

For discussion  
on 19 April 2017

**LEGISLATIVE COUNCIL**

**PANEL ON DEVELOPMENT**

**Regulatory Control over Lift and Escalator Safety**

**Purpose**

This paper briefs Members on the regulatory control over lift and escalator safety in Hong Kong, and the progress of investigation and follow-up actions related to the escalator incident happened at Langham Place, Mongkok on 25 March 2017 and three other lift/escalator incidents happened in March 2017.

**Regulatory Control over Lift and Escalator Safety under the Lifts and Escalators Ordinance**

2. The Electrical and Mechanical Services Department (EMSD) attaches great importance to the safe operation of lifts and escalators (L/Es) and is committed to strictly enforce the Lifts and Escalators Ordinance (Cap. 618) (the Ordinance) to ensure that the public is served with safe L/E services. The Ordinance was put into full operation on 17 December 2012 to replace the repealed Lifts and Escalators (Safety) Ordinance (Cap. 327). The Ordinance introduces a series of new and enhanced regulatory control measures on lift and escalator safety, including among others, setting out the duties of responsible persons (RPs) (i.e. owners of L/Es and any other persons who have the management or control of the L/Es), registered contractors (RCs), registered engineers (REs) and registered workers (RWs).

Type approval

3. All L/Es in Hong Kong are designed in compliance with the Code of Practice on the Design and Construction of Lifts and Escalators (Design Code) and relevant international standards. They are equipped with multiple safety devices to monitor

their safe operation and protect against component failures in ensuring passengers safety. Before installation, RCs shall obtain type approval from the EMSD for the design of L/Es and safety components.

#### Installation of L/Es

4. Installation of L/Es shall be undertaken by RCs. Upon completion of an L/E installation, the RP shall cause the L/E to be thoroughly examined by an RE. After certifying that the L/E is of good design and construction and is in safe working conditions by the RE, the RP shall obtain a use permit from the EMSD before the L/E can be operated.

#### Periodic maintenance and examination

5. RPs shall ensure that maintenance of their L/Es is undertaken by RCs. Periodic maintenance shall be carried out by RCs at intervals not exceeding one month. In addition, all lifts and escalators shall be examined by REs at intervals not exceeding 12 months and 6 months respectively in order to renew the use permits from the EMSD. The EMSD has published the Code of Practice for Lift Works and Escalator Works (Works Code) to give guidance on lift works and escalator works including among others, the examination, maintenance and repair of L/Es. In particular, the Works Code specifies the items to be checked for proper condition, and attended to if necessary, during periodic maintenance in accordance with a schedule recommended by the L/E manufacturer. Also, the Works Code specifies the examination activities to be carried out by an RE undertaking periodic thorough examination to determine whether the L/E is in safe working order.

#### Audit inspections

6. The EMSD conducts audit inspections to L/Es and works of RCs to identify any non-compliance with the requirements of the Ordinance.

7. In 2016, EMSD conducted a total of 10,171 inspections for L/E, including 8,808 for lifts and 1,363 for escalators, covering new installations, periodic maintenance, periodic examination and surprise check.

8. Prosecution/disciplinary actions will be instituted against the concerned RCs/RWs/REs if non-compliance of the Ordinance is found during the EMSD's audit inspections. The numbers of prosecution and disciplinary cases completed from 2014 to 2016 are summarized in **Annex 1**.

## **Escalator Incident Happened at Langham Place on 25 March 2017**

9. An escalator incident occurred at Langham Place, Mongkok at about 4:30 pm on 25 March 2017. At the time of the incident, the upward moving incident escalator linking 4/F and 8/F with a rise of 21 metres stopped suddenly and moved downwards. Many passengers on the escalator lost balance and 18 of them suffered injuries. Among the injured passengers, three were hospitalized and the remaining ones were discharged after treatment at the hospital.

10. The EMSD has been carrying out an in-depth independent investigation immediately since occurrence of the incident. Our preliminary findings reveal that the drive chain of the escalator broke at the time of the incident and the auxiliary brake was not triggered to stop the escalator. As a result, the escalator lost the driving force and started to move downwards due to the weight of passengers. Under normal circumstance, the healthiness of the drive chain is continuously monitored by the broken chain safety device, which will trigger the auxiliary brake to stop the moving escalator in case of chain breakage or excessive elongation of the chain. In this incident, the broken chain safety device failed to detect the chain breakage and the auxiliary brake was not triggered to stop the escalator from moving downwards.

