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For discussion
on 29 May 2018

LEGISLATIVE COUNCIL PANEL ON DEVELOPMENT

Enhancing Safety of Aged Lifts

PURPOSE

This paper aims to brief Members on the follow-up work of the Electrical and Mechanical Services Department (EMSD) on the lift incidents that happened at Waterside Plaza in Tsuen Wan on 8 April 2018 and Paris Court of Sheungshui Town Centre on 11 May 2018, and to outline the proposed measures to enhance the safety of aged lifts.

RECENT LIFT INCIDENTS LEADING TO CASUALTIES

Lift Incident at Waterside Plaza in Tsuen Wan

2. A lift incident happened at Block 2 of Waterside Plaza in Tsuen Wan on 8 April 2018. A lift which has been put into service for about 27 years ascended to the top of the lift shaft before it stopped, resulting in injury of two passengers. The EMSD is conducting an in-depth investigation. Initial findings revealed that the incident might have been due to insufficient traction between the suspension ropes and the traction sheave or failure of the braking system. It is expected that the investigation will be completed by early July.

3. For the sake of prudence, the EMSD and the relevant registered lift contractor inspected all the other lifts of the same brand in Waterside Plaza on the day and the following day of the incident and found no abnormality. The EMSD also requested all registered lift contractors responsible for the

maintenance of the same brand of lift as the one in the incident to complete a special inspection within two weeks to ensure safety. The special inspections[1] were all completed on 23 April with relevant lift equipment (i.e. traction system, suspension ropes and braking system) confirmed to be in safe working order. During the special inspections, relatively serious wear and tear was found in the grooves of the traction sheaves or the suspension ropes of three lifts, which however did not alter the normal and safe operation of the lifts[2].

Lift Incident at Paris Court of Sheungshui Town Centre

4. A lift incident happened on 11 May 2018 at Paris Court of Sheungshui Town Centre. The incident involved a lift which has been put into service for 26 years, resulting in fatality of one passenger. The EMSD is conducting an in-depth investigation along the direction of whether there was fault in the lift control system and/or mechanical failure of the traction system. It is expected that the investigation will be completed by early August.

5. The EMSD in collaboration with the relevant registered lift contractors carried out special inspections to the remaining seven passenger lifts and two goods lifts at Sheungshui Town Centre at the night of the incident, which were completed in the early morning of the next day. The lifts were confirmed safe for operation. As a prudent measure, the EMSD also requested all other registered lift contractors currently maintaining the same brand of the lift to complete special inspections of the lifts within two weeks and the relevant registered lift contractor to conduct special inspections of all the lifts currently under its maintenance within one month. The EMSD will carry out surveillance checks of the special inspections to ensure safety.

6. For the two lift incidents mentioned above, the EMSD will investigate whether there has been contravention of the Lifts and Escalators Ordinance

[1] The special inspections covered 384 lifts of the "Dong Yang" brand but excluded the one involved in the Waterside Plaza lift incident and 10 others currently undergoing modernisation works. The EMSD also conducted its surveillance checks when the registered lift contractor was conducting the special inspections.

[2] As a prudent measure, suspension ropes of two of the three lifts were replaced and the lifts resumed normal operation after thorough examination. For the remaining lift, grooves of its traction sheaves were found worn. The Responsible Person of the lift concerned is arranging modernisation works for the lift and has suspended the operation of the lift. Normal operation of the lift will not resume until completion of the modernisation works and a thorough examination by the registered lift engineer.

("The Ordinance"). The EMSD will enforce the law strictly if contravention has been identified.

