

[DESCRIPTION]

[Title of Invention] ELEVATOR CONTROL DEVICE

[Technical Field]

[0001]

The present invention relates to an elevator control device. Particularly, it relates to an elevator control device provided with a starting compensation function to give torque to a hoist motor in advance before releasing a brake.

[Background Art]

[0002]

In order to improve the ride quality at a starting time, a recent elevator includes a weighing device for detecting the weight of passengers in a car and has a starting compensation function to supply torque to a hoist motor in accordance with the weight detected by the weighing device so that the car can start up smoothly without jumping or reversing when a brake is released. When jumping or reversing of the car is sensed in examination of the ride quality performed during periodic inspection, the amount of starting compensation torque is adjusted so that the ride quality can be adjusted. Currently, the ride quality is generally adjusted with no load on this occasion.

[0003]

Figs. 8A to 8C are velocity diagrams showing velocity changes of a car in a normal time (Fig. 8A), a jumping time

(Fig. 8B) and a reversing time (Fig. 8C) for comparison when the car moves up with a brake released. As shown by reference signs A in Figs. 8A to 8C, the car is accelerated smoothly from a stop state and moves up in the normal time whereas the car is not accelerated from the stop state but moves up suddenly in a moment in the jumping time and the car moves down suddenly in the reversing time. After that, the car moves up while being accelerated at predetermined accelerations respectively in the jumping time and the reversing time. Such velocity changes (momentary moving up and down) lead to deterioration in ride quality.

[0004]

Inspection and adjustment for the ride quality is performed by an inspector. While repeating running of the elevator, the inspector bodily senses, examines and adjusts the ride quality at the starting time. That is, during the adjustment, the inspector once interrupts the service of the elevator to stop the elevator, and operates switches in a control panel. As a result, there is a problem that it takes much labor and time to perform the inspection and adjustment.

[0005]

To solve the problem, for example, JP-A-2011-131967 (Patent Literature 1) discloses a technique as follows. That is, in an elevator control device, hoist motor torque is obtained from a measured load inside a car by use of a

predetermined relation between the load inside the car and the hoist motor torque, and the obtained hoist motor torque is applied to a driving sheave at the starting time so that the ride quality at the starting time can be kept comfortable. In the elevator control device, a car movement amount is measured when the car is started up in the state in which the measured load inside the car is no load. When the measured car movement amount is out of a predetermined reference range, both the fact that the car movement amount is out of the reference range and the car movement amount are stored. When there appears at least one floor where the car movement amount is out of the reference range, the hoist motor torque is corrected or a weighing device for measuring the load inside the car is modified.

[Citation List]

[Patent Literature]

[0006]

[Patent Literature 1] JP-A-2011-131967

[Summary of Invention]

[Technical Problem]

[0007]

In the aforementioned background-art technique, the car movement amount when the car is started up in the state in which the load inside the car is no load is calculated from an output of an encoder attached to an existing hoist motor. When the

calculated car movement amount is out of the reference range, the hoist motor torque is corrected automatically so that the riding quality at the starting time can be kept comfortable. However, it may be difficult to grasp the actual ride quality of the car correctly because the car movement amount is estimated and calculated from the output of the encoder attached to the hoist motor. That is, even when the hoist motor rotates smoothly, for example, the car may be held at the starting time due to some mechanical factor such as misalignment in a guide unit on the car side. In such a case, it is difficult to grasp abnormality in the ride quality correctly.

[0008]

In addition, even if the abnormality occurring thus in the ride quality is caused not by the amount of hoist motor torque for starting compensation but by only a mechanical factor derived from the related equipment, there is a possibility that an erroneous measure such as repeated correction of the hoist motor torque may be carried out. That is, the abnormality in the ride quality at the starting time is not only caused by the starting compensation torque but also caused in the following cases.

i) Due to distortion occurring in the car after a long-term use, the guide unit is strongly thrust on a guide rail so that the car is held at the starting time.

ii) Due to abrasion of a brake, the timing when the brake is released becomes slightly earlier than the timing when application of the torque for starting compensation is completed.

iii) Due to deterioration in the related equipment, a short delay begins to occur in the timing when the brake is released.

