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Method and computer program product for modernisation of a lift installation

The invention relates to a method and a computer program product for modernisation of a lift installation according to the definition of the patent claims.

Lift installations for conveying persons and goods are relatively long-term investment products with service lives of 20 years and more. If after such a length of time a general overall of a lift installation arises, then the components of the lift installation are often old in terms of technology, which obliges a more or less complete exchange of components. Such an exchange of components of a lift installation is termed modernisation in the following. The modernisation is often carried out staggered in time, wherein control units and lift cages are modernised in a first stage, whilst drives are modernised in the engine room in a further stage and storey call transmitters are modernised in the individual storeys in a final stage.

The document US 5 352 857 is regarded as the closest state of the art for the field of the invention. US 5 352 857 discloses a method for modernisation of a lift installation. The lift installation consists of a group of lifts which convey users in a building, wherein each lift is controlled by a lift control. In order to maintain the transport capacity of the lift installation during modernisation, the modernisation is undertaken in modular manner and in time segments. A first method step consists of incorporating a group control and several adapter units. The adapter units are mounted at the lift controls and act between the individual lift controls and the new group control. In this manner there is formed a communications network which allows control of the individual lifts by way of the new group control. In further method steps existing components of the lift installation are - at freely selectable later moments in time - combined in modules. Existing lift installation components - such as the drive in the engine room, the storey call transmitters in the storeys, etc. - are then selected and removed in the manner of modules and replaced by new, corresponding lift installation components. When all modules have been replaced, the lift controls and the adapter units are removed in a further method step and replaced by a safety system interface in order to control the individual lifts by way of the safety system interface from the group control.

Disadvantages of this method of modernisation of a lift installation are that the transport capacity of the lift installation has to be maintained as best as possible during the

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modernisation, that the modular modernisation can be drawn out in time and that the method is material-intensive and thus costly in realisation.

In many cases, however, modernisation of a lift installation is carried out in order to produce an increase in the efficiency of the lift installation or to increase the travel comfort for the users. Thus, users want to be transported as quickly and directly as possible, long waiting times or a reboarding being perceived as disagreeable. In addition, accelerations and retardations of the lift cages should be hardly detectable by the users.

A first object of the invention is to provide a method and a computer program product in order to increase the efficiency of the lift installation or enhance the travel comfort for users even during modernisation of a lift installation. A further object of the invention is to realise this method and this computer program product economically and quickly. Finally, the invention shall be compatible with proven standards of machine construction and the electronics industry.

These objects are met by the invention according to the definition of the patent claims.

According to the invention a lift installation which is disposed in a building and to be modernised is equipped with a destination call control within the framework of preparatory operations for modernisation of the lift installation. The destination call control comprises at least one storey terminal which is mounted at a storey. A user inputs a destination call report at the storey terminal or an identification code of the user is recognised at the storey terminal. The destination call control detects the boarding storey and the destination storey by a single destination call report or automatically associates a destination storey with an identification code recognised at a boarding storey. A destination call report thus comprises data not only with respect to the boarding storey, but also with respect to the destination storey. Traditional call reports containing only one item of information or report only a boarding storey or only a destination storey to the lift control are superfluous by virtue of the destination call control. In particular, the destination call control avoids the need for a user at a boarding storey to input a first call report at a storey call transmitter in order to call a lift to the boarding storey and then to input a second call report in the lift cage at a cage call transmitter in order to indicate a destination storey.

The destination call control comprises at least one computing unit which evaluates the destination call reports or unambiguously identifies users on the basis of identification codes and assigns a predetermined destination storey to identified users. Further data, such as data about the building or data about the actual user arrival, flow into this evaluation of the destination call reports or association of the identification code. According to a conveying result, a lift is allocated to each user and the user is thus conveyed in the shortest time or with the greatest travel comfort, for example with low waiting times or if possible without changeovers, to a destination storey.

The destination call control controls an existing lift control of the lift installation, which is to be modernised, by way of at least one device. The device has an intermediary function in that it converts the conveying result ascertained by the computing unit into at least one call report to the lift control. The computing unit communicates at least one destination signal to the device, which destination signal is converted by the device into at least one call report by which the lift control is controlled. In this manner the lift installation to be modernised can be equipped with a destination call control and is in that case further operated in accordance with call reports by the existing lift control.

