
Subject: Building Services-III

Topic: ELEVATORS

Presented by: Kavita Nagpal

- **Traction elevators**
- **Hydraulic elevators**
- **Traction-Hydraulic Elevators**

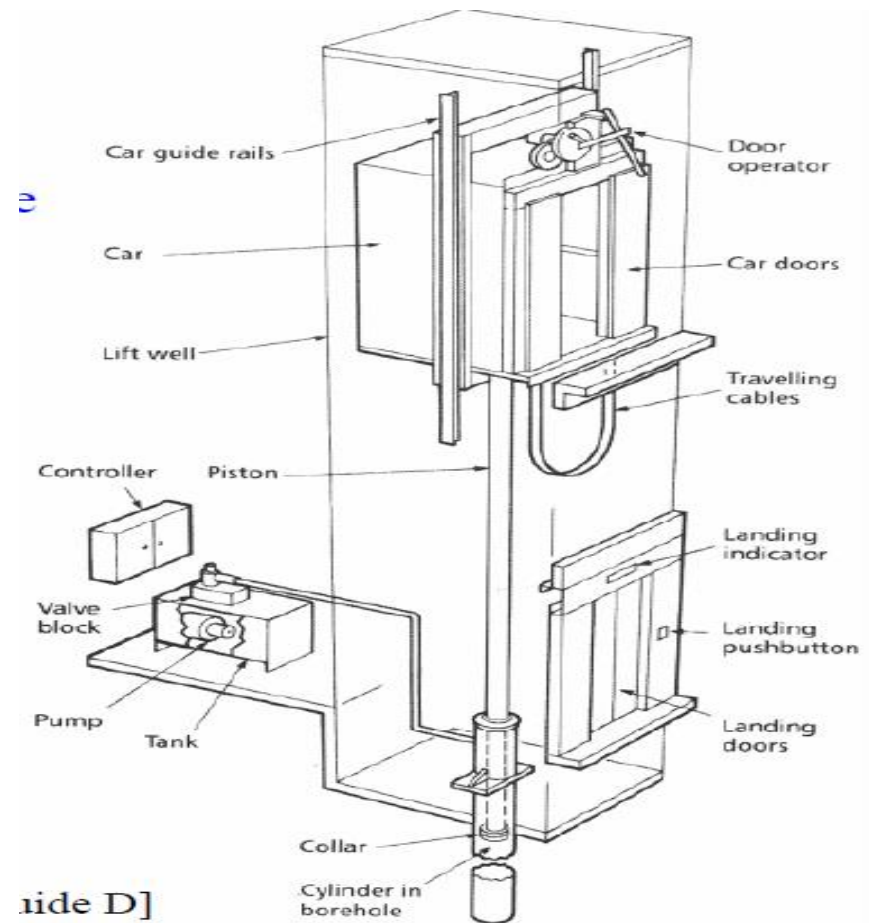
Geared traction machines are driven by AC or DC electric motors.

Geared machines use gear to control mechanical movement of elevator cars by "rolling" steel hoist ropes over a drive sheave which is attached to a gearbox driven by a high speed motor.



