

GENERAL ELEVATOR PLANNING

Several numbers of passenger elevators are usually required in most buildings in order to cope with the traffic density and choosing the right elevator configuration can be a critical decision. In the interest of economy as well as even utilization, every effort should be made to achieve a layout where elevators can be combined into a group with an appropriate group control system.

For Office buildings, one elevator group can generally serve all floors in buildings up to 15 to 20 floors depending on the building population. When there are more than 20 floors, single grouping is not efficient and would normally result in long travel times and congestion in the elevator lobbies during peak periods. The passenger elevators for buildings with more than 20 floors (up to about 35 floors), should be separated into low rise service and high rise service.

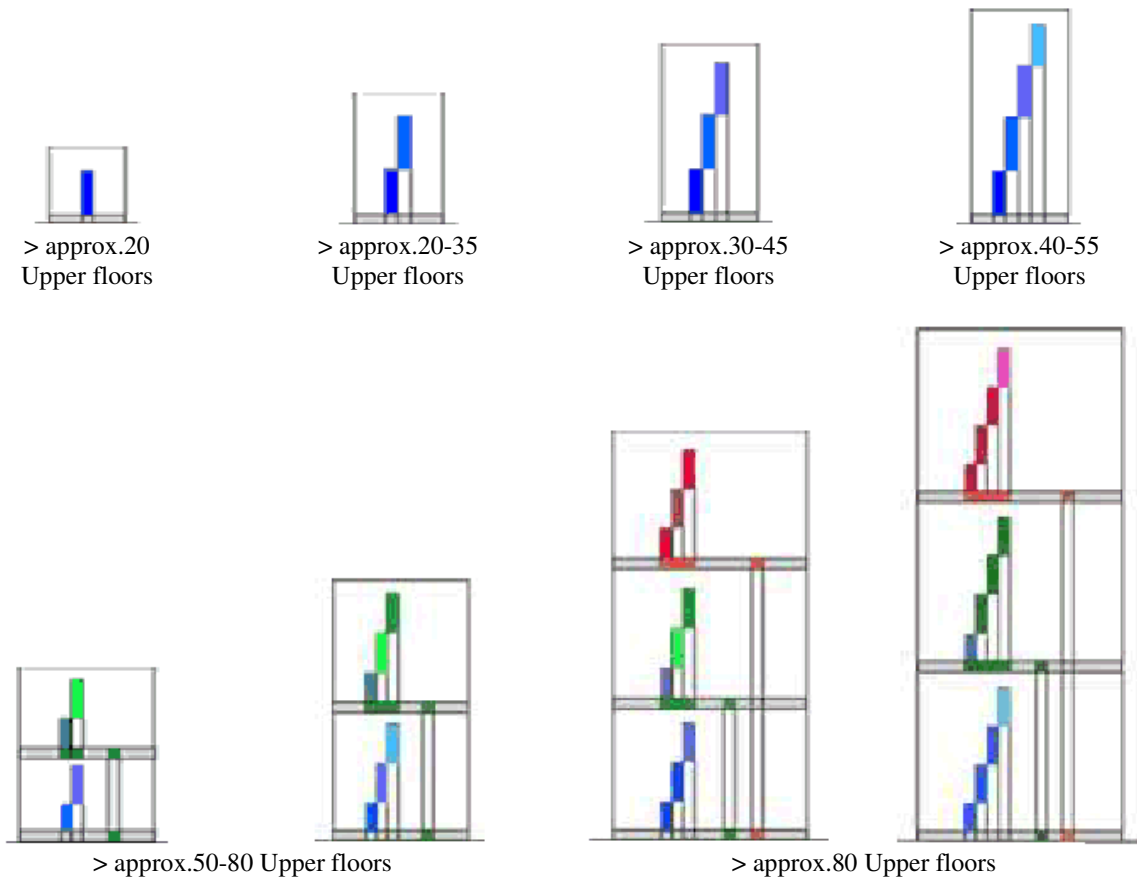
Elevators in the low rise group should serve the lower half of the building while elevators in the high rise group travel directly from the main stop to the upper half of the building. Such a zoning arrangement would cut down on the number of stops per elevator,

thus reducing round trip times and increasing the handling capacity of each group.