THE SITUATION OF AGED LIFTS IN HONG KONG

7. The operation of lifts in Hong Kong is regulated by the Ordinance, which was put into operation on 17 December 2012, to replace the repealed Lifts and Escalators (Safety) Ordinance (Chapter 327). The Ordinance introduces a series of new and enhanced regulatory measures including stipulating clearly the responsibilities of the Responsible Person (i.e. owner of the lift/escalator and any person who has the management or control of the lift/escalator), the Registered Contractor, the Registered Engineer and the Registered Worker. Since the Ordinance has come into operation, the average annual number of incidents involving failure of lift and escalator equipment has been remarkably reduced as compared with that before the Ordinance was put in effect, with a reduction of 72% from an average of 28 cases per year in 2010 – 2012 to an average of 7.8 cases per year in 2013 – 2017.

8. In general, safe use of lifts can be safeguarded through proper periodic examination and maintenance. Owing to rapid technological advancement in recent years, modern lifts are equipped with more comprehensive safety devices than the aged ones. Therefore, aged lifts have room for improvement and enhancement. In view of this, the EMSD promulgated in 2011 "the Guidelines for Modernising Existing Lifts" (see abstract at **Annex I**), introducing measures to enhance the safety of aged lifts and recommending retrofitting of safety devices to make them safer, more reliable and comfortable. Whilst the lift modernisation works are not mandatory, the EMSD recommends the Responsible Persons of aged lifts install these devices as soon as possible.

9. At present, there are about 66 000 lifts in Hong Kong, of which about 80% of them have not been equipped with safety devices of the latest standard (see **Annex II**). As mentioned above, the lift modernisation is carried out on a voluntary basis and different level of modernisation works have been carried out to about 5 200 lifts since 2011. The progress is not remarkable.

PROPOSED MEASURES TO ENHANCE THE SAFETY OF AGED LIFTS

10. In view of the above, we are actively formulating short-term, medium-term and medium to long-term measures to enhance the safety of aged lifts, thereby further protecting public safety. The proposed measures are as follows:

Short-term Measures

11. The EMSD has been paying attention to the progress of the lift modernisation works. In 2018/19, the EMSD will increase its manpower to step up the surveillance of aged lifts. The EMSD is also studying the need for the Responsible Persons and the Registered Contractors to step up the maintenance of aged lifts, which have not yet been modernised, in particular for those components that may affect the safe operation of lifts. At the same time, the EMSD will increase surveillance checks of relevant maintenance items to ensure the quality of the inspection and maintenance works carried out by the Registered Contractors. In addition, the EMSD will study and improve the format of the logbook for recording the Registered Contractors' maintenance works so that the EMSD, the Registered Contractors' works supervisors and the Responsible Persons can perform their supervision/inspection more effectively.

Medium-term Measures

12. The Government has made available financial assistance to owners of private buildings in need to modernise or replace their lifts. These include the "Integrated Building Maintenance Assistance Scheme" provided by the Urban Renewal Authority, the "Building Safety Loan Scheme" provided by the Buildings Department and the "Building Maintenance Grant Scheme for Elderly Owners" administered by Hong Kong Housing Society under the Government's entrustment. The Government understands that owners may tend to use such financial support to repair or improve other common areas based on the conditions of the building rather than to modernise the lifts. In addition, the existing level of financial assistance may not be sufficient for the lift

modernisation works, which may impose additional burden on some owners with financial difficulty. We are actively considering the offering of financial incentives to owners of buildings in need, including making reference to the on-going "Operation Building Bright 2.0 Scheme" and "Fire Safety Improvement Works Subsidy Scheme", with a view to exploring the feasibility of allocating funding to subsidise those owners to encourage them to speed up the lift modernisation works.

Medium to Long-term Measures

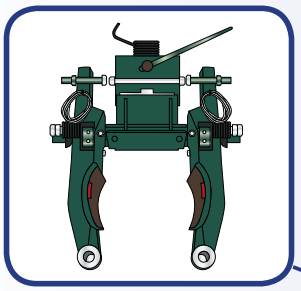
13. As a further measure, the EMSD will also study the feasibility of mandating the lift modernisation works. The EMSD will make reference to relevant experience in other countries, the enactment and enforcement of similar ordinances in Hong Kong as well as taking into account the impact on the community and the trade. In this connection, we will consult the public, Members and the trade, and submit our proposal in due course.