Hydraulic elevators

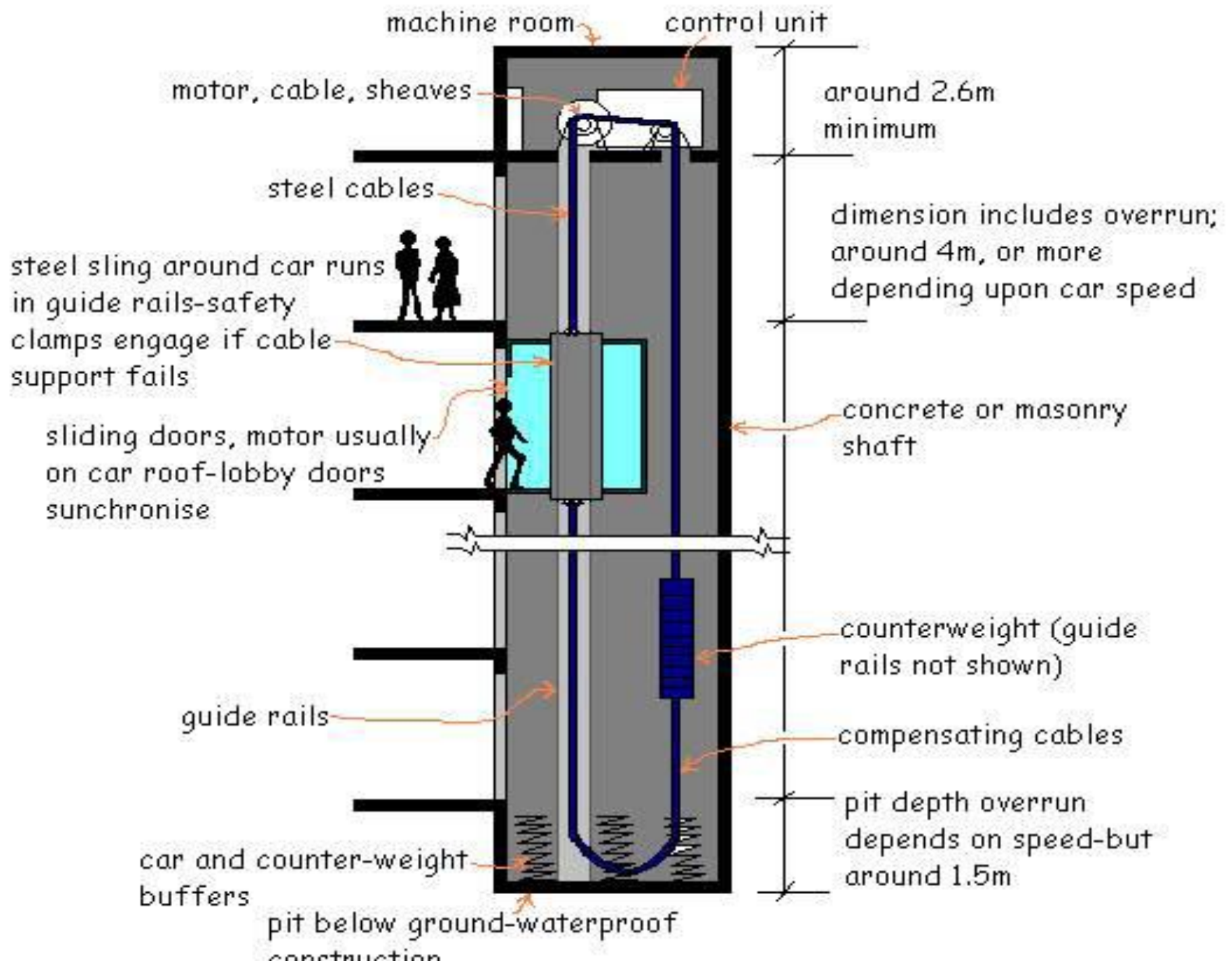
- Used for high loads.
- They use an underground cylinder, are quite common for low level buildings with 2–5 floors (sometimes but seldom up to 6–8 floors),
- have speeds of up to 200 feet/minute (1 meter/second)
- High maintenance

