

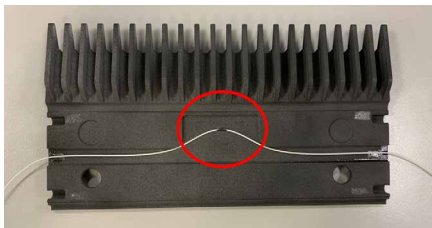


LIFT & 電梯通訊 ESCALATOR NEWSLETTER

Feature Article

Application of Optical Fibre Bragg Grating Sensing Technology To Enhance Safety and Reliability of Escalators

The Electrical and Mechanical Services Department (EMSD) has always been proactively promoting the use of innovative technologies to the trade to enhance the safety and reliability of escalators for the benefits of the public. Recently, the EMSD applied Optical Fibre Bragg Grating Sensing technology to develop a cost-effective escalator monitoring system to detect escalator faults. Optical Fibre Bragg Grating Sensing technology uses optical fibre as the medium, and employs temperature-sensitive and pressure-sensitive sensors at the core of the optical fibre to measure various escalator operation indexes such as temperature, movement, pressure and vibration. Coupled with big data analytics, signs that occur at the early stage of mechanical faults can be identified and the responsible persons for escalators (RPs) / registered escalator contractors (RCs) will be alerted for any potential equipment faults or accidents ahead of time.

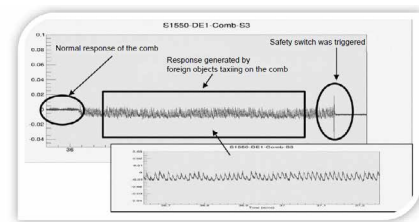


An Optical Fibre Bragg Grating sensor is located within the red circle

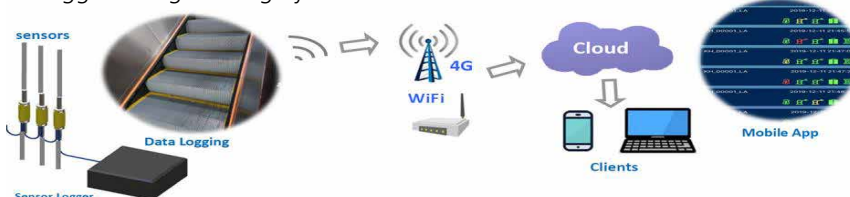
The EMSD installed Optical Fibre Bragg Grating sensors at the major components of two escalators and conducted a series of on-site simulation tests, the results of which suggested that the sensors could detect signs of various escalator operation conditions and predict impending faults. At present, detectable fault signs include brake malfunctions, foreign hard objects at comb plates, faults of step rollers, loosened and sliding handrails, etc. Through real-time record and analysis of escalator operation conditions, the Optical Fibre Bragg Grating sensing system can

detect minor signs of abnormalities in the components and predict impending faults of the mechanical components, enabling RPs / RCs to carry out maintenance works for the faulty components in time, so that faults which may cause injury to passengers or equipment damage can be avoided. With the use of artificial intelligence (AI) and machine-learning algorithms, it forms an effective predictive fault alarm system for escalators, which can help reduce the escalator downtime, avoid unnecessary checks, and achieve preventive maintenance and cost reduction.

To further improve this technology, the EMSD has commenced work on the second stage and installed the real-time monitoring system at a total of eight escalators at four trial venues. The system will collect real-time data of major components from the escalators of various brands installed at different venues, including Government complexes and offices, large shopping centres and outdoor walkways, to build an AI model to support the operation of the online predictive fault alarm system for escalators. It is expected that the second stage work will be completed in 2022, and relevant RPs may then consider installing this monitoring system to further enhance the safety and reliability of escalators.



Incident simulation test: When a number of foreign objects that could cause step collision accidents were placed on the comb plates installed with Optical Fibre Bragg Grating sensors, the sensors successfully captured the signs of foreign objects rolling near the comb plates.



Sensors send the signals via 4G to the cloud servers for data analysis, and convey the state of the escalator operation to RPs through a mobile app



Feature Article

Recommendations on Daily Management of Lifts / Escalators

Time flies! The Lifts and Escalators Ordinance (Cap. 618) (the Ordinance) has been implemented for over eight years. The Ordinance includes a series of measures to strengthen regulation, the most significant of which is the introduction of the role of responsible persons for lifts/escalators (RPs). RP means a person who owns the lifts/escalators or any other person who has the management or control of the lifts/escalators. RPs should ensure that the lifts/escalators or any associated equipment or machinery of the lifts/escalators are kept in a proper state of repair and in safe working order. To fulfil the above requirements, RPs should have appropriate knowledge of lift and escalator management. Here we would like to share five useful recommendations on the daily management of lifts/escalators.