WAY FORWARD

14. We attach utmost importance to the safety of lifts. The EMSD will continue to strictly enforce the Ordinance and will strive to introduce various measures to enhance the safety of aged lifts so that the public can enjoy safe lift services. If the proposed measures mentioned above are well accepted by the public, we will work out the details of the measures for implementation so as to improve the safety of aged lifts.

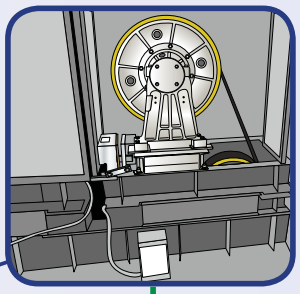
Development Bureau
Electrical and Mechanical Services Department
May 2018

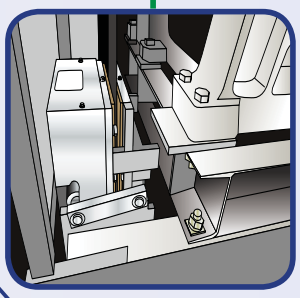
Applicable Solutions for Enhancing Requirements of Existing Lifts

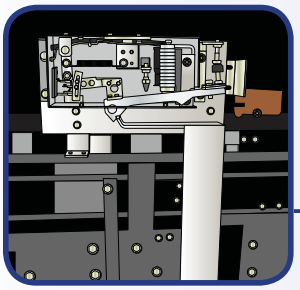


1. Install a double brake system

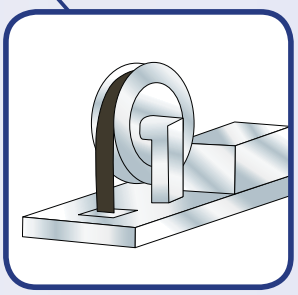
2. Install an unintended car movement protection device on the brake system



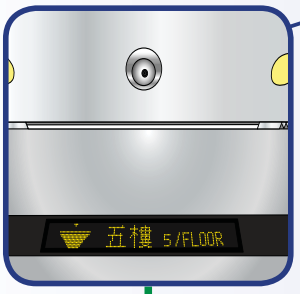




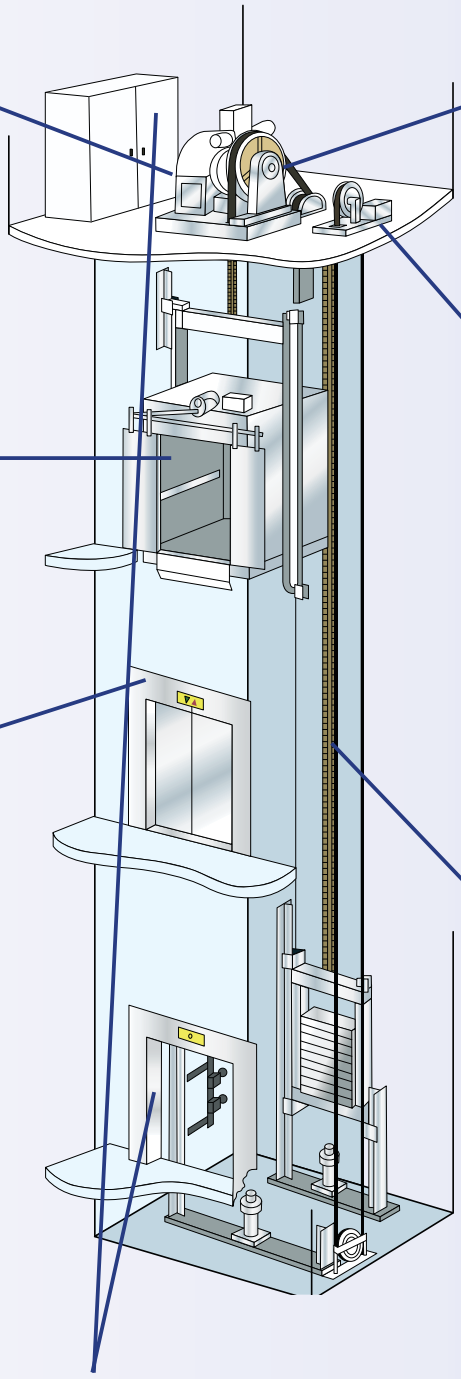
4. Install advanced car door mechanical lock and door safety edge