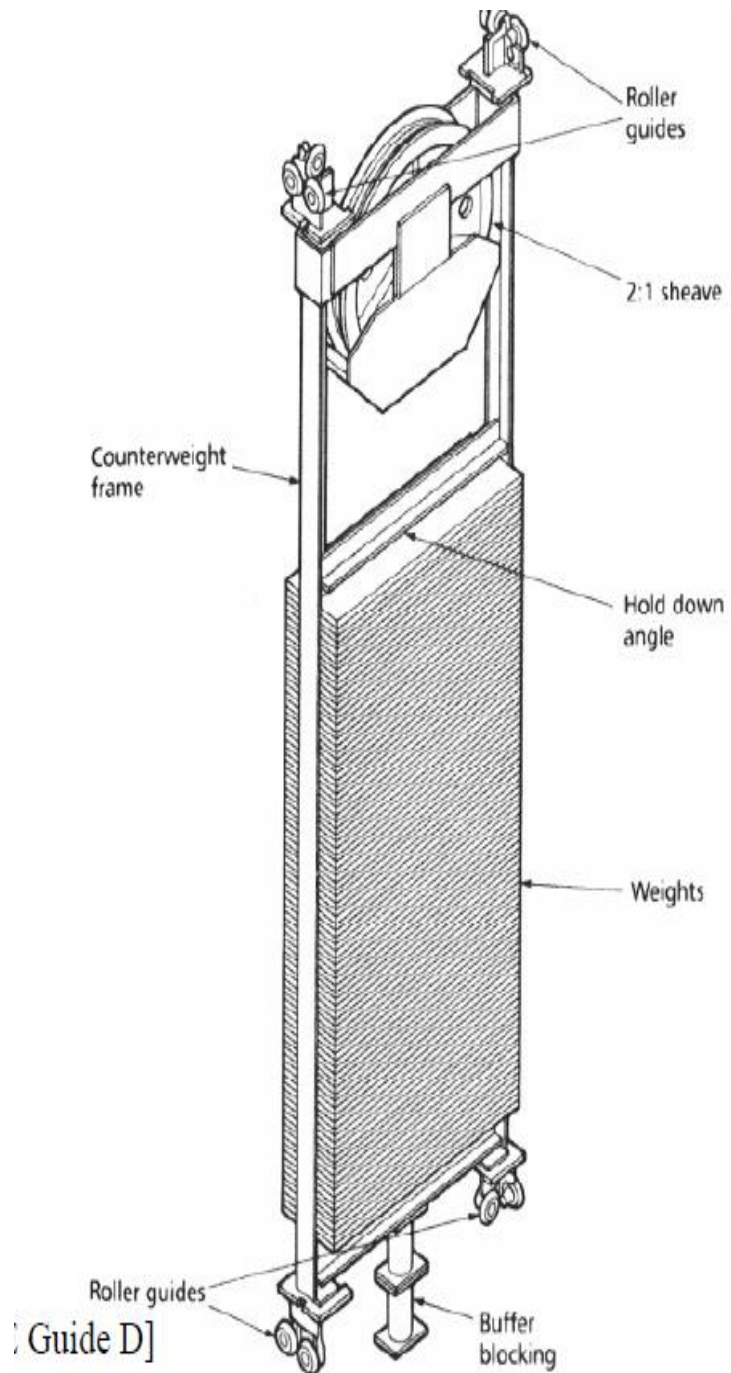


- The traction-hydraulic elevator has overhead traction cables and counterweight,
- It is driven by hydraulic power instead of an overhead traction motor. The weight of the car and its passengers
- advantageous roping ratio, reduces the demand from the pump to raise the counterweight, thereby reducing the size of the required machinery.