11. The incident was a very rare case as it was caused by the breakage of drive chain, which rarely happens, coupled with the malfunctioning of the broken chain safety device. There was no similar incident occurred previously in Hong Kong.

12. The EMSD seized the drive chain and broken chain safety device for investigation of the cause of their failures. Material experts engaged for the examination of the drive chain identified that the possible cause of the chain breakage was metal fatigue. As for the broken chain safety device, the initial finding was that its moving mechanical components failed to react due to locking of a spring inside the device by accumulated grease.

13. The last periodic examination of the incident escalator was carried out by an RE on 27 January 2017 and the last periodic maintenance was conducted by Otis Elevator Company (HK) Limited (Otis) on 23 March 2017. The EMSD is investigating whether the periodic examination and maintenance were carried out in

accordance with the Works Code and the maintenance manual from the escalator manufacturer.

### **Investigation and Follow-Up Actions**

14. The EMSD continues to investigate the escalator incident at Langham Place. The investigation is being focused on, among others, the cause of failure of the drive chain and the malfunctioning of the broken chain safety device, and the periodic maintenance and periodic examination carried out by the RC, Otis. The investigation is targeted for completion by the end of May 2017 tentatively.

15. In order to ensure passenger safety, the EMSD prohibited the operation of the incident escalator and three other high rise escalators at Langham Place after the incident. Otis will replace the drive chain and broken chain safety device of the four escalators and examine them thoroughly by an RE. The EMSD will then examine the escalators to ensure their safe working conditions before approving the resumption of their operation.

16. The EMSD has accorded 30 performance monitoring points to Otis for the breakage of the drive chain and malfunctioning of the broken chain safety device in the Langham Place escalator incident and a warning letter was also issued to Otis for its poor performance. The Safety Star and all Quality Stars will be removed from Otis in the Contractors' Performance Ratings of RCs for first quarter of 2017 (i.e. January to March 2017).

17. Prosecution/disciplinary actions will be instituted against the concerned RC, RE and/or RW if non-compliance of the Ordinance is found in our investigation.

18. There are a total of 65 high rise escalators with vertical rise of 15 metres or above in Hong Kong, including the four at Langham Place, as at March 2017. The list of these escalators is given in **Annex 2**. Considering their high patronage, the EMSD considers it prudent to reconfirm the safety of these escalators and assure the public of their safety through a special inspection by the respective RCs after the incident. The inspections were completed within a week of the incident on 31 March 2017. No abnormality was found and all escalators were confirmed to be in safe working conditions.

19. The EMSD also requested Otis to conduct special inspections of all Otis escalators in Hong Kong within a month on 3 April 2017. The EMSD will scrutinise its inspection plan and conduct checks on site.

### **Statistics of Reported Escalator Incidents in the Past 3 years**

20. The numbers of escalator incidents reported under the Ordinance from 2014 to 2016 are summarized in **Annex 3**. In the past three years, 99.8% of the incidents were not caused by equipment failure, with 94.3% incidents caused by passenger behaviour and 5.5% caused by external factors such as tiny metallic objects being wedged in the space between step and combplate thereby triggering safety devices to stop the escalator.

### **Three Other L/E incidents Occurred in March 2017**

21. On 27 March 2017, two other escalator incidents occurred at Metro Town, Tiu Keng Leng and MTR Lam Tin Station respectively. The EMSD deployed officers to carry out investigation on the same day. In the incident at Metro Town, Tiu Keng Leng, visible smoke was emitted during escalator related welding repair works. The incident was considered not related to the equipment fault of the escalator. The incident at MTR Lam Tin Station involved overheating of the gearbox of the driving system due to unsmooth operation of the worm gear. The operation of the escalator was resumed after replacement of the gearbox and thorough examination by an RE.