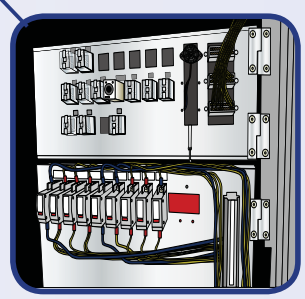
3. Install an ascending car overspeed protection device



5. Add an intercom & CCTV system



7. Add automatic rescue devices



6. Install an obstruction switch to protect suspension ropes

Seven Solutions for Enhancement of Older Lifts

Seven solutions have been identified with the greatest potential benefit for safety, reliability and comfort enhancement in older lifts. The first four solutions should be considered with priority, whereas the remaining three solutions should be considered according to the actual situation or individual need. The applicable solutions for enhancing requirements of existing lifts shown on page 5 are elaborated as follows:-

Solution 1: *Install a Double Brake System*

Older lifts may be fitted with only one brake and so the failure of parts could cause a lift car to stop ineffectively. Installing a redundant braking system can enhance safety as it has all the main brake parts in two sets, so that in the event of one set of parts fails, the other set of parts will ensure the safe operation of the lift.

A modern double brake system has two independent braking systems, each of which is normally electrically monitored.

Lifts installed before 2002 may not be up to this technical level. RPs should consider installing such system.

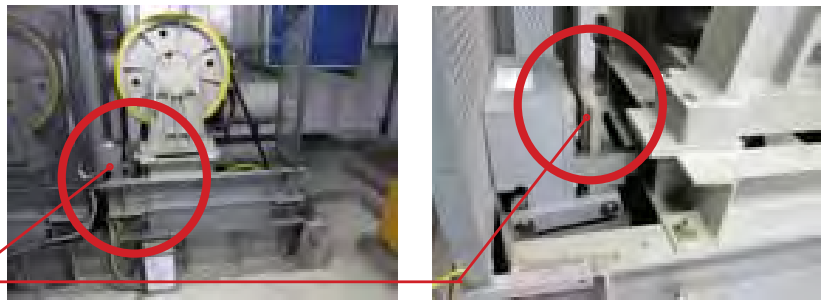
Solution 2: *Install an Unintended Car Movement Protection Device*

Unintended movement of the lift car whilst the doors are open and passengers are entering or exiting the lift car could result in injuries. To prevent unintended car movement, lift owners are advised to upgrade the braking system with built-in redundancy and self-monitoring features,

such as rope gripper. Such devices can protect the lift car from any unintended movement away from the landing position, thus enhancing passenger safety.