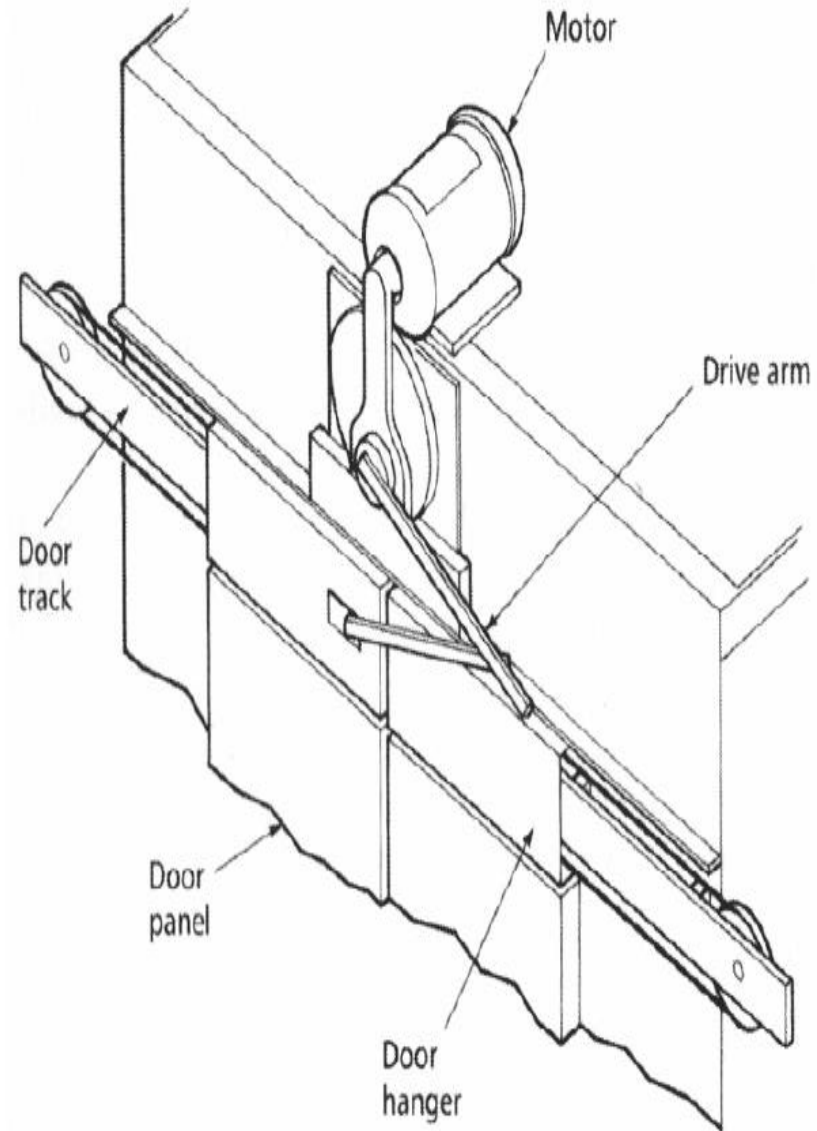
Components of elevator

- **Prime mover (electric machine or hydraulic pump)**
 - **Lift car (car frame the car itself) car (car frame, the car itself)**
 - **Counterweight (if used)**
 - **Guide rails**
 - **Entrances/Doors**
 - **Safety gear & over speed governor**
 - **Buffers (energy accumulation, energy dissipation) (energy accumulation, energy dissipation)**