- During daily inspections, RPs should enhance the checking on the operation conditions of the lifts/escalators and the associated equipment. For details of the inspection items, please refer to the Checklist for the Frontline Staff of Property Agencies published by the EMSD (Chinese version only)

(https://www.emsd.gov.hk/filemanager/sc/content_803/RP%20LE_checklist_chi.pdf)

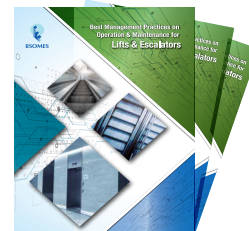


- RPs should maintain good ventilation of the lift machine rooms and keep the room temperature below 40°C. RPs may install air conditioners in the lift machine rooms to lower the room temperature and humidity level in order to extend the service lives of the electrical components in the lift machine rooms.

- When complaints regarding lifts and escalators are received or equipment faults are found, RPs should inform the RCs as soon as possible for inspection and maintenance.
- RPs should ensure that the necessary information are recorded in the log-book, and sign to confirm the completed works for lifts/escalators.
- RPs should display relevant guides on the safe use of lifts/escalators near those installations and actively participate in lifts/escalators safety events organised by the EMSD or professional institutions to help promote the safety of lifts/escalators. Relevant promotional materials may be obtained from the EMSD.

We hope the above recommendations would help RPs to effectively manage the daily operation and maintenance of equipment with good practices. To assist RPs in enhancing the effective management of lifts/escalators, the Building Services Operation and Maintenance Services Executives Society (BSOMES) published the Best Management Practices on Operation & Maintenance for Lifts & Escalators last year. Training courses will also be provided in the future to promote the sharing of knowledge and experience. Please stay tuned and actively enrol in the courses.

(Contributed by the Building Services Operation and Maintenance Executives Society)



Best Management Practices on Operation & Maintenance for Lifts & Escalators

News *-in-* Brief

Code of Practice on the Design and Construction of Lifts and Escalators (2021 Edition)

The Code of Practice on the Design and Construction of Lifts and Escalators (CoP) aims to provide guidance to trade practitioners on the technical details, methods, procedures and safety requirements of the design and construction of lifts and escalators and their associated equipment or machinery. The last update of the CoP (i.e. 2019 Edition of the CoP) came into effect on 1 June 2020. This edition mainly updated the requirements on the design and construction of lifts.

As for escalators, the new EN115-1:2017 standard was officially introduced by the European Committee for Standardization in February 2019, superseding the previous

EN115-1:2008+A1:2010 standard.

The new standard aims to further enhance the reliability, safety and comfort of escalators. To ensure that the design requirements of local escalators are in line with the latest international standards, the EMSD had revised the CoP with reference to the above new standard. In the new edition of the CoP (i.e. 2021 Edition), the existing requirements and specifications on the design and construction of escalators are replaced with the applicable provisions of the new EN115-1:2017 standard, and some local requirements are retained. The new edition of the CoP is expected to be gazetted in mid-2021.

Research on the Structural Integrity of Aged Lifts



Like most well-developed areas, Hong Kong is facing the problems of aging buildings and electrical and mechanical facilities, and the issue of aging lifts is of concern to the public. As at the end of 2020, there are about 70 000 lifts in Hong Kong, of which more than half are aged lifts (i.e. 20 years old or above), and there are more than 10 000 lifts which are at least 40 years old.

To further understand the condition of aged lifts for the prevention of incidents, the EMSD had engaged a consultant to study the integrity of structural components of aged lifts. The consultant conducted site inspections and studies on the main components of aged lifts (including the drive shafts, gears, bearings, etc. of traction machines, and the structural components installed in the lift shafts, e.g. the car frames, counterweight frames, rail clips, etc.) during the work period of lift modernisation works. More than 50 aged lifts which are over 30 years old were inspected, and five of them were selected for non-destructive testing in the laboratory. The findings of the tests are as follows:

1. Traction machines of lifts

The surfaces of certain drive shafts and worms were slightly corroded with rust stains, and the surfaces of gears' teeth and certain bearings were slightly corroded. In general, the safe operation of the lifts was not affected.



2. Car frames and counterweight frames

The structural condition of car frames and counterweight frames was generally normal, but some of the frame bottoms were rusty and some of the guide shoes at the car bottoms had accumulated dirt.



