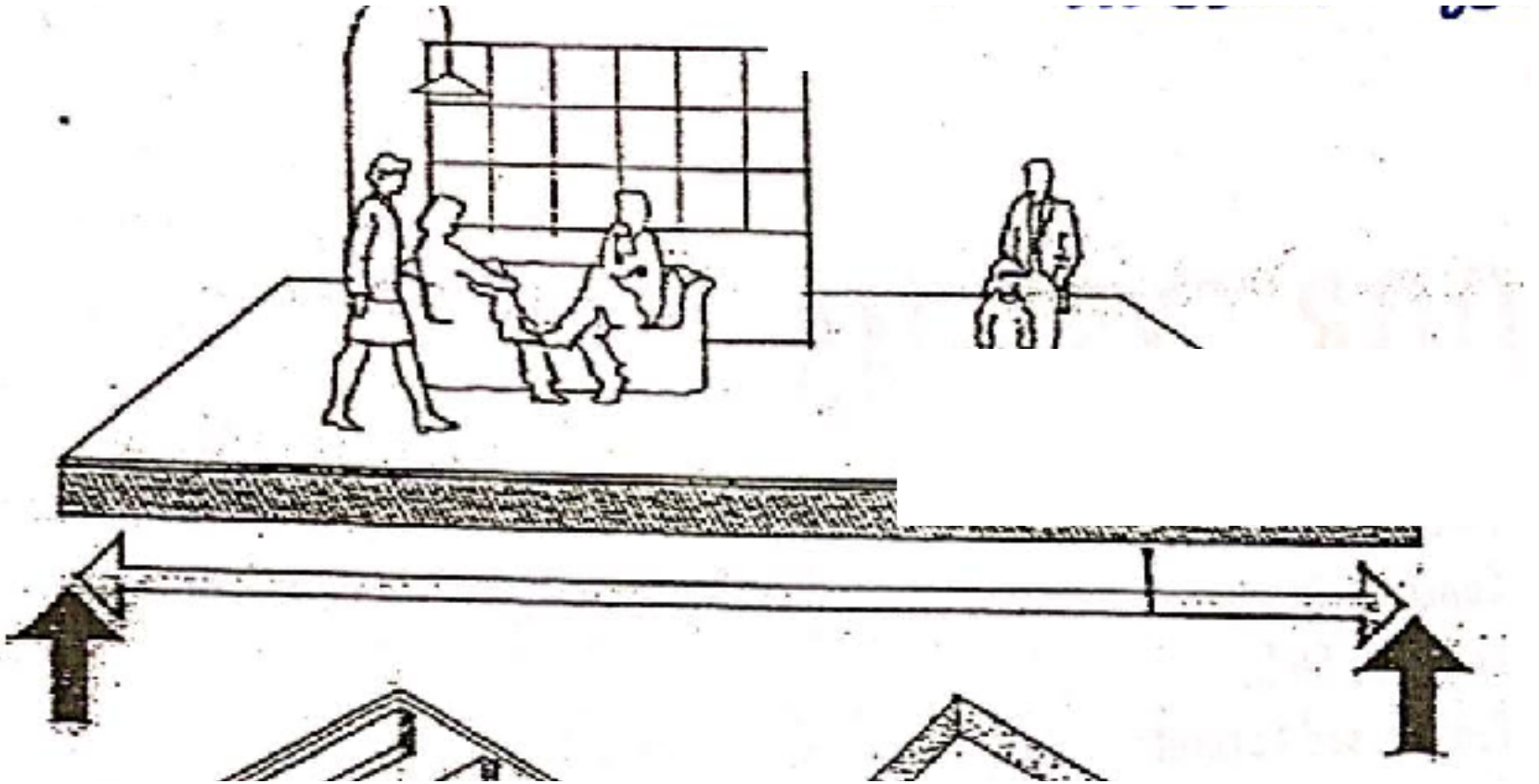
SOURCE: <https://sciencestruck.com/different-types-of-elevators>



SOURCE: <http://elevarse.co.in/products/hospital-lift-bed-lift/>

Passenger elevators are designed primarily to carry persons. Hospital elevators are also passenger elevators but employ special cars, suitable in size and shape for transportation of patients in stretchers or standard hospital beds and of attendants accompanying them. Freight elevators carry freight, which may be accompanied only by an operator and persons necessary for loading and unloading it.