 - **Roping systems (compensating ropes, traction systems)**
 - **Car & landing fixtures (buttons, indicators & switches)**
 - **Machine room.**
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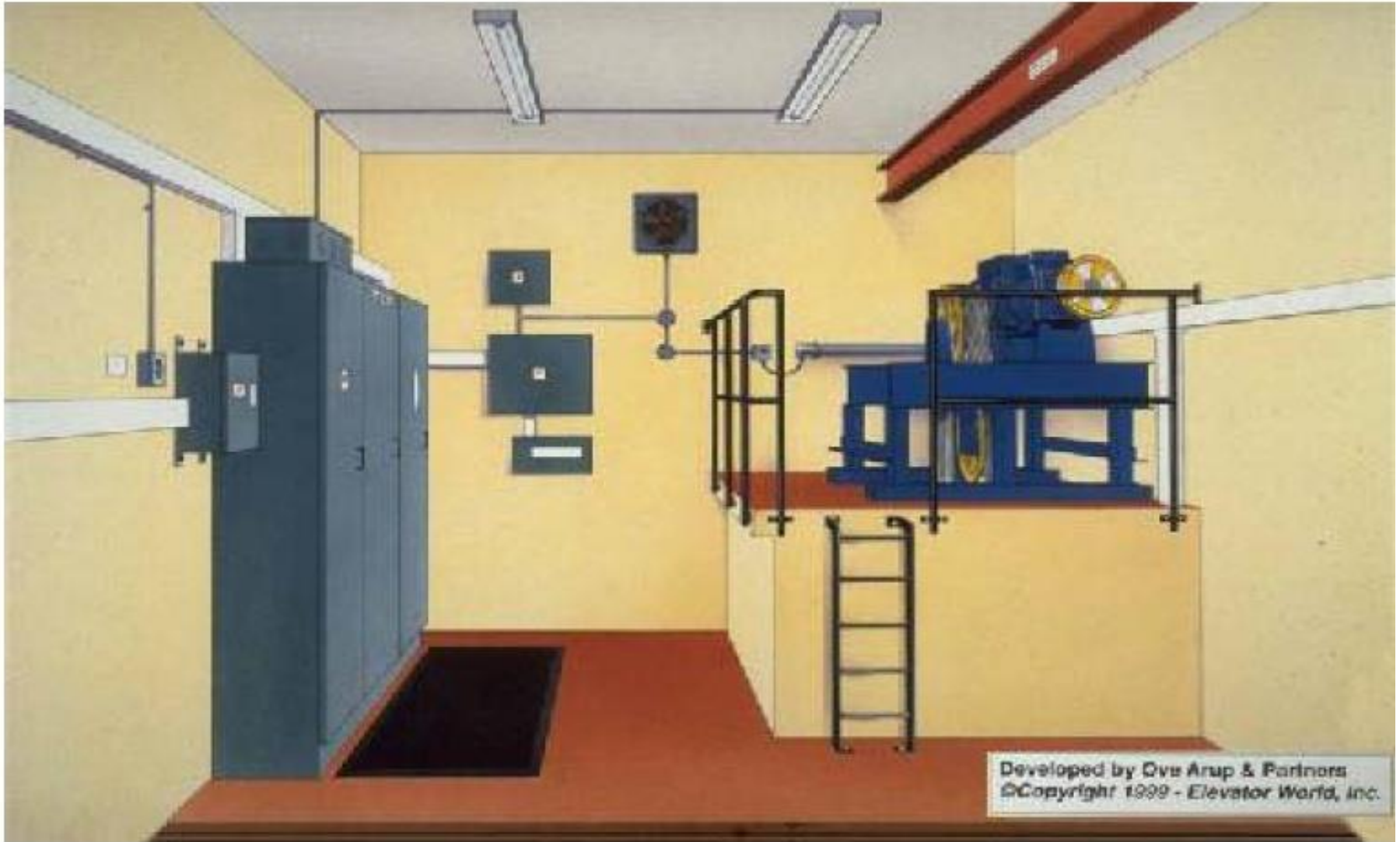


Typical counterweight



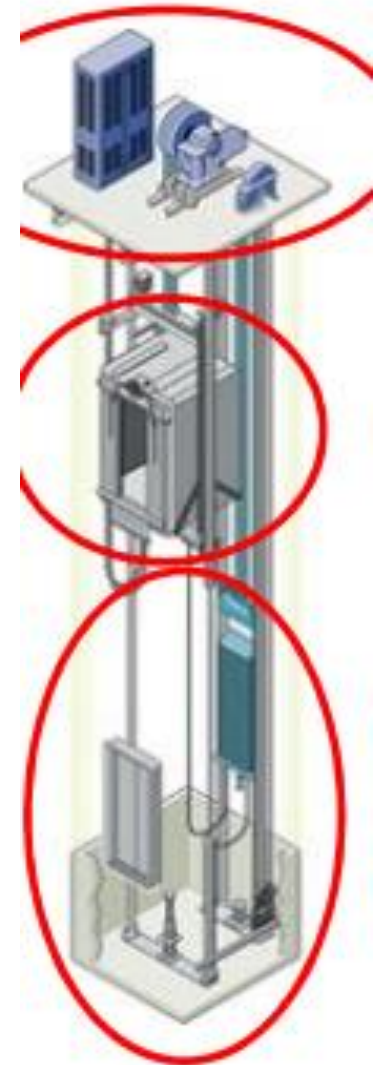
Typical door operator

Machine Room



Elevator has been used in buildings having more than 4 stories.