The device documents the behaviour of the lift control as at least one travel time profile. The lift control is in that case to be regarded as a kind of 'black box', the behaviour of which is predictable in a learning process. For this purpose, at least one signal of the lift control is tapped off and the course thereof over time is documented as a travel time profile. The travel time profile contains data such as the acceleration, speed and retardation of the lift cage as a function of the length of the conveying path, the carriage load, etc. Advantageously, a large number of travel time profiles is documented.

The invention relates to at least one computer program product which analyses the travel time profile and provides data with respect to the lift installation as at least one advance selector. The advance selector indicates for a travelling lift cage that storey at which the lift cage could still stop. For ascertaining the advance selector, the computer program product compares the course over time of the actual tapped signal with travel time profiles and selects that travel time profile which reproduces with the greatest probability, or substantially reproduces, the time course of the actual tapped signal. Advantageously, an advance selector is actualised for each lift of the lift installation at continuous time intervals and communicated to the destination call control. This actualised advance selector flows

as further information into the evaluation of the conveying result by the computing unit. The advance selector enables a fast assignment of a user to a lift cage and thus reduces waiting times of the user. In addition, the advance selector makes it possible for the lift cage to be accelerated or retarded in hardly detectable manner and thus guarantees a high travel comfort for the user. The documentation of a large number of travel time profiles enables an accurate determination of the advance selector and optimises the efficiency of the lift installation.

The equipping of the lift installation with a destination call control can be carried out quickly, for example within a few hours, for example in times of low loading of the lift installation. For that purpose the lift control is connected by way of at least one electrical line with the device. The storey terminal is mounted and the computing unit is installed. The system consists of storey terminal, computing unit and device, which are connected together by way of at least one data bus. The individual components of the system are standardised and can be produced economically.

The lift installation prepared in that manner for modernisation is simple and uncomplicated to modernise. Due to the fact that traditional call reports have become superfluous by virtue of the preparatory operations and that the efficiency of the lift installation has been increased, a lift installation can be modernised without disadvantages for the users. Advantageously, a lift installation with several lifts is modernised in modular manner in at least one method step. By contrast to the state of the art according to the document US 5 352 857, lift installation components are not, however, combined into modules and such a module modernises the lift installation in each method step, but at least one lift is substantially completely modernised in each method step. With advantage, a lift cage of a lift is modernised in one method step, the drive of this lift is modernised, the conveying cable of this lift is modernised, the lift control of this lift is modernised and the device is removed from this lift.

The invention is explained in detail in the following on the basis of exemplary embodiments according to Figs. 1 to 3, in which:

Fig. 1 shows a part of a lift installation to be modernised,

Fig. 2 shows a part of the lift installation according to Fig. 1 after conclusion of the preparatory operations for modernisation and

Fig. 3 shows a schematic illustration of a part of a device.

Fig. 1 shows a part of an exemplary embodiment of a lift installation to be modernised, with at least one lift 10, 10', 10" which is controlled by at least one lift control 14, 14', 14". The lift installation 1 is mounted in, for example, a building 2 with storeys 21, 21', 21" and serves for conveying users such as persons or goods from one storey 21, 21', 21" to another storey 21, 21', 21". The building 2 comprises, for example, three storeys 21, 21', 21" which are accessible by way of the lift installation 1.

The lift installation 1, comprises, for example, two lifts 10, 10' which are arranged, for example, parallel and adjacent to one another. Each lift 10, 10' comprises a lift cage 11, 11' which is moved, for example suspended at a conveying cable 9, 9', by way of a drive 12, 12' from one storey 21, 21', 21" to another storey 21, 21', 21". The vertical conveying direction of the lifts 10, 10' is indicated according to Figs. 1 and 2 by a double arrow.

The drive 12, 12' is controlled by the lift control 14, 14', wherein in known manner at least one target value is produced, at least one regulating function is present and at least one start or at least one stop is realised. The actual position of a lift cage 11, 11' is detected, for example, by way of at least one travel pick-up 24, 24', 24", 25, 25', 25" and communicated as at least one travel signal to the lift control 14, 14'. For example, a first travel pick-up 24, 24', 24" for a first lift 10 is mounted in each storey 21, 21', 21" and a second travel pick-up 25, 25', 25" for a second lift 10' is mounted in each storey 21, 21', 21".