Furthermore, the low rise group would then not require high speed elevators, thus providing an economical solution as well as more efficient distribution of the building population during peak periods. The same zoning principle is also applied in buildings with even greater number of floors where 3 or more elevator zones can and should be deployed.

Efficiency of the passenger elevator service in a building is usually measured by the "5-minute handling capacity" and the "average destination time" which can be defined as the waiting time in the elevator lobby plus the travelling time inside the elevator. As a guide, the following are the guidelines for 5-minute handling capacity for different types of buildings:

- Residential Apartments / buildings: 7 to 9%.
- Premises without specific distribution traffic, such as mixed-tenancy Office buildings with different working hours: 12 to 16%.
- Premises with excessive distribution traffic, such as single tenancy Office buildings with the same working hours: 16 to 25%.



>> *Planning Requirements*

General Considerations

The design team will need to consider a whole spectrum of diverse factors, for example:

- The arrival rate of passengers into the building
 - How close are rail and bus stations?
 - Are the parking facilities self-contained or adjacent?
 - How many building entrances are there?
 - What is the mail distribution system in the building?
- The investment interests of the developer
 - Is the building speculative?
 - Is the owner a landlord or an occupant?
- The quality of the adjacent buildings
 - Will new or existing tenants be attracted?
 - Are there high-quality tenants looking to trade up or down in the neighbouring area?
 - Are the elevators in the adjacent buildings doing their job efficiently?

And so on. There could be over a hundred different possible configurations for your building's elevators, and each will have its advantages and disadvantages compared with the others.

The professional team working to find that optimum solution will need expert advice, both in conceptualizing alternative schemes and in providing the multiple traffic calculations and simulations that will form the basis for the final design.

Elevator Cores

Once the overall concept for the service core is defined and traffic analysis has confirmed that the internal passenger transportation solution will meet its design brief, the next step is to plan the individual elevator cores in detail.

General Guidance

This planning document sets out dimensional information on the main modules, speeds and loads recommended for Schindler 300P elevators, and the planning dimensions recommended to conform with international design standards. This includes reliable guidance on the most popular installation options, but is in no way a complete guide to the potential applications of Schindler 300P elevators.

Individual Needs

The elevator requirements of both Commercial and Residential building can rarely be planned on the basis of brochures alone. Each building is unique, and the optimum solution will usually require individual variations from routine standards. For example :

- Very high buildings require extra hoistway clearance to allow for additional construction tolerances.
- Individual national regulations will need to be accommodated.
- Innovations in architectural styling or structure may necessitate a radical approach to the layout.
- Escalators may be more appropriate than elevators between adjacent floors. Frequently, interchange floors or main lobbies with public spaces above them (such as retail) will be better served by escalators, freeing the elevators for longer-distance travelers.
- High rise buildings needs fireman's lift which serves every floor according to national code requirements.

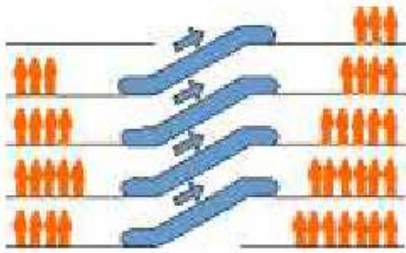
Dividing Beams

We also recommend that multiple cars in a group with common shafts be separated by 'I' beams, which can allow the easy passage of air between individuals shafts. This would avoid the 'piston effect', and its consequent negative impact upon ride quality and noise in the lobbies.