Even in any of such cases in which mechanical adjustment is required, the hoist motor torque may be corrected repeatedly in error. As a result, there is a possibility that the ride quality may deteriorate.

[0009]

It is therefore an object of the invention to grasp the ride quality of a car directly to thereby adjust the amount of hoist motor torque for starting compensation correctly.

[Solution to Problem]

[0010]

In order to attain the object, the invention provides an elevator control device in which hoist motor torque at a starting time is obtained from a load inside a car by use of a predetermined relation between the load inside the car and the hoist motor torque, and the hoist motor torque is corrected to drive a hoist motor so that the ride quality at the starting time can be kept comfortable, wherein: a car movement amount at a starting time with no load inside the car is measured from an output of an encoder attached to a velocity governor

interlocking with movement of the car, the hoist motor torque at the starting time is corrected in accordance with the car movement amount when the car movement amount is out of a predetermined reference range. Other objects, configurations and effects than the aforementioned ones will be made clear from the following description of an embodiment.

[Advantageous Effects of Invention]

[0011]

According to the invention, it is possible to grasp the ride quality of a car directly to thereby adjust the amount of hoist motor torque for starting compensation correctly.

[Brief Description of Drawings]

[0012]

[Fig. 1] A view showing the configuration of an elevator control device according to Example 1 in an embodiment of the invention.

[Fig. 2] A graph showing an example of a predetermined default of starting compensation torque of a hoist motor in Example 1.

[Fig. 3] A graph showing an example of the starting compensation torque of the hoist motor corrected for jumping in Example 1.

[Fig. 4] A graph showing an example of the starting compensation torque of the hoist motor corrected for reversing in Example 1.

[Fig. 5] A graph showing an example of a correction amount of starting compensation torque of the hoist motor in accordance with the amount of jumping and the amount of reversing in Example 1.

[Fig. 6] A flow chart showing a processing procedure executed by the elevator control device in Example 1.

[Fig. 7] A flow chart showing a processing procedure executed by the elevator control device in Example 2.

[Figs. 8A] Velocity diagrams showing velocity changes of a car in a normal time for comparison when the car moves up with a brake released.

[Figs. 8B] Velocity diagrams showing velocity changes of a car in a jumping time for comparison when the car moves up with a brake released.

[Figs. 8C] Velocity diagrams showing velocity changes of a car in a reversing time for comparison when the car moves up with a brake released.

[Description of Embodiment]

[0013]

An embodiment of the invention will be described below along Examples with reference to the drawings.

[Example 1]

[0014]

Fig. 1 is a view showing the configuration of an elevator control device according to Example 1 in an embodiment of the

invention. In Fig. 1, a control device 20 for an elevator 100 includes a CPU (Central Processing Unit). In the CPU, a car movement amount measuring portion 21, a correction determination portion 22, a starting compensation torque correction portion 23, a hoist motor control portion 24, a continuous correction number count portion 25 and a mechanical adjustment request/notification portion 26 are set by software. The mechanical adjustment request/notification portion 26 is communicably connected to a monitoring center 28 through a (public) telephone circuit 27. The CPU serving as the control device 20 sequentially reads and interprets programs which are, for example, on a storage device, and executes the programs to perform processes set in advance by the programs.

[0015]

The elevator 100 is fundamentally constituted by a car 1, a counterweight 2, a main rope 3, a hoist motor 4, a governor 6, encoders 5 and 7, a governor rope 8, a connection tool 9, a guide rail 10 and a guide unit 11.

[0016]

The main rope 3 supports the weight of the car 1 and the counterweight 2, and opposite ends of the main rope 3 are placed on the building side. The hoist motor interlocking encoder 5 which generates pulses in proportion to the rotation amount of the host motor 4 is installed in the hoist motor 4. The governor 6 is a velocity governor which rotates interlocking

with the up/down movement of the car 1 so as to detect abnormality in velocity and stop the elevator 100 safely. The governor interlocking encoder 7 which generates pulses in proportion to the rotation amount of the governor 6 is installed in the governor 6. The movement amount of the car 1 can be grasped substantially correctly by the governor interlocking encoder 7. The governor 6 rotates in accordance with movement of the governor rope 8, and the rotation amount (movement amount) of the governor 6 is detected by the governor interlocking encoder 7. The governor rope 8 is connected to the car 1 through the connection tool 9. The car 1 moves up/down along the guide rail 10. On that occasion, the car 1 is guided by the guide unit 11.