The users pass by way of access means into or out of the lift cages 11, 11'. For example, the users in each storey 21, 21', 21" pass by way of an access means in the form of a storey door into or out of the lift cages 11, 11'. The lift cage 11, 11' has, for example, an access means in the form of a lift cage door through which the users pass into or out of the lift cage 11, 11'. In the lift cage 11, 11' the actual position of the lift cage 11, 11' is indicated to the user by way of at least one cage indicator 15, 15'.

The lift installation 1 is operated by users outside the lift cage 11, 11' by way of at least one storey call transmitter 22, 22', 22", 23, 23', 23" which is arranged, for example, in a storey 21, 21', 21" near the lift installation 1 and which has at least one input means for input of a first call report. For example, in each storey 21, 21', 21" a first storey call transmitter 22, 22', 22" is arranged near the storey door of the first lift 10 and in each storey 21, 21', 21" a second storey call transmitter 23, 23', 23" is arranged near the storey door of the second lift 10'.

The lift installation 1 is operated by users in the interior of the lift cage 11, 11' by way of at least one cage call transmitter 12, 12', 12" which has at least one input means for input of a second call report. These traditional call reports contain a single item of information. For example, the first call report indicates a conveying destination direction (upwards or downwards) or a boarding storey. The second call report indicates, for example, a destination storey.

The different components of the lift installation 1, such as storey call transmitter 22, 22', 22", 23, 23', 23", cage call transmitter 13, 13', travel pick-up 24, 24', 24", 25, 25', 25", lift control 14, 14', drive 12, 12' and cage indicator 15, 15' are connected together by way of at least one electrical line:

- For example, the storey call transmitter 22, 22', 22", 23, 23', 23" is connected by way of at least one electrical storey call transmitter line 16, 16' with at least one input of the lift control 14, 14' and thus enables communication of a first call report to the lift control 14, 14'.
- For example, the cage call transmitter 13, 13' is connected by way of at least one electrical cage call transmitter line 18, 18' with at least one input of the lift control 14, 14' and thus enables communication of a second call report to the lift control 14, 14'.
- For example, the travel pick-up 24, 24', 24", 25, 25', 25" is connected by way of at least one electrical travel pick-up line 17, 17' with at least one input of the lift control 14, 14' and thus enables communication of a travel signal to the lift control 14, 14'.
- For example, the drive 12, 12' is connected by way of at least one electrical drive line 19, 19' with at least one output of the lift control 14, 14' and thus enables communication of a target value to the drive 12, 12'.
- For example, the cage indicator 15, 15' is connected by way of at least one electrical cage indicator line 20, 20' with at least one output of the lift control 14, 14' and thus enables communication of at least one indicating signal to the cage indicator 15, 15'.

These call reports, this travel signal, this target value and this indication signal are, for example, analog electrical signals of defined current strength, voltage, frequency, period, etc.

The operation of the lift installation 1 functions, for example, as follows:

- A user actuates a storey call transmitter 22, 22', 22", 23, 23', 23" in a boarding storey.
- According to a first call report, which is communicated by way of an electrical storey call transmitter line 16, 16' to the lift control 14, 14', the lift control 14, 14' controls a drive 12, 12' and moves a lift cage 11, 11' to the boarding storey.
- After the lift cage 11, 11' has reached the boarding storey, the user boards the lift cage 11, 11' and actuates a cage call transmitter 13, 13'.
- According to a second call report, which is communicated by way of an electrical cage call transmitter line 18, 18' to the lift control 14, 14', the lift control 14, 14' controls the drive 12, 12' and moves the lift cage 11, 11' from the boarding storey to the destination storey.
- After reaching the destination storey, the user disembarks from the lift cage 11, 11'.

This lift installation 1 is now to be modernised. The invention is used for this purpose.

Fig. 2 shows a part of an exemplary embodiment of a lift installation 1 after conclusion of preparatory operations in accordance with the invention for modernisation of the lift installation 1. Within the frame of the preparatory operations, the lift installation 1 is equipped with a destination call control 3.