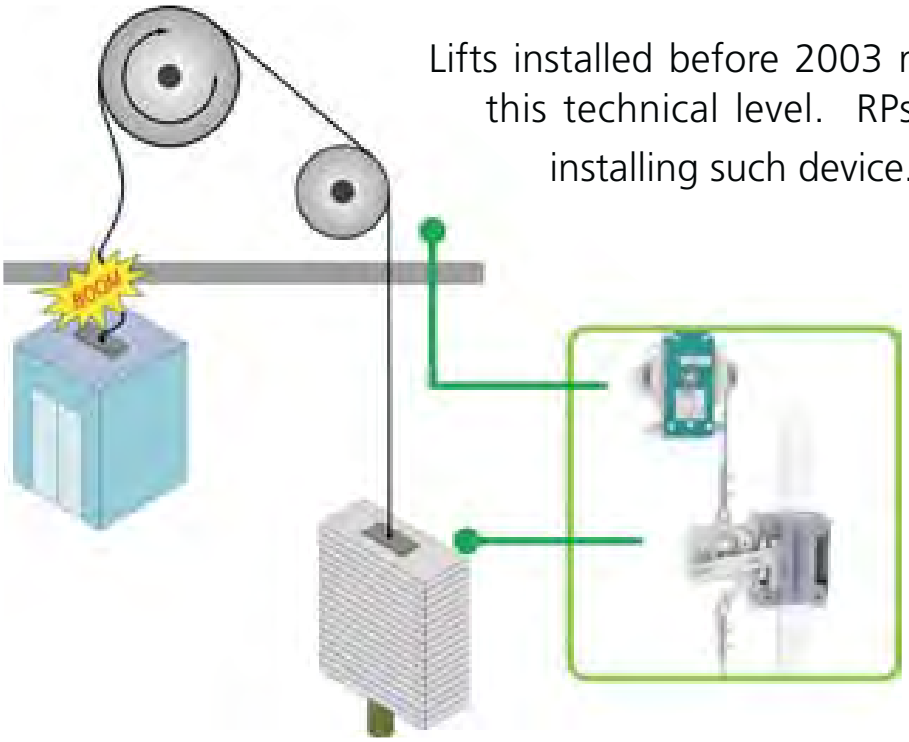
Lifts installed before 2007 may not be up to this technical level. RPs should consider installing such device.

Diagram showing the operation of rope gripper: if unintended car movement is detected, the rope gripper will be activated to stop the lift.



Solution 3: *Install an Ascending Car Overspeed Protection Device*

Installing an ascending car overspeed protection device can protect an ascending car from accidentally overspeeding. This can reduce the risk of the ascending lift car from accidentally hitting the top of the lift well, and thus protecting passengers from injuries. The protection device detects and stops any overspeed movement of the ascending lift car.



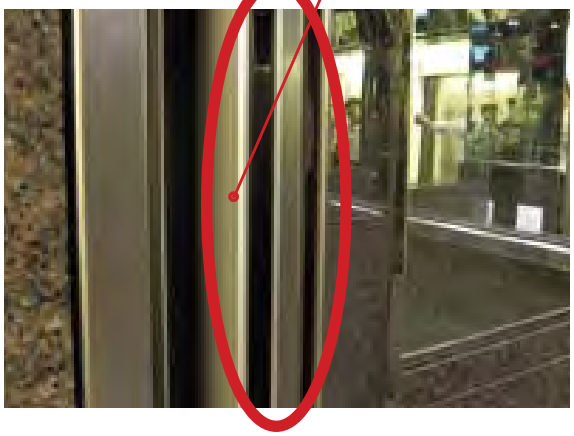
Lifts installed before 2003 may not be up to this technical level. RPs should consider installing such device.

Solution 4: *Install Car Door Mechanical Lock and Door Safety Edge*

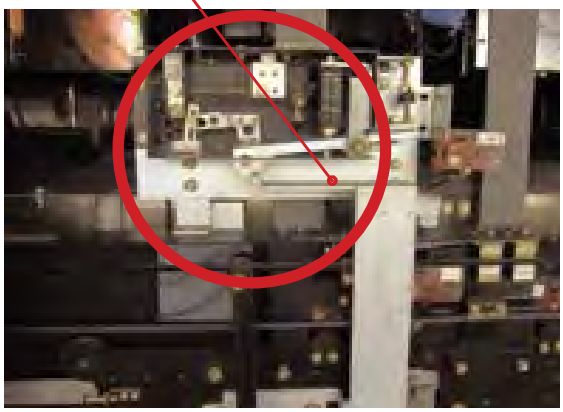
The benefit of installing car door mechanical lock in older lift doors is to prevent passengers inside the lift car from forcibly opening the lift doors, which can be dangerous. The benefit of installing the door safety edge is to automatically initiate re-opening of the door should a passenger be struck by the door as it is closing.