22. On 21 March 2017, a lift incident occurred at lift No. 2 at Wing Fat Commercial Building, Aberdeen. The incident lift with rated capacity of 680 kilograms was installed in 1982. The EMSD has been carrying out investigation of the incident since being notified on 22 March 2017. The preliminary investigation reveals that during the incident, an unintended movement of the lift car in upward direction occurred due to malfunction of the braking system. No abnormality of the suspension ropes and control system was found. The EMSD will continue to investigate the root cause of the braking system malfunction. Prosecution/disciplinary actions will be instituted against the concerned RC, RE and/or RW if non-compliance of the Ordinance is found in our investigation.

## **The Way Forward**

23. The EMSD will continue to strictly enforce the Ordinance to ensure that the public is served with safe lift and escalator services and will introduce measures to enhance lift and escalator safety in Hong Kong upon completion of the investigation and confirmation of the root cause(s) of the recent incidents.

**Development Bureau**

**Electrical and Mechanical Services Department**

**April 2017**

**Numbers of Prosecution and Disciplinary Cases from 2014 to 2016**

**Number of Completed Prosecution Cases from 2014 to 2016**

	<b>2014</b>	<b>2015</b>	<b>2016</b>
<b>No. of Completed Summonses</b>	20	21	7

**Number of Completed Disciplinary Cases from 2014 to 2016**

	<b>2014</b>	<b>2015</b>	<b>2016</b>
<b>No. of Completed Disciplinary Cases</b>	0	0	1

## High Rise Escalators of Vertical Rise 15 Metres or Above

Region	District Council	Location	Quantity of High Rise Escalators	Vertical Rise (metres)
Hong Kong	Central & Western	MTR Central Station*	1	16.6
		MTR Hong Kong Station*	6	17.0
		MTR Sai Ying Pun Station	2	21.7
		MTR HKU Station	3	20.2
	Wan Chai	Hysan Place	4	16.1 – 18.7
		MTR Causeway Bay Station*	4	16.0
	Eastern	Fortress Hill Pedestrian Link*	1	15.2
		MTR Fortress Hill Station*	4	19.7
		MTR Quarry Bay Station*	2	15.9
		MTR Tai Koo Station*	4	17.0 – 17.5
	Southern	Ocean Park*	8	19.3 – 31.8
	Kowloon	Yau Tsim Mong	Langham Place*	4
iSQUARE*			2	20.4
Kowloon City		MTR Ho Man Tin Station	2	17.8
		Kai Tak Cruise Terminal*	4	16.5
Kwun Tong		MegaBox	4	15.0 – 21.8
		MTR Lam Tin Station*	8	16.1 – 20.0
New Territories	Sai Kung	Hong Kong Design Institute	2	25.8
<b>Total</b>			<b>65</b>	

\* The high rise escalators at these locations (totaling 48 nos. of escalators) are maintained by Otis.



### Statistics of Reported Escalator Incidents in 2014 to 2016

Cause of Incident	Year			Total
	2014	2015	2016	
<b>No. of reported escalator incidents</b> <sup>Note 1</sup>				
Equipment failure	0 (0%)	8 <sup>Note 3</sup> (0.5%)	3 <sup>Note 3</sup> (0.2%)	11 (0.2%)
Passenger behaviour	1,530 (93.3%)	1,477 (92.9%)	1,571 (96.7%)	4,578 (94.3%)
External factors <sup>Note 2</sup>	109 (6.7%)	105 (6.6%)	50 (3.1%)	264 (5.5%)
<b>Total</b>	1,639	1,590	1,624	4,853
<b>No. of injuries involved in the reported escalator incidents</b>				
Equipment failure	0	12	3	15
Passenger behaviour	1,760	1,663	1,695	5,118
External factors <sup>Note 2</sup>	109	105	56	270
<b>Total</b>	1,869	1,780	1,754	5,403

Note 1: According to the Ordinance, when there is an escalator incident belonging to a type as listed in Schedule 7 of the Ordinance, the RP of the escalator must inform the EMSD within 24 hours after the incident comes to the RP's knowledge.

Note 2: Example of external factors - Passenger injuries due to foreign objects, e.g. tiny metallic object, shoe, stroller wheels, trolley wheels etc., wedged in the space between step and combplate thereby triggering safety devices to stop escalator operation.

Note 3: For the escalator incidents caused by equipment failure, Otis was the RC in 4 escalator incidents in 2015 (resulting in 7 injuries) and 1 escalator incident in 2016 (resulting in 1 injury).