The principle of the destination call control 3 is known from the document EP 0 246 395. The destination call control 3 comprises at least one storey terminal 31, 31', 31" which is arranged, for example, in each storey 21, 21', 21" near the lift installation 1. The storey terminal 31, 31', 31" comprises at least one manual input means 32, 32', 32" for input of a destination call report or at least one recognition device 33, 33', 33" for recognition of at least one identification code. The recognition of an identification code communicated by at least one identification transmitter 34, 34', 34" to a recognition device 33, 33', 33" is known from the document EP 0 699 617. The destination call control 3 detects, by a single destination call report, the boarding storey and the destination storey or automatically

assigns a destination storey to an identification code recognised in a boarding storey. A destination call report comprises data regarding not only the boarding storey, but also the destination storey.

The destination call control 3 comprises at least one computing unit 30. The computing unit 30 is, for example, a commercially available personal computer or a work station. The computing unit 30 includes at least one processor and at least one data memory. The computing unit 20 is arranged at any suitable location, for example in a vestibule of the building 2 or in a computer room of the building 2, etc. The computing unit 30 executes at least one computer program product for evaluation of destination call reports or for association of recognised identification codes with destination storeys. This computer program product is, for example, stored in the data memory and is loaded into the processor for execution thereof.

For example, an evaluation of destination call reports runs as follows:

- The computer program product for evaluation of destination call reports records an input time of each destination call report with a statement of the boarding storey as well as of the desired destination storey in at least one request table.
- This computer program product compares the distance between the boarding storey and the actual position of the at least one lift cage 11, 11'. This computer program product also computes the distance between boarding storey and destination storey. In addition, this computer program product takes into consideration the actual user presence and computes possible intermediate stops along the conveying path.
- On the basis of these data, this computer program product performs an optimisation and ascertains for each destination call report at least one conveying result. The conveying result denotes the most favourable lift 10, 10' for conveying the user, i.e. the lift 10, 10' which conveys the user most quickly or with the highest degree of travel comfort to the destination storey.

An assignment of recognised identification codes with destination storeys runs, for example, as follows:

- The computer program product for association of recognised identification codes with destination storeys records a recognition time of a recognised identification code under a statement of the boarding storey in a requests table.

- In the data memory a user profile with at least one user-specific statement is led to a destination storey. This user profile is unambiguously identifiable by way of an identification address. Exactly one identification code exists for each identification address. For example, an identification address is able to be exactly associated with an identification code when the identification address and identification code are identical.
- This computer program product compares the recognised identification code with the identification addresses of stored user profiles. This computer program product then precisely delivers a positive association result when one of the stored identification addresses is identical with the recognised identification code, but otherwise this computer program product delivers a negative association result.
- This computer program product records the destination storey in the requests table.
- This computer program product compares the distance between the boarding storey and the actual position of the at least one lift cage 11, 11'. In addition, this computer program product computes the distance between the boarding storey and destination storey. This computer program product also takes into consideration the actual user presence and computes possible intermediate stops along the conveying path.
- On the basis of this data, this computer program product performs an optimisation and ascertains at least one conveying result for each recognised identification code. The conveying result denotes the most favourable lift 10, 10' for conveying the user, i.e. the lift 10, 10' which conveys the user the most quickly or with the highest degree of travel comfort to the destination storey.

The conveying result is converted. Advantageously, a lift 10, 10' allocated to the destination storey of the user is indicated to the user. For this purpose, the storey terminal 31, 31', 31" has at least one lift indicator 35, 35', 35". The computing unit 30 executes at least one computer program product for control of the lift installation 1. The computing unit 30 controls the lift installation 1, which is to be modernised, by way of at least one device 36, 36'. By the term "control" there is to be understood an indirect control. In the present case, the existing lift control 14, 14' is controlled by the computing unit 30 indirectly by way of the device 36, 36'.

The storey terminal 31, 31', 31", the computing unit 30 and the device 36, 36' communicate with one another by way of at least one data bus 37. The data bus can be any modern standard bus. Such data buses are known to the expert. The data bus can

be based on electrical or optical signal transmission, such as an Ethernet network, a Token-ring network, etc. It can also be a radio network, an infrared network, a radar network, a radio beam network, etc. With knowledge of the present invention, numerous possibilities of realisation with respect thereto are open to the expert.

Fig. 3 shows a part of an exemplary embodiment of a device 36, 36'. The computing unit 30 issues by way of the data bus 37 at least one destination signal to the device 36, 36'. The device 36, 36' comprises, for example, at least one input for the data bus 37 for reception of the destination signal. For example, the destination signal is transmitted to the device 36, 36' in accordance with at least one communication protocol of the data bus 37 and is read by the device 36, 36'. The device 36, 36' comprises, for example, at least one converter 361 which accepts the destination signal and converts it into a call report. The converter 361 is a commercially available and proven converter of the electronics industry.

