Chapter 11: Communication with passengers; building security and intelligent door- and drive systems

Summary: This chapter reviews a few aspects of group controls that deserve special attention during the development of "intelligent destination" group controls.

Communication with passengers

Traditional elevators communicate with passengers by means of UP and DOWN buttons and a variety of indicators and gongs in lobbies. Passengers observe arriving cars and take the first one that goes in the desired direction. Passengers enter their destinations with floor buttons after entering the cars.

Each passenger of a group with intelligent destination controls is required to enter his/her destination on arrival in a lobby. Each lobby usually has a special panel for destination entry by passengers. The reply of the group control might be as follows: **“Please use car B arriving in about 12 seconds”**. For a passenger on the 4th floor with destination floor 9 the reply might be: “Please use DOWN going car C arriving in about 11 seconds to go to floor nine”. Particularly during periods of heavy traffic intelligent destination controls will do their utmost to reduce stops by directing passengers to pre-assigned cars.

The panel for destination entry in each lobby can be abolished if passengers enter their destinations with a mobile device, i.e. each passenger communicates directly with the group control. If a passenger has a fixed destination the group control could advise the assigned car automatically on arrival in the lobby.

It is unlikely that an assigned car will reach full load prior to reaching the assigned passenger because the group uses "brain power" to prevent full cars. How this is done is explained in chapter 16: “Module for heavy simultaneous UP and DOWN traffic”. In spite of "brain power" full cars may happen occasionally and to resolve this situation passengers should be aware that re-entry of destination is necessary in case the car does not arrive as promised. Re-entry is necessary to enable the group control to inform the passenger of the changed identity of his or her car. Mobile devices will also make this type of communication with passengers much easier.

Existing destination group controls usually have destination indicators integrated on both sides of the car entrance frames to re-confirm the destinations of each car when the doors open. These indicators are practical for intelligent destination elevators as well.

The use of gongs and/or indicators to announce the arrival of cars is not necessary for "intelligent elevators", however, in case a customer wishes the use of gongs a small improvement might be gongs that announce DOWN going cars with low tones and UP going cars with high tones.

Lobby networks

As mentioned above mobile devices or customized mobile phones are very attractive for direct communication between passengers and intelligent destination group controls.

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Lobby networks will enable intelligent destination elevators to register the arrival and departure of each and every passenger. Direct communication will provide group controls with exact information of traffic flows. It will also know the exact number of passengers waiting for service in each lobby. These data will support best-possible group performance because the group control has traffic data that are 100 % accurate.

Building security

Building security will benefit when a group control communicates directly with individual passengers via lobby networks. Visitors to a building will be required to obtain their mobile devices from **the building reception or security desk**. A personal device will give access to a specific floor(s) during a specific period. When a visitor or passenger leaves a car on an unauthorized floor the security control system can automatically inform both security personnel and, if desired, the visitor/passenger of this incorrect situation.

It will be possible to limit Main Lobby entry to authorized passengers only or to check the authorization of persons entering the Main Lobby automatically.

The authorization of maintenance personnel can be limited to specific floors and periods as required.

Lists with the identities and numbers of persons on each floor can be maintained. Tenants may appreciate to have access to these data to monitor the coming and going of personnel.

Intelligent door systems

Door panels on different floors may have different weights. For example the landing doors on floor zero and/or other floors can be heavier on account of decorative materials integrated in the door panels. The weight of individual door panels affects the permitted maximum door closing speed on account of regulations concerning maximum impact forces. For this reason "Intelligent destination" elevators must be able **to control the closing speed of doors individually or for two categories of doors: standard and heavy**. The weight of door panels may also affect door opening speeds. If all doors move slower on account of heavy door panels on one or two floors it is obvious that the efficiency of the group is reduced.

A separate problem in respect of door closing and opening speeds is the range of possible door speeds. Should doors always move at their maximum possible speed? Most probably this is not desirable because it may cause wear and tear and other characteristics that are not desirable during NON PEAK traffic conditions.

"Intelligent elevators" should be able to use different door speed settings for different traffic conditions, for example for:

- PEAK traffic
- Medium traffic
- Light traffic

The differences between the settings may be small; however, the objective of the suggested system is a control and door system that adapts to changing traffic conditions. At present most elevators operate with standard door speed settings that are influenced neither by traffic conditions nor building management. The settings are decided by maintenance personnel at a level that gives the least amount of trouble. This is seldom the best speed setting of which the door system is capable. This may be a good principle from a maintenance point of view but during PEAK traffic it may well be desirable to get extra performance.

It is important that all elements of performance become transparent and measurable. This will encourage the development of better systems.

Intelligent drive systems

The situation in respect of drive control settings is similar to the one described above for door speed settings. Maintenance personnel make settings that cause the least amount of trouble, however, during PEAK traffic conditions the temporary use of the maximum possible acceleration and deceleration rates and higher jerk rates may be desirable. "Intelligent elevators" should be able to automatically adjust "muscle power" characteristics in accordance with criteria agreed between the building management and the elevator contractor for specific traffic conditions.

Door- and drive settings for best-possible spacing of cars

For best-possible spacing of cars the ability of the group to adjust door- and/or drive systems is useful. These adjustments enable influencing of the INTERVAL between cars in a manner that is unnoticeable to passengers. This is another reason why "intelligent elevators" should be able to vary "muscle power" characteristics.