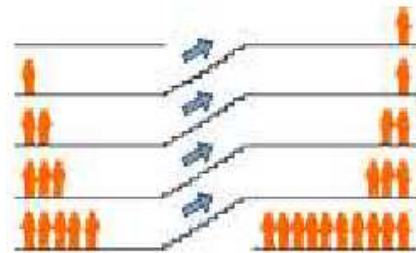
Counterweight Safety Gears

Elevators in hoistways that are not solid to ground or have occupied space beneath them must be fitted with counterweight safety gears. This may also require up to 200mm increase in shaft depth.

GENERAL PLANNING FOR ESCALATORS AND PASSENGER CONVEYORS



Escalators increase the volume of business on all sales levels.



With fixed stairs, the upper sales levels are less frequented.

Applications for escalators and passenger conveyors

Escalators and passenger conveyors enable a constant stream of passengers, even at a high transport volume. In the commercial sector, consumers get to become familiar with all sales levels. This gives escalators the potential to boost sales. In public transport, escalators can transport passengers quickly at high traffic volumes.

Speeds and transport capacities

Speeds of between 0.45 and 0.5 m/s are the common international standard. Speeds of 0.65 and 0.75 m/s are only recommended for higher rises or in public transport. Increasing the speed does not lead to a

proportional rise in transport capacity, since users hesitate longer before stepping on the unit.

Depending on the given situation (location, application), the effective transport capacity may measure up to 80% of the theoretical values. The transport of baggage carts reduces transport capacity significantly. In addition to a group of two or more escalators, a passenger elevator should be provided for the transport of strollers and wheelchairs.

Transport capacity - escalators and passenger conveyors

Fully occupied escalators and passenger conveyors have the following theoretical transport capacities:

Escalators

		Pers./h at 0.5 m/s	Pers./h at 0.6 m/s	Pers./h at 0.65 m/s
Step width	600 mm	4500	5400	5850
Step width	800 mm	6750	8100	8775
Step width	1000 mm	9000	10800	11700

Inclined passenger conveyors

		Pers./h at 0.5 m/s	Pers./h at 0.6 m/s	Pers./h at 0.65 m/s
Pallet width	800 mm	6750	8100	8775
Pallet width	1000 mm	9000	10800	11700

Horizontal passenger conveyors

		Pers./h at 0.5 m/s	Pers./h at 0.65 m/s	Pers./h at 0.75 m/s*
Pallet width	800 mm	6750	8775	10150
Pallet width	1000-1400 mm	9000	11700	13500

*0.65 m/s are recommended

Inclinations and rises

Escalators

Inclinations of 30 and 35 degrees are the common international standard for escalators. Escalators with an inclination angle of 27.3 degrees are also available. The 35 degrees escalator is the most efficient solution, since it requires less space and costs less to make. However, with rises exceeding 5 m this inclination angle is perceived as too steep, especially when going down. For rises exceeding 6 m an inclination angle of 35 degrees is not permissible according to EN 115.

Recommended values for the transport of baggage carts:

Speed = 0.5 m/s

Inclination max. 30

Step run min. "M"

Step width min. 1000 mm

Passenger conveyors

Inclinations of 10, 11 and 12 degrees are the common international standard for passenger conveyors. Horizontal passenger conveyors can basically be provided for inclinations between 0 and 6 degrees. Schindler passenger conveyors with short pallets permit minimum installation lengths.

- Escalators

Table according to EN 115 (other national regulations can be met)

Rise	Speed	Max.inclination	Horizontal step (mm)
H ≤ 6 m	≤ 0.5 m/s	35—	800 (K)
	> 0.5 ≤ 0.65 m/s	30°	1200 (M)
	> 0.65 < 0.75 m/s	30°	1600 (L)*
H > 6 m	≤ 0.5 m/s	30°	1200 (M)
	> 0.5 ≤ 0.65 m/s	30°	1200 (M)
	> 0.65 < 0.75 m/s	30°	1600 (L)*

* recommended

- Passenger conveyors

Table according to EN 115 (other national regulations can be met)

Rise	Speed	Inclination	Horizontal pallet run [mm]
not limited by standards	≤ 0.75 m/s*	0° - 6°	not required
		10° - 12°	400 at the top
	> 0.75 ≤ 0.9 m/s	max. 12°	1600 at top and bottom, pallet width ≤ 1.1 m

Intermediate supports

One or more intermediate supports must be provided, if there are large spans between the upper and lower end supports. Whether and how many intermediate supports are necessary depends on the truss deflection under live load and the applicable regulations. General rule:

An intermediate support is necessary at installed lengths exceeding 16 m at a step width of 1000 mm. Schindler determines whether and how many intermediate supports are needed for each project.