The device 36, 36' and the lift control 14, 14' are connected together by way of at least one electrical line. The device 36, 36' comprises, for example, at least one output for the issue of call reports. This output is connected with the lift control 14, 14' by way of at least one storey call transmitter line 16, 16' as well as at least one cage call transmitter line 18, 18'. The call reports are issued to the lift control 14, 14' from at least one signal generator 362 of the device 36, 36'. It is advantageous, but not obligatory, to arrange the device 36, 36' near the lift control 14, 14'. The signal generator 36 is a commercially available and proven signal generator of the electronics industry.

The operation of the modernised lift installation 1 functions, for example, as follows:

- A user inputs, in a boarding storey, a destination call report by way of a manual input means 32, 32', 32" of the storey terminal 31, 31' 31" or the user carries an identification transmitter 34, 34', 34" and communicates an identification code to the recognition device 33, 33', 33" of the storey terminal 31, 31', 31", which identification code is recognised by the recognition device 33, 33', 33".
- The storey terminal 31, 31', 31" communicates to the computing unit 30 by way of the data bus 37 a conveying signal corresponding with the destination call report or an identification signal corresponding with a recognised identification code.
- The computing unit 30 executes a computer program product and ascertains at least one conveying result for the conveying signal or for the identification signal.

- At least one control signal for controlling the lift installation 1 is issued as conveying result.
- The control signal comprises a user information signal which is communicated by way of the data bus 37 to the storey terminal 31, 31', 31" in the boarding storey where the user has made the destination call report. According to the user information signal, the lift 10, 10' allocated to the destination storey of the user is indicated to the user on the lift indicator 35, 35', 35".
- The control signal comprises at least one first destination signal which is communicated by way of the data bus 37 to the device 36, 36'. According to this first destination signal the device 36, 36' issues by way of an electrical line a first call report to the lift control 14, 14'. According to this first call report the lift control 14, 14' controls a drive 12, 12' and moves a lift cage 11, 11' to the boarding storey.
- After the lift cage 11, 11' has reached the boarding storey, the user boards the lift cage 11, 11'.
- The control signal comprises at least one second signal which is communicated by way of the data bus 37 to the device 36, 36'. According to this second destination signal the device 36, 36' issues a second call report to the lift control 14, 14' by way of an electrical line. According to this second call report the lift control 14, 14' controls the drive 12, 12' and moves the lift cage 11, 11' from the boarding storey to the destination storey. The user is conveyed without further action to the destination storey.
- After reaching the destination storey the user disembarks from the lift cage 11, 11'.

The device 36, 36' has, at at least one input, at least one signal receiver 363 for detection of at least one signal of the lift control 14, 14'. The signal is tapped at at least one input or at at least one output of the lift control 14, 14'. Advantageously, this input of the device 36, 36' is connected by way of at least one drive line 19, 19' and/or at least one cage indicator line 20, 20' with the lift control 14, 14'. The signal receiver 363 detects, for example, at least one target value of the drive line 19, 19' and/or at least one indication signal of the cage indicator line 20, 20'. The signal receiver 363 is a commercially and proven signal receiver of the electronics industry.

The behaviour of this target value and/or of this indication signal over time is documented as at least one travel time profile. The travel time profile is a protocol with regard to the mode of function of the lift control 14, 14'. It documents numerous data about the lift installation 1, such as the acceleration, speed and retardation of a lift cage 11, 11' as a

function of the length of the conveying path, the cage load, etc. The travel time profile can be documented in any data format. For example, the device 36, 36' comprises at least one data memory 364 for storage of the travel time profile.