- **Lift** — An appliance designed to transport persons or materials between two or more levels in a vertical or substantially vertical direction by means of a guided car or platform. The word 'elevator' is also synonymously used for 'lift'.
- **Lift Car** — The load carrying unit with its floor or platform, car frame and enclosing bodywork.
- **Lift Landing** — That portion of a building or structure used for discharge of passengers or goods or both into or from a lift car.
- **Lift Machine** — The part of the lift equipment comprising the motor and the control gear therewith, reduction gear (if any), brake(s) and winding drum or sheave, by which the lift car is raised or lowered.
- **Lift Pit** — The space in the lift well below the level of the lowest lift landing served.
- **Lift Well** — The unobstructed space within an enclosure provided for the vertical movement of the lift car(s) and any counterweight(s), including the lift pit and the space for top clearance.
- **Lift Well Enclosure** — Any structure which separates the lift well from its surroundings.
- **Passenger Lift** — A lift designed for the transport of passengers.



- **There are primarily two types of lifts- Passenger and freight or goods lifts, Passenger lifts are provided in apartments, high rise buildings, and offices etc.**
- **The size and speed of lift depend upon the services expected from lift. In hospitals it is required to shift patients from one floor to another floor for treatment.**
- **Therefore it should be large enough to accommodate stretchers and even the speed is kept moderate in hotels, service boys require to take food, beverages etc. from kitchens to rooms.**
- **Goods lifts are provided in industrial buildings to carry material from one floor to another floor. The size provided is large to carry big packages. The speed is normally moderate or slow.**

TYPES OF LIFTS



- **Number of floors to be served**
 - **Floor to floor distance**
 - **Population of each floor**
 - **Location of building**
 - **Specialist services within building**
 - **Type of building occupancy**
 - **Maximum peak demand in passengers per**
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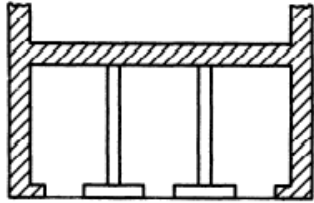
Lifts on the basis of requirements

- *Hotels*
 - *Residential apartments*
 - *Offices*
 - *Hospitals*
 - *Shopping malls*
 - *Bus, railways metro stations, air ports.*
 - *High rise buildings/Skyscrapers.*
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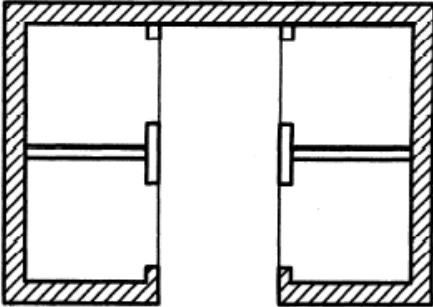
A group of elevators should be designed to be located closely together to minimize the walking distance between entrances. Waiting passengers can then react quickly and access cars swiftly without detrimental effect to the quality of overall service.

Lobby areas, especially the main ones, should not be in the path of passageways. Any potential for confusion between waiting passengers and passers-by should be avoided by having separate lobby areas.

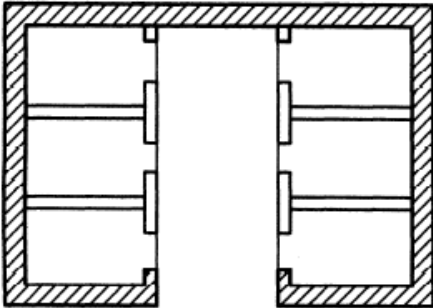
Grouping of elevators



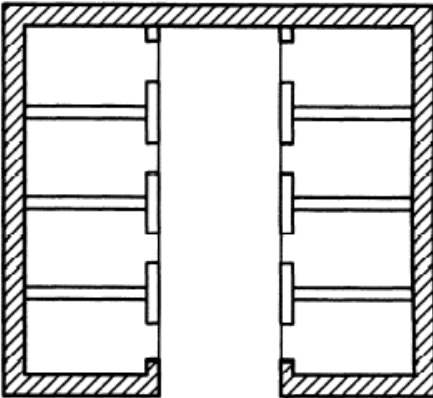
1A STRAIGHT LINE
ARRANGEMENT FOR THREE LIFTS