3. Rails and rail clips

The structural condition of rail codes was generally normal, but some rails and rail codes had slight rust stains or dirt accumulation.



As a whole, the statuses of structural components of aged lifts are satisfactory in general. However, since the lifts have been in operation for many years and some components are difficult to access during routine maintenance, there were dirt accumulation or rusts observed on the components. In response to the above situation, the EMSD has issued letters requesting the RPs to follow up as soon as possible, and the findings had also been shared with the trade. In the long run, the RPs may, subject to the condition of the components, consider conducting modernisation or enhancement works for the lifts to uplift the safety, reliability and comfort of lifts.

Lift and Escalator Work Safety Video Shooting Competition 2020/21

The Lift and Escalator Work Safety Video Shooting Competition 2020/21, organized by the EMSD in collaboration with the Labour Department, Construction Industry Council, Vocational Training Council, Occupational Safety and Health Council, Lift and Escalator Contractors Association, Hong Kong General Union of Lift and Escalator Employees, etc., has been completed successfully. Thanks to the active participation of the trade, the competition was a huge success. The participating teams produced many inspiring and creative videos, which conveyed important messages of work safety clearly with interesting plots. Delivered with the practitioners' passionate and heartening performance, the videos were immersive and extremely effective in promoting the work safety of lifts and escalators.

This year's competition adopted online voting for the four best videos selected by the competition's panel. We encouraged the trade and members of the public to enjoy the videos on online platforms and vote for their

favourite videos. Within just two weeks, the total view count of the four videos reached 11 300. Moreover, the production teams of the four winning videos were invited to the Championship Competition cum Award Presentation Ceremony held on 19 March to present their works to the guest judges from the co-organizers. At the award presentation ceremony, Mr PANG Yiu-hung, Director of Electrical and Mechanical Services, expressed his gratitude for the staunch support of the co-organizers and the trade, and encouraged the trade to continue to be flexible and innovative in seizing every opportunity to keep on enhancing the work flow and work safety, such that "worries can be alleviated with better conscientiousness; we can be rest assured with better safety".

<https://www.youtube.com/channel/UCZzMFklqWumFrSx1XfIYGiA>



Pictured are the winning teams with the staff and guests.



Pictured are Mr PANG Yiu-hung, Director of Electrical and Mechanical Services (fifth left, front row) and Mr POON Kwok-ying, Raymond, Deputy Director/Regulatory Services (fourth right, front row) with the guests and judges from the co-organizers.



Mr PANG Yiu-hung, Director of Electrical and Mechanical Services, delivered a speech at the award presentation ceremony.



Participating teams introduced their works to the audience.

Enter and Exit with Caution to Ensure Safe Use of Lifts

To ensure the safety of lifts, proper maintenance and regular inspection are essential, but correct use of lifts by passengers is equally important. Last year, the EMSD received a total of 238 reports on lift-related incidents, of which 95% were caused by passenger behaviours, including when passengers entered or exited the lifts. How should passengers protect themselves when entering and exiting lifts? We will analyze the risks one by one below.



Difference in height between the lift car and the ground

Due to the design limitations of some lifts, even with proper maintenance and inspection, there will still be a slight difference in height between the lift car and the ground when the lifts arrive at the floors. When this happens, if a passenger is not aware of the difference in height, he/she may trip when entering and exiting the lift, and an accident may occur.

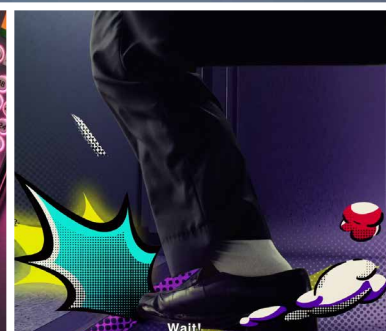
Besides, the design of some lifts allows the opening of lift doors before the lift cars come to a complete halt, so that passengers can enter and exit as soon as the lift cars stop. However, if a passenger enters or exits hastily without waiting for the lift to stop completely, he/she may trip due to imbalance as there is still a considerable difference in height between the lift car and the ground, and the lift car is still moving.

Finally, with large flow of people during peak hours and limited space in some buildings, if passengers rush in and out of the lifts, they will not only increase the load of the lifts, but also bump against one another, thus causing unnecessary clashes or even accidents.

All in all, when passengers use a lift, they should wait for the lift car to stop completely and pay attention to the difference in height between the lift car and the landing ground before entering or exiting the lift. Passengers should also observe order and let the passengers in the lift exit before entering it. If any abnormality is found, the RPs (e.g. the building security guards, property management company) should be notified immediately, and they should contact the RCs for follow-up.