Two examples of signals tapped at the lift control 14, 14' serve for illustration:

- The lift control 14, 14' communicates, for example, an indication signal on the cage indicator line 20, 20' as a form of acknowledgement for an input call report. This acknowledgement is communicated to a cage indicator 15, 15' of the lift cage 11, 11' and is indicated there as the actual position of the lift cage 11, 11'. The indication signal on the cage indicator line 20, 20' is, for example, an electrical voltage of 5 V direct voltage and is of different length in time according to the respective storey to be indicated. Thus, the indication signal can, for indication of the first storey, be one second long, whilst that for indication of the second storey is two seconds long. The actual position of the lift cage 11, 11' can thus be determined from this acknowledgement to the cage indicator 15, 15'.
- For example, the lift control 14, 14' communicates a target value on the drive line 19, 19' for acceleration or retardation of a lift cage 11, 11'. The target value for acceleration of the lift cage 11, 11' is, for example, an electrical direct voltage of 5 V. The target value for retardation of the lift cage 11, 11' is, for example, an electrical direct voltage of 0 V. The acceleration or retardation of the lift cage 11, 11' can thus be determined from these target values.

Advantageously, the device 36, 36' executes at least one computer program product which analyses the travel time profile and determines or provides at least one advance selector. An advance selector indicates for a moving lift cage 11, 11' that storey at which the lift cage 11, 11' could still stop. For example, the device 36, 36' comprises a data memory 364 for storage of the computer program product and at least one processor 365 for carrying out the computer program product. The computer program product compares, for example, the actually detected indication signal or the actually detected target value with stored travel time profiles. The computer program product selects that travel time profile which substantially corresponds with the course over time of the actually detected indication signal or the actually detected target value and provides this selected travel time profile as an advance selector. By actually detected signal there is understood a signal obtained in real time or in quasi real time. For example, a signal is tapped every 1/4 of a second, preferably every 1/20 of a second, preferably every 1/1000 of a second. Advantageously, an advance selector is actualised at continuous time intervals for each lift

10, 10' of the lift installation 1 and communicated to the computing unit 30. For example, an advance selector is communicated every 1/4 of a second, preferably every 1/20 of a second, preferably every 1/1000 of a second, to the computing unit 30. With knowledge of the present invention, numerous possibilities of realisation of variants are open to the expert. Thus, it is entirely possible to perform the computer program product on any computer, for example on the computing unit 30 of the system or on a remote server. In this case the actually detected signal is communicated to the computing unit or to the remote server. Such a communication takes place, for example, by Internet.

An actualised advance selector flows as further information into the conveying result. The advance selector enables a rapid assignment of a user to a lift cage 11, 11' and thus reduces the waiting times of the user. In addition, the advance selector makes it possible that the lift cage 11, 11' is accelerated or retarded in hardly noticeable manner and thus guarantees a high travel comfort for the user. Through documentation of a large, substantially complete number of travel time profiles, the advance sector can be ascertained with a high degree of accuracy and the efficiency of the lift installation 1 can be optimised.

The preparatory operations for modernisation of the lift installation 1 consist in mounting at least one storey terminal 31, 31', 31" and installing at least one computing unit 30 as well as at least one device 36, 36'. The system consisting of storey terminal 31, 31', 31", computing unit 30 and device 36, 36' is advantageously composed of prefabricated and, for example, pre-configured units which are simple and quick to mount or to install.

A storey terminal 31, 31', 31" is, for example, mounted in each storey 21, 21" near the lift installation 1. For example, a storey terminal 31, 31', 31" is mounted in each storey 21, 21', 21" as a stand-alone apparatus near the two lifts 10, 10'. This stand-alone apparatus is, for example, fixed in the floor or to a wall of the storey 21, 21', 21" by screws. These storey terminals 31, 31', 31" replace the storey call transmitter, 22, 22', 22", 23, 23', 23" or the cage call transmitter 13, 13'.

A device 36, 36' is installed at, for example, each lift control 14, 14'. For this purpose, the existing electrical storey call transmitter line 16, 16' to the storey call transmitter 22, 22', 22", 23, 23, 23" or the existing electrical cage call transmitter line 18, 18' to the cage call transmitter 13, 13' is interrupted at the input of the lift control 14, 14' and this input of the lift

control 14, 14' is, instead, connected by way of an electrical line with an output of the device 36, 36'. Advantageously, the existing electrical drive line 19, 19' at the output of the lift control 14, 14' is branched off and this output of the lift control 14, 14' is connected by way of an electrical line with an input of the device 36, 36'. The existing electrical cage indicator line 20, 20' to the cage indicator 15, 15' is advantageously interrupted at the output of the lift control 14, 14' and this output of the lift control 14, 14' is, instead, connected by way of an electrical line with an input of the device 36, 36'. By virtue of the usually small number of inputs and outputs of the lift control 14, 14', this installation of the device 36, 36' is simple and quick to manage. The device 36, 36' is, for example, fixed near the lift control 14, 14' by screws.