1B ALCOVE ARRANGEMENT FOR
FOUR LIFTS



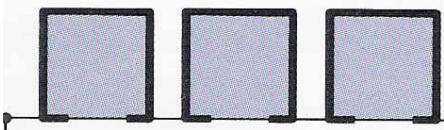
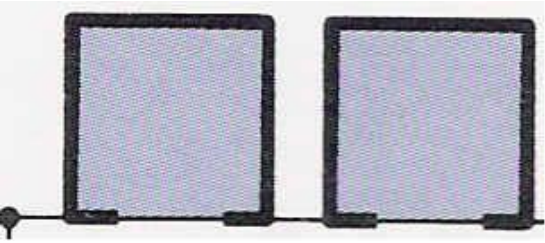
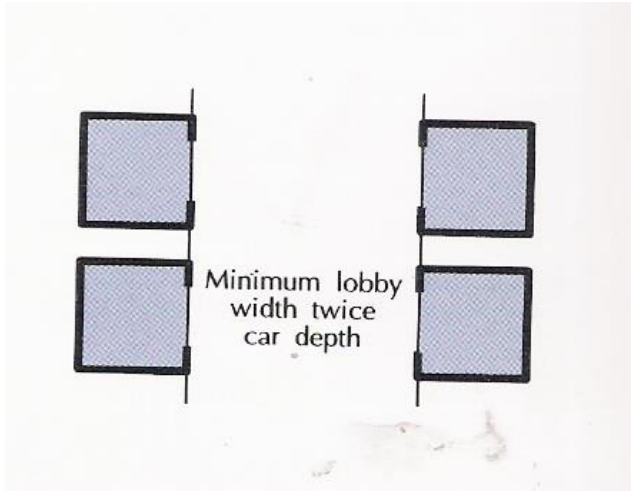
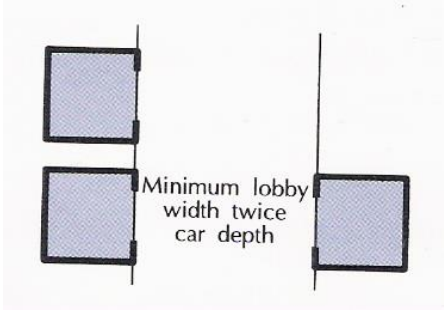
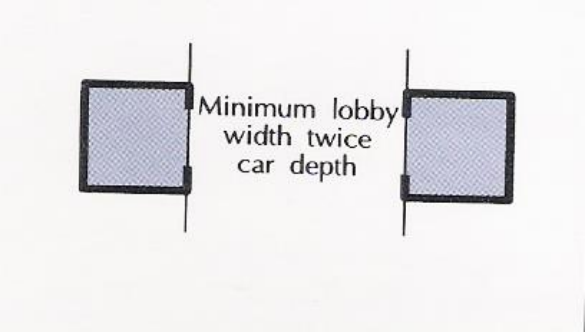
1C ARRANGEMENT FOR SIX LIFTS



1D ARRANGEMENT FOR EIGHT LIFTS

FIG. 1 ARRANGEMENT OF LIFTS

Grouping of elevators



Two Car Groups

Three Car Groups

Four Car Groups

Escalators



Grouping of elevators

- **Escalators are the elevators used for vertical transportation of large number of people between limited numbers of building levels.**
- **These are power driven stairs and one has to stand in a step and it takes him/ her up / down in horizontal direction.**
- **These stairs have continuous operation without the help of any operator.**
- **The escalator are in the form of an inclined bridge spanning between the floors.**
- **Two roller hauling chains, precision made, travel over the sprocket pulling the endless belts of steps.**
- **Slopes of stairs are usually 30° horizontal**