[0017]

The car movement amount measuring portion 21 set in the control device (CPU) 20 measures the movement amount of the car 1 based on a pulse signal from the governor interlocking encoder 7. Generally, the movement amount of the car 1 of the elevator 100 can be also measured by the hoist motor interlocking encoder 5. However, the ride quality of the car 1 or the movement amount of the car 1 per unit time may be hardly grasped correctly by the hoist motor interlocking encoder 5 when, for example, the car 1 is held due to some mechanical factor. In the Example, therefore, the movement amount of the car 1 is measured by the governor interlocking encoder 7.

[0018]

The guide unit 11 provided in the car 1 may be strongly thrust on the guide rail 10, for example, due to misalignment of the guide unit 11. In such a case, even if the hoist motor 4 begins to rotate smoothly at the starting time, the guide unit 11 is held so that a phenomenon that the car 1 begins to move as if it jumped out may occur after some tension is applied to the main rope 3. When, for example, the car 1 is held in this manner due to some mechanical factor, the ride quality of the car 1 or the movement amount of the car 1 per unit time may be hardly grasped correctly by the host motor interlocking encoder 5. In the Example, therefore, the movement amount of the car 1 is measured based on a pulse signal from the governor interlocking encoder 7 which rotates following the movement of the car 1.

[0019]

When there is no load inside the car and the car 1 starts from a floor where the car 1 has stopped toward a floor at which an elevator hall call has been registered, the correction determination portion 22 monitors whether the amount of jumping or the amount of reversing at the starting time measured by the car movement amount measuring portion 21 reaches at least a predetermined amount (out of a reference range) or not. When the amount of jumping or the amount of reversing reaches at least the predetermined amount, the correction determination

portion 22 issues an instruction to correct starting compensation torque. In addition, the correction determination portion 22 monitors whether the starting compensation torque is corrected continuously at least a predetermined number of times or not. When the number of times of continuous correction reaches at least the predetermined number of times, the correction determination portion 22 inhibits correction of the starting compensation torque.

[0020]

The starting compensation torque correction portion 23 corrects the starting compensation torque in accordance with a correction instruction from the correction determination portion 22. The hoist motor control portion 24 controls the host motor 4 based on the starting compensation torque corrected by the starting compensation torque correction portion 23. The continuous correction number count portion 25 counts the number of times of continuous correction when a correction instruction is given to the starting compensation torque correction portion 23 by the correction determination portion 22. When the number of times counted by the continuous correction number count portion 25 reaches at least the predetermined number of times, the mechanical adjustment request/notification portion 26 issues, in response to an instruction from the correction determination portion 22, a notification that jumping or reversing at the starting time

is caused not by a control factor derived from the starting compensation torque but by a mechanical factor.

[0021]

Fig. 2 is a graph showing an example of a predetermined default of starting compensation torque of the hoist motor. As shown in Fig. 2, the hoist motor torque with a load inside the car ranging from no load to a 100% load which is a rated load can be approximated by a straight line with respect to the load inside the car. Since the inclination of the straight line is defined in advance, the hoist motor torque with up to the rated load can be decided when the hoist motor torque with no load is decided.

[0022]

Fig. 3 is a graph showing an example of the starting compensation torque of the hoist motor corrected for jumping. Fig. 4 is a graph showing an example of the starting compensation torque corrected for reversing. Fig. 5 is a graph showing an example of the correction amount of starting compensation torque of the hoist motor in accordance with the amount of jumping and the amount of reversing. For example, when jumping in response to a velocity instruction occurs at the starting time of an ascending operation with no load inside the car due to incorrect starting compensation torque, a correction amount of starting compensation torque corresponding to the amount of jumping is selected as shown

in Fig. 5. Usually, in the elevator 100, for example, in an ascending operation with no load inside the car, it is necessary to generate hoist motor torque in the descending operation direction, which is negative against the ascending operation direction, at the starting time in spite of the ascending operation because the car 1 is pulled by the counterweight 2.