The storey terminal 31, 31', 31", the computing unit 30 and the device 36, 36' are, for example, connected together by way of at least one data bus 37. The cable of the data bus 37 is, for example, laid in at least one existing cable shaft of the building 2.

This lift installation 1 prepared in that manner for modernisation is simple and complicated to modernise. Advantageously, a lift installation 1 with several lifts 10, 10' is modernised in modular manner in at least one method step, wherein at least one lift 10, 10' is substantially completely modernised in each method step. With advantage, a lift cage 11, 11' of a lift 10, 10' is modernised in one method step, the drive 12, 12' of this lift 10, 10' is modernised, the cable 9, 9' of this lift 10, 10' is modernised, the lift control 14, 14' of this lift 10, 10' is modernised and the device 36, 36' of this lift 10, 10' is removed.

Patent Claims

1. Method of modernising a lift installation (1), which lift installation (1) comprises at least one lift (10, 10'), which lift (10, 10') is controlled by at least one lift control (14, 14') by way of at least one call report, characterised in that at least one storey terminal (31, 31', 31") for the input of destination call reports or for recognition of identification codes of users is mounted, that at least one computing unit (30) for evaluation of the destination call reports or for association of destination storeys with recognised identification codes and for the output of at least one destination signal is installed, and that at least one device (36, 36') for reading the destination signal, for converting the destination signal into at least one call report and for controlling the lift control (14, 14') by way of the call report is installed.

2. Method according to claim 1, characterised in that at least one existing electrical storey call transmitter line (16, 16') between at least one storey call transmitter (22, 22', 22', 23, 23' 23") and the lift control (14, 14'), or at least one existing cage call transmitter line (18, 18') between at least one cage call transmitter (13, 13') and the lift control (14, 14'), is interrupted and that the lift control (14, 14') is instead connected by way of electrical lines (16, 16', 18, 18') with the device (36, 36').

3. Method according to claim 1 or 2, characterised in that at least one existing electrical drive line (19, 19') between at least one drive (12, 12') and the lift control (14, 14') is connected with the device (36, 36') and/or that at least one output for at least one electrical cage indicator line (20, 20') of the lift control (14, 14') is connected with the device (36, 36').

4. Method according to claim 3, characterised in that at least one target value of the drive line (19, 19') or at least one indicator signal of the cage indicator line (20, 20') is detected by the device (36, 36') and that the behaviour of this target value or of this indication signal over time is documented as at least one travel time profile.

5. Method according to claim 4, characterised in that at least one actually detected target value or at least one actually detected indication signal is compared with target time profiles, that that travel time profile is selected which substantially corresponds with the course over time of the actually detected target value or the actually detected indication

signal and that this selected travel time profile is provided as at least one advance selector.

6. Method according to claim 5, characterised in that a rapid association of a user with a lift cage (11, 11') is undertaken with consideration of the advance selector.

7. Method according to one of claims 1 to 6, characterised in that a lift installation (1) with several lifts (10, 10') is modernised in modular manner in at least one method step.

8. Method according to claim 7, characterised in that at least one lift (10, 10') is substantially completely modernised in each method step.

9. Method according to claim 7 or 8, characterised in that in one method step:
- a lift cage (11, 11') of a lift (10, 10') is modernised,
- the drive (12, 12') of this lift (10, 10') is modernised,
- the conveying cable (9, 9') of this lift (10, 10') is modernised,
- the lift control (14, 14') of this lift (10, 10') is modernised and
- the device (36, 36') is removed from this lift (10, 10').

10. Computer program product for modernising a lift installation (1), which lift installation (1) comprises at least one lift (10, 10'), which lift installation (1) comprises at least one lift control (14, 14') for controlling the lift (10, 10') by way of at least one call report, characterised in that the computer program product compares at least one target value actually detected at at least one output of the lift control (14, 14'), or at least one indication signal actually detected at at least one output of the lift control (14, 14'), with target time profiles, that the computer product selects that travel time profile which substantially corresponds with the course of the actually detected target value or the actually detected indication signal over time and that the computer program product provides this selected travel time profile as at least one advance selector.