Lifts installed before 1984 may not be up to this technical level, and RPs are recommended to install such device.

Safety Edge



Door Lock



To ensure the lift is more reliable and comfortable for riding, RPs are also recommended to consider the following solutions while carrying out the lift modernisation works.

Solution 5: Add an Intercom and CCTV System

If trapped in a lift, passengers can always press the alarm bell for help, but experience shows that it is not the best option. Installing an intercom system makes it possible for trapped passengers to communicate directly with management office staff who can take speedy action to call Fire Services Department and lift contractor. Some advanced intercom systems also allow passengers to directly contact a 24-hour call centre of the registered lift contractor for assistance.

RPs may also consider installing a closed-circuit television (CCTV) system which comprises a camera in the lift car and an emergency alarm push button with buzzer (or alarm bell), all connected to the building management office. Management office staff can also monitor the CCTV video captured round the clock and take speedy action during emergency.

Intercom

Lifts installed before 1997 may not be equipped with such intercom and CCTV system. Lift owners are desired to install such system.

CCTV system

Solution 6: Install an Obstruction Switch to Protect Suspension Ropes

Excessive wear and tear of suspension ropes is a major cause of ropes breakages. The provision of an obstruction switch can prevent the excessive wear and tear of the suspension ropes and sheaves during breakdown, which can happen when the movement of the lift car or counterweight is obstructed while the motor is still in operation.

Obstruction Switch installed in the Control Panel

Lifts installed before 1984 may not satisfy this requirement. Lift owners are desired to install such device.

Solution 7: Add Automatic Rescue Devices

Passengers may be trapped inside a lift car in case of power failure. If an advanced automatic rescue device is installed, it can maintain the lift in a momentary operation for the safe exit of passengers, and prevent them from being trapped. When normal power supply fails, the device detects the voltage dip, uses back-up battery power to move the lift to the nearest landing floor and opens the doors to release the passengers. The lift will then remain out of service until normal power supply is resumed.

Summary of Seven Enhancement Solutions

	Enhancement Solution	Benefit
1.	Install a redundant brake system	Older lifts with one brake may lead to ineffective braking should the brake fail. If a redundant brake system is installed, the lift will be able to stop safely even if one set of the brake fails.
2.	Install an unintended car movement protection device on the brake system	It can prevent any unintended lift car movement, passengers will be safer as they go in and out of a lift.
3.	Install an ascending car overspeed protection device	Prevent overspeed of an ascending lift car. Increased safety and reliability of lift operation.
4.	Install car door mechanical lock and door safety edge	Prevent passengers inside the lift cars from forcibly opening the lift door, and from being struck by the lift door as it is closing. Passengers will be safer as they enter and exit the lift.
5.	Add an intercom and CCTV system	It enables trapped lift passengers to communicate instantly with management staff, speedy rescue action for trapped passengers.
6.	Install an obstruction switch to protect the suspension ropes	When the movement of the lift car or counterweight is obstructed while the motor is still in operation, it will cause excessive wear and tear of the suspension ropes and sheaves. This enhancement solution prevents from excessive wear and tear of suspension ropes and sheaves, so that the lift is more safe and reliable for riding.
7.	Add automatic rescue device	Prevent passengers from being trapped in case of power failure. Increased reliability of lift operation.

Annex II

Lifts which have not been equipped with modernisation items

Modernisation items for lifts	Percentage of total lifts which has not been equipped with modernisation items
Items 1 to 4 should be considered with priority	
1 Double Brake System	59%
2 Unintended Car Movement Protection Device	80%
3 Ascending Car Overspeed Protection Device	77%
4 Car Door Mechanical Lock and Door Safety Edge	38%
Items 5 to 7 should be considered according to the actual situation or individual need	
5 Intercom and CCTV System	18%
6 Obstruction Switch to Protect Suspension Ropes	18%
7 Automatic Rescue Devices	82%