# FLOORS



Floor systems are the horizontal planes that must support both live loads and dead loads. Floor systems must transfer their loads horizontally across space to either beams and columns or load-bearing walls. Depth of a floor system is directly related to the size and proportion of the structural bays it must span and the strength of the materials used

# TYPES OF LOADS

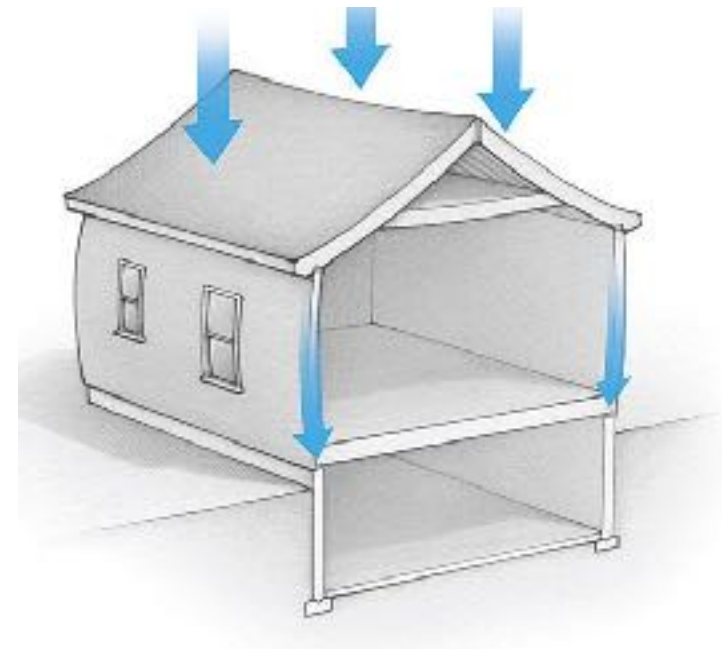
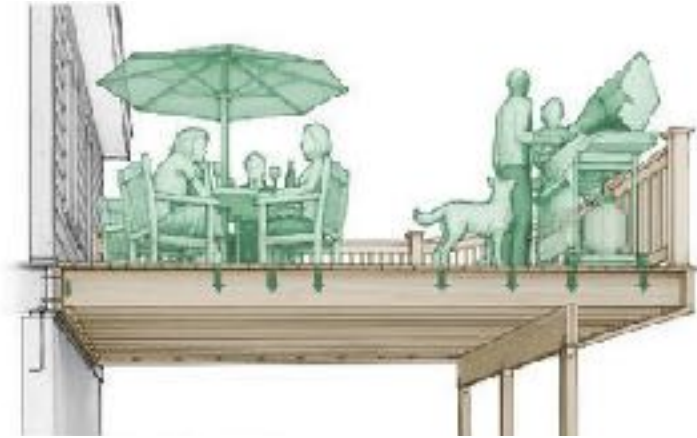
Following are the types of load acting on a slab