[0023]

Fig. 6 is a flow chart showing a processing procedure executed by the control device (CPU) 20 of the elevator 100 in Example 1. When the elevator 100 shown in Fig. 1 performs an ascending operation, determination is first made in Step S1 as to whether the inside of the car is free from a load or not, using a not-shown weighing device. When determination is made that there is no load inside the car, determination is made in Step S2 as to whether an elevator hall call has been registered or not. When determination is made that an elevator hall call has been registered, the procedure moves to Step S3. When the car 1 moves from the floor where the car 1 has stopped to the floor at which the elevator hall call has been registered, the car movement amount at the starting time with a brake released is measured in Step S3 by the car movement amount measuring portion 21 based on pulses generated in the governor interlocking encoder 7.

[0024]

Next, based on the car movement amount measured in Step

S3, determination is made in Step S4 as to whether jumping has occurred or not. That is, in the ascending operation, determination is made as to whether the car movement amount exceeds a velocity instruction and leads to occurrence of jumping in the ascending direction or not (see Fig. 8B). When determination is made that jumping has occurred, the procedure moves to Step S5, in which the amount of jumping is obtained from the car movement amount measured in Step S3, and determination is made as to whether the amount of jumping reaches at least a predetermined amount or not.

[0025]

When determination is made in Step S5 that the amount of jumping reaches at least the predetermined amount (out of a predetermined reference range), the procedure moves to Step S6, in which, by the starting compensation torque correction portion 23, a correction amount of starting compensation torque to be corrected is obtained from the amount of jumping based on the relation shown in Fig. 5, the starting compensation torque is then reduced by the correction amount of starting compensation torque (to be changed from characteristic indicated by the broken line to characteristic indicated by the solid line) as shown in Fig. 3, and an instruction of a proper amount of starting compensation torque is given to the hoist motor control portion 24. Thus, the ride quality can be improved. Incidentally, the processes of Step S4 and Step

S5 are executed by the correction determination portion 22. On the other hand, when determination is made in Step S5 that the amount of jumping does not reach the predetermined amount, it is not necessary to improve the ride quality. Accordingly, the processes are terminated without correcting the starting compensation torque.

[0026]

On the other hand, when determination is made in Step S4 that jumping has not occurred, the procedure moves to Step S7, in which determination is made as to whether reversing has occurred or not based on the car movement amount measured in Step S3. That is, for example, in the ascending operation, determination is made as to whether there has occurred or not reversing, which is a phenomenon that the car once moves in the descending direction at the starting time and then moves in the ascending direction (see Fig. 8C). When determination is made in Step S7 that reversing has occurred, the procedure moves to Step S8, in which the amount of reversing is obtained from the car movement amount measured in Step S3, and determination is made as to whether the amount of reversing reaches at least a predetermined amount or not. When determination is made in Step S8 that the amount of reversing reaches at least the predetermined amount (out of a predetermined reference range), the procedure moves to Step S9. In Step S9, by the starting compensation torque correction

portion 23, a correction amount of starting compensation torque to be corrected is obtained from the amount of reversing based on the relation shown in Fig. 5, the starting compensation torque is then increased by the correction amount of starting compensation torque (to be changed from characteristic indicated by the broken line to characteristic indicated by the solid line) as shown in Fig. 4, and an instruction of a proper amount of starting compensation torque is given to the hoist motor control portion 24. Thus, the ride quality can be improved. The processes of Step S7 and Step S8 are also executed by the correction determination portion 22.

[0027]

On the other hand, when determination is made in Step S7 that reversing has not occurred, and when determination is made in Step S8 that the amount of reversing does not reach the predetermined amount, it is not necessary to improve the ride quality. Accordingly, the processes are terminated without correcting the starting compensation torque.

[0028]

Although correction of starting compensation torque in an ascending operation has been described in the Example by way of example, correction of starting compensation torque in a descending operation can be also performed in the same manner as in the ascending operation to improve the ride quality.

[0029]

As described above, according to the Example, the car movement amount is measured from the output of the governor interlocking encoder attached to the governor 6 interlocking with the movement of the car 1. When the car movement amount reaches at least a predetermined amount, the hoist motor torque at the starting time of the elevator is corrected automatically in accordance with the car movement amount so that the ride quality at the starting time can be kept comfortable.

