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Panel on Transport

Subcommittee on Matters Relating to Railways
Meeting on 1 February 2019

Background brief on upgrading signaling system for railway lines

Purpose

This paper provides background information on the upgrade of signalling system for railway lines. It also summarizes the major views and concerns expressed by members of the Subcommittee on Matters Relating to Railways ("the Subcommittee") during previous discussion on the subject.

Background

2. The MTR Corporation Limited ("MTRCL") has been monitoring the capacity of railway lines under the existing signalling system. To increase capacity and further enhance the overall reliability and efficiency of railway services, MTRCL earlier decided to replace the signalling systems of seven MTR lines (Tsuen Wan Line, Island Line, Kwun Tong Line, Tseung Kwan O Line, Disneyland Resort Line, Tung Chung Line and Airport Express). According to the information provided by MTRCL in November 2017, works of the replacement projects will be completed in phases and the timeframe of completion is at **Appendix I**. MTRCL is also replacing the signalling system of the East Rail Line to tie in with the operations of the Shatin to Central Link.

3. According to MTRCL, any large-scale system upgrade would entail the risks that the system may become unstable during the process with higher risks of service disruption. Such risks are common to any system change. Overseas experiences indicate that some railways try to avoid such risks by partially or fully suspending railway services when their signalling systems undergo major upgrades until the completion of works. However, this arrangement is not practicable in Hong Kong having regard to Hong Kong's

well-developed public transport system. Therefore, MTRCL has to maintain its service level during upgrades of its signalling systems to avoid causing inconvenience to passengers. It is crucial to complete a smooth upgrade of the signalling system while minimizing the risks of impacting on railway service.

4. Replacement of signalling system involves the installation of a large number of new equipment such as optical fibres, cables, equipment at trackside and stations, followed by extensive tests to be rolled out in a progressive manner to achieve safe and smooth operations before the new system comes into service. Tests include switching from the existing signalling system to the new system on test-tracks at depots and on main lines. To minimize impact on train services, on-site tests on main lines are conducted during non-traffic hours overnight and there are only about two hours available each night for the tests. The Electrical and Mechanical Services Department ("EMSD") will inspect the tests on-site and the new system could only come into operations after obtaining the approval by EMSD.

Members' major views and concerns

5. Members noted with serious concern that signalling fault was one of the major causes of railway service disruption. At the Council meeting of 24 October 2018, Hon Gary FAN raised an urgent oral question on the urgent measures to prevent and deal with large-scale disruptions of railway services. In