To further promote the safe use of lifts, the EMSD launched a new series of TV and radio Announcements in the Public Interest (APIs) as well as stickers in April 2021, reminding passengers about the safety tips for using lifts, including paying attention when entering and exiting lifts. The EMSD's new mascots "Witty Bear" (left) and "KnowBot" (right) will also appear in the APIs and stickers. The TV APIs are available for viewing on the EMSD YouTube channel.

https://www.youtube.com/watch?v=DmgQI540f_w



Recent Prosecution Cases

Over the past year, the EMSD issued a total of 21 summonses to initiate prosecution against nine persons/companies which were suspected of contravening the Lifts and Escalators Ordinance. Among them, the prosecution procedures of five cases have been completed. Below are some of the cases:

Case 1

In February 2020, the EMSD was notified by the RP of a housing estate in Chai Wan that the mechanical components of the car door lock installation of a lift were tied up and the electrical components were short-circuited, resulting in the lift being used by passengers with car door lock bypassed. The EMSD initiated prosecution against the registered lift worker involved for failure to ensure that the lift works were carried out properly and

safely. The registered lift worker was fined HK\$2,000 upon conviction.

Case 2

In April 2020, the EMSD found that a lift in a building in Tai Kok Tsui was operated without a valid use permit. The EMSD initiated prosecution against the RP involved. The RP was convicted and fined HK\$18,000.

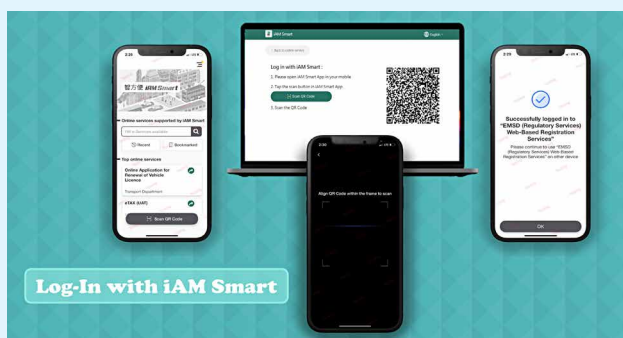
Case 3

In January 2021, the EMSD found that the periodic maintenance works for two lifts in a building in Happy Valley were overdue for over one month. The EMSD initiated prosecution against the RP involved. Upon conviction of the two offences, the RP was fined a total of HK\$8,000.

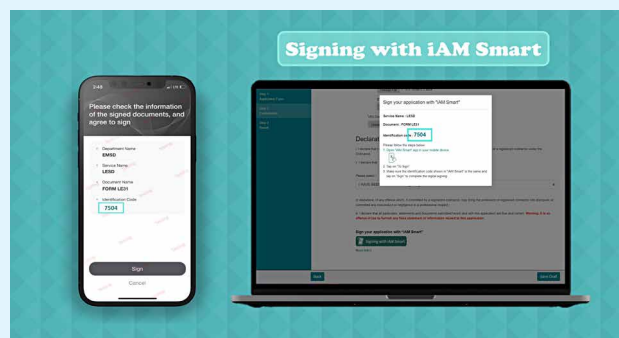
Using iAM Smart for Online Submission of Forms

The Government launched the iAM Smart mobile application in the fourth quarter of 2020 to provide a one-stop personalised digital services platform, which enables users to log in and use online services by their personal mobile phones. Through the mobile application or website services, users with iAM Smart accounts could easily log in and use the functions of authentication, digital signing and "e-ME" form filling for the online services which support iAM Smart.

RPs and trade practitioners need to submit forms specified under the Lifts and Escalators Ordinance from time to time for approval by the EMSD. To facilitate their submission of forms, the EMSD has set up an online platform for submission of some commonly used electronic forms. To optimise the online submission process, the EMSD now incorporates iAM Smart into the process, and it is expected that a total of 24 online forms would be launched on the online platform in mid-2021 for trial use. By then, RPs and trade practitioners could make use of the functions of iAM Smart to easily log in, fill in and sign various e-forms.



The online platform provides the function of logging in with iAM Smart.



The screen of the online platform for digital signing by applicants

Feedback

Your comments and suggestions, whether on editorial style or contents, are most welcome. Tell us how we can improve and make the Lift and Escalator Newsletter a truly informative and interesting publication for you. The Lift and Escalator Newsletter is available on our website at <http://www.emsd.gov.hk>.

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