[Example 2]

[0030]

Fig. 7 is a flow chart showing a processing procedure executed by an elevator control device according to Example 2. Incidentally, Example 2 is the same as Example 1 in the configuration of the elevator 100 and the configuration of the control device 20 of the elevator 100 shown in Fig. 1, the relation between the hoist motor torque and the load inside the car shown in Figs. 2 to 4, and the relation between the amount of jumping (amount of reversing) and the correction value of starting compensation torque shown in Fig. 5. Therefore, duplicate description thereof will be omitted. Incidentally, processes from Step S1 to Step S9 in Fig. 7 are equivalent to the corresponding processes shown in Fig. 6, and description thereof will be therefore omitted.

[0031]

In Fig. 7, the processes from Step 1 to Step S9 are carried

out in the same manner as in Example 1 shown in Fig. 6. Therefore, determination is made in Step S4 that jumping has occurred after the processes from Step S1 to Step S3, determination is made in Step S5 by the correction determination portion 22 as to whether the amount of jumping reaches at least a predetermined amount (out of a predetermined reference range) or not. When determination is made here that the amount of jumping reaches at least the predetermined amount, the procedure moves to Step S6. In Step 6, by the starting compensation torque correction portion 23, a correction amount of starting compensation torque to be corrected is obtained from the amount of jumping based on the relation shown in Fig. 5, the starting compensation torque is reduced by the correction amount of starting compensation torque as shown in Fig. 3, and an instruction of a proper amount of starting compensation torque is given to the hoist motor control portion 24. Thus, the riding quality can be improved. Next, the procedure moves to Step S10, in which the number of times of continuous jumping correction is counted up by the continuous correction number count portion 25. Then, the procedure moves to Step S12.

[0032]

On the other hand, when determination is made in Step S5 by the correction determination portion 22 that the amount of jumping does not reach the predetermined amount, it is not

necessary to improve the ride quality so that the procedure moves to Step S11 without correcting the starting compensation torque. In Step S11, the number of times of continuous jumping correction is cleared by the continuous correction number count portion 25. Then, the procedure moves to Step S12.

[0033]

In Step S12, the number of times of continuous reversing correction is cleared by the continuous correction number count portion 25 because determination is made in Step S4 that jumping has occurred.

[0034]

Next, in Step S13, determination is made by the correction determination portion 22 as to whether the number of times of continuous jumping correction reaches at least a predetermined number of times or not. When determination is made here that the number of times of continuous jumping correction reaches at least the predetermined number of times, the procedure moves to Step S19. In Step S19, re-correction of the starting compensation torque is inhibited by the correction determination portion 22. In Step 20, an instruction is given to the mechanical adjustment request/notification portion 26 by the correction determination portion 22. Thus, in response to the instruction, the mechanical adjustment request/notification portion 26 notifies the monitoring center 28 via the telephone

circuit 27, of the fact that it is necessary to adjust the equipment because abnormality in the ride quality cannot be improved even if the starting compensation torque is corrected. Then, a series of processes are terminated.

[0035]

On the other hand, when determination is made in Step S4 that jumping has not occurred, determination is made in Step S7 as to whether reversing has occurred or not. When determination is made in Step S7 that reversing has occurred, the procedure moves to Step S8. In Step 8, determination is made by the correction determination portion 22 as to whether the amount of reversing reaches at least a predetermined amount (out of a predetermined reference range) or not. When determination is made that the amount of reversing reaches at least the predetermined amount, the procedure moves to Step S9. In Step S9, by the starting compensation torque correction portion 23, a correction amount of starting compensation torque to be corrected is obtained from the amount of reversing based on the relation shown in Fig. 5, the starting compensation torque is then increased by the correction amount of starting compensation torque as shown in Fig. 4, and an instruction of a proper amount of starting compensation torque is given to the hoist motor control portion 24. Thus, the ride quality can be improved. Next, the procedure moves to Step S14, in which the number of times of continuous reversing correction

is counted up by the continuous correction number count portion 25. Then, the procedure moves to Step S16.

[0036]

On the other hand, when determination is made in Step S8 by the correction determination portion 22 that the amount of reversing does not reach the predetermined amount, it is not necessary to improve the ride quality so that the procedure moves to Step S15 without correcting the starting compensation torque. In Step S15, the number of times of continuous reversing correction is cleared by the continuous correction number count portion 25. Then, the procedure moves to Step S16.