## 1. LIVE LOAD

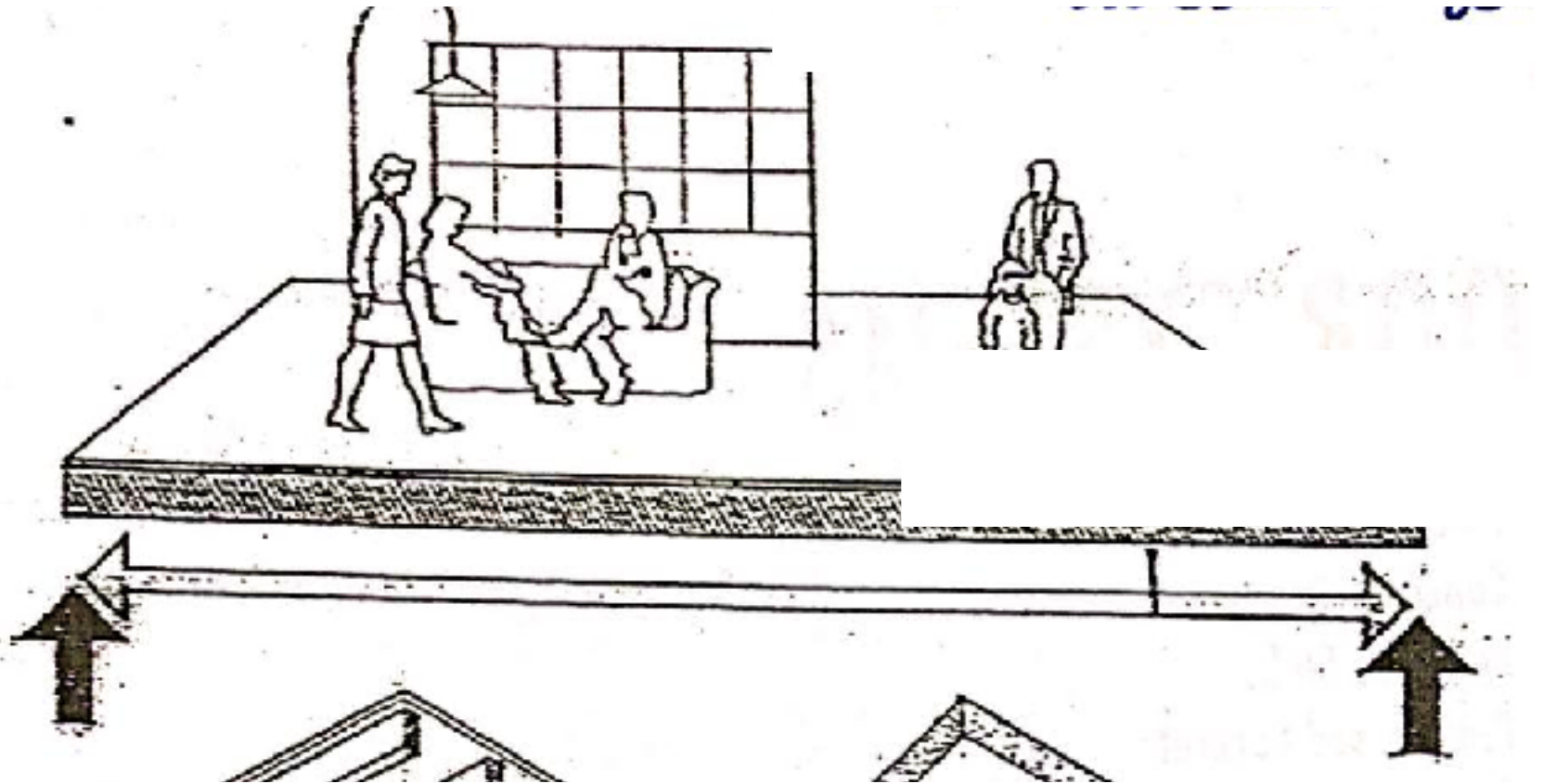
Refers to loads that do, or can, change over time, such as people walking around a building (occupancy) or movable objects such as furniture.

## 2. DEAD LOAD

Dead load refers to loads that relatively don't change over time, such as the weight of permanent components of a building including walls, Beam, columns, flooring material, etc) fixed permanent equipment and fitting that are an integral part of the structure.



# ROOFS



The upper most protective covering provided over the building to protect building from rain, heat, wind, snow, etc. It consists of the framework supported on walls or columns. The frame work is covered by suitable covering materials. There are various types of roofs that can be used but selection of type of roof depends on span, type of building, location, material, technology and available skills.