Step/pallet/belt widths

- Steps

Escalators are available with step widths of 600, 800, and 1000 mm. The most popular step width is 1000 mm. This step width gives the user unimpeded access to the step band, even with baggage and shopping bags. The other two step widths are used mainly for less frequented units or where space is tight.

- Pallets/belts

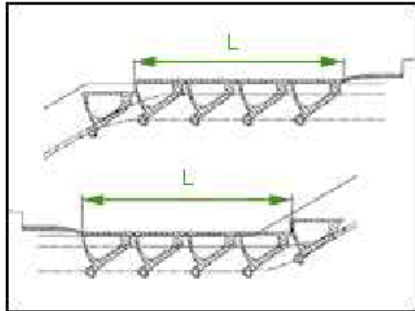
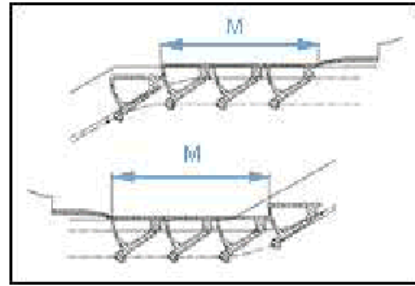
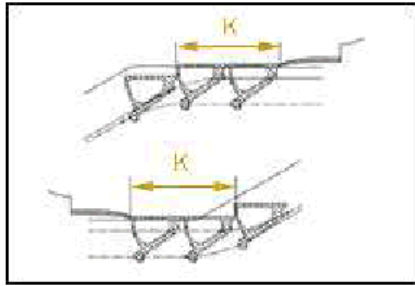
Passenger conveyors with inclinations between 10 and 12 degrees are available with pallet widths of 800 and 1000 mm, and passenger conveyors with inclinations between 0 and 6 degrees are available with either a pallet width of 800 mm or with pallet or belt widths of 1000, 1200, and 1400 mm.

The most popular width is 1000 mm. Since passenger conveyors with this pallet or belt width are also suitable for transporting shopping and baggage carts, they are used mainly at shopping centers and railroad

stations. At airports, there is an increasing tendency to use 1400 mm wide passenger conveyors, since this width even makes it possible to get around passengers with baggage carts comfortably.

Horizontal step/pallet run

EN 115 distinguishes between three designs with respect to horizontal step or pallet run:



Design "K" = 800 mm horizontal

Design "M" = 1200 mm horizontal

Design "L" = 1600 mm horizontal

Installation - planning information

General

Questions concerning transport, access to the installation site, and installation must always be included in the planning process, so that the condition on delivery, the access route into the building, and the suspension points for lifting equipment can be clarified as far in advance as possible. Planning criteria relevant to installation greatly facilitate the installation process and can produce substantial cost savings during installation.

Installation dimensions

The installation dimensions are to be taken from the following documentation: dimension sheet (appendix to offer) - not to scale layout drawing

Required pit width of the carcass:

Single installation: escalator/passenger conveyor width + 60 mm

Parallel installation: double the escalator/passenger conveyor width + 100 mm

Any change in installation dimensions after release of the drawing by the architect can result in delivery delays, is extremely expensive, and should be avoided.

Transport dimensions

The escalators/passenger conveyors are preassembled and - where possible - delivered to the construction site in one piece. This facilitates transport and installation. When planning the method of assembly and determining the delivery date, care must be taken to provide access dimensions up to the installation pit. If the overhead clearance for the access route is inadequate, the balustrade can be partially dismantled. Assembly time will be a determining factor when planning the installation method.