[0037]

In Step S16, the number of times of continuous jumping correction is cleared by the continuous correction number count portion 25 because determination is made in Step S4 that jumping has not occurred.

[0038]

Next, in Step S17, determination is made by the correction determination portion 22 as to whether the number of times of continuous reversing correction reaches at least a predetermined number of times or not. When determination is made here that the number of times of continuous reversing correction reaches at least the predetermined number of times, the procedure moves to Step S19. In Step S19, re-correction

of the starting compensation torque is inhibited by the correction determination portion 22. In Step S20, an instruction is given to the mechanical adjustment request/notification portion 26 by the correction determination portion 22. Thus, in response to the instruction, the mechanical adjustment request/notification portion 26 notifies the monitoring center 28 via the telephone circuit 27, of the fact that it is necessary to adjust the equipment because abnormality in the ride quality cannot be improved even if the starting compensation torque is corrected. Then, a series of processes are terminated.

[0039]

On the other hand, when determination is made in Step S7 that reversing has not occurred, the procedure moves to Step S18. It is not necessary to improve the ride quality because determination is also made in Step S4 that jumping has not occurred. Accordingly, in Step S18, both the number of times of continuous jumping correction and the number of times of continuous reversing correction are cleared by the continuous correction number count portion 25. Then, a series of processes are terminated.

[0040]

As described above, according to the Example, when jumping or reversing of the car 1 is not improved though the amount of starting compensation torque is corrected,

determination is made that jumping or reversing is not caused by a control factor. The correction of the amount of starting compensation torque is interrupted and a notification is made that jumping or reversing is caused by a mechanical factor. Thus, it is possible to urge an inspector to adjust the equipment. According to the Example, it is therefore possible to prevent the amount of starting compensation torque from being corrected repeatedly in error, and it is also possible to prevent the ride quality from further deteriorating.

[0041]

Although correction of starting compensation torque in an ascending operation has been described in the Example by way of example, correction of starting compensation torque in a descending operation can be performed in the same manner as in the ascending operation and in the same manner as in Example 1 to improve the ride quality.

[0042]

As described above, according to the embodiment, the following effects can be obtained. Incidentally, in the following description of the effects in the embodiment, constituent elements in the claims are enclosed in parentheses and attached to parts in the embodiment respectively or reference numerals are attached thereto, so that the corresponding relation between the both can be made obvious.

[0043]

1) A control device 20 of an elevator 100 in which hoist motor torque at a starting time is obtained from a load inside a car by use of a predetermined relation between the load inside the car and the hoist motor torque, and the hoist motor torque is corrected to drive a hoist motor 4 so that the ride quality at the starting time can be kept comfortable, wherein: a car movement amount at a starting time with no load inside the car is measured from an output of a governor interlocking encoder (encoder) 7 attached to a governor (velocity governor) 6 interlocking with movement of the car 1, and the hoist motor torque at the starting time is corrected in accordance with the car movement amount when the car movement amount is out of a predetermined reference range. Thus, the ride quality at the starting time can be automatically kept optimal. In other words, the movement amount of the car 1 at the starting time of the elevator is grasped correctly, or the ride quality of the car 1 is grasped directly, so that the amount of starting compensation torque can be corrected in accordance with the movement amount.

[0044]

Incidentally, the car movement amount is measured by a car movement amount measuring portion 21, determination is made by a correction determination portion 22 as to whether the car movement amount is out of the predetermined reference range or not, and the hoist motor torque is corrected by a

starting compensation torque correction portion 23.

[0045]

2) The car movement amount is a movement amount at a jumping time or at a reversing time. It is therefore possible to suppress the movement of the car 1 at the jumping time or at the reversing time when the elevator is started up.

[0046]

3) A number of times of continuous correction of the hoist motor torque at the starting time is counted, and correction of the hoist motor torque at the starting time is inhibited when the number of times of continuous correction reaches at least a predetermined number. Accordingly, when occurrence of abnormality in the ride quality is not caused by the amount of hoist motor torque for starting compensation, the hoist motor torque can be prevented from being corrected repeatedly, so that the ride quality can be prevented from deteriorating. In other words, when jumping or reversing of the car 1 is not improved though the amount of starting compensation torque for starting compensation is corrected, the correction of the amount of starting compensation torque is interrupted so that the hoist motor torque can be prevented from being corrected repeatedly. Thus, it is possible to eliminate a control factor, which may deteriorate the ride quality.

[0047]

Incidentally, the number of times of continuous

correction is counted by the continuous correction number count portion 25, and the correction of the hoist motor torque at the starting time is inhibited based on the determination result of the correction determination portion 22.

[0048]

4) In addition to the inhibition of the correction, notification is made that the car movement amount is out of the predetermined reference range due to a mechanical factor (not due to an electrical factor). Accordingly, it is possible to urge an inspector to adjust the equipment. Incidentally, notification of the fact that the car movement amount is out of the predetermined reference range due to a mechanical factor is given from the mechanical adjustment request/notification portion 26 to the monitoring center 28 through a telephone circuit 27.

[0049]

5) Since the notification is given to the monitoring center 28, central management can be performed by the monitoring center 28, and the elevator 100 as an inspection target and a factor of deterioration in the ride quality can be accurately instructed to the inspector.

[0050]

Further, the invention is not limited to the aforementioned embodiment but may be modified variously without departing from the spirit and scope of the invention.

All the technical items included in the technical ideas stated in the claims are aimed at by the invention. Although preferable examples have been shown in the Examples, various alternatives, revisions, modifications and improvements may be attained by those skilled in the art from the disclosure of the description of the invention and should be included in the technical scope stated in the accompanying claims.

[Reference Signs List]

[0051]

- 1 car
- 4 hoist motor
- 6 governor
- 7 governor interlocking encoder
- 20 control device (CPU)
- 21 car movement amount measuring portion
- 22 correction determination portion
- 23 starting compensation torque correction portion
- 24 hoist motor control portion
- 25 continuous correction number count portion
- 26 mechanical adjustment request/notification portion
- 28 monitoring center
- 100 elevator

CLAIMS

1. An elevator control device in which hoist motor torque at a starting time is obtained from a load inside a car by use of a predetermined relation between the load inside the car and the hoist motor torque, and the hoist motor torque is corrected to drive a hoist motor so that the ride quality at the starting time can be kept comfortable, wherein:

it measures a car movement amount from an output of an encoder attached to a velocity governor interlocking with movement of the car, and it determines that a jumping or reversing of the car movement amount which reaches out of a predetermined reference range occurs at every starting time with no load inside the car, and

it correct the hoist motor torque at the starting time in accordance with the car movement amount when jumping or reversing occurs, and

it inhibits a correction when the number of times of continuous correction because of the jumping or the number of times of continuous correction because of the reversing reaches at least a predetermined number of times, wherein:

the number of times of continuous correction is cleared when either the jumping or reversing doesn't occur

at the starting time.

2. An elevator control device in which hoist motor torque at a starting time is obtained from a load inside a car by use of a predetermined relation between the load inside the car and the hoist motor torque, and the hoist motor torque is corrected to drive a hoist motor so that the ride quality at the starting time can be kept comfortable, wherein:

it measures a car movement amount from an output of an encoder attached to a velocity governor interlocking with movement of the car, and it determines that a jumping or reversing of the car movement amount which reaches out of a predetermined reference range occurs at every starting time with no load inside the car, and

it correct the hoist motor torque at the starting time in accordance with the car movement amount when jumping or reversing occurs, and

it inhibits a correction when the number of times of continuous correction because of the jumping or the number of times of continuous correction because of the reversing reaches at least a predetermined number of times, wherein:

the number of times of continuous correction because of the jumping is cleared when the reversing occurs, and

the number of times of continuous correction because of the reversing is cleared when the jumping occurs.

3. An elevator control device according to Claim 2, wherein:

the number of times of continuous correction is cleared when either the jumping or reversing doesn't occur at the starting time.

4. An elevator control device according to Claim 2 or Claim 3, wherein:

in addition to the inhibition of the correction, notification is made that the car movement amount is out of the predetermined reference range due to a mechanical factor.

5. An elevator control device according to Claim 4, wherein:

the notification is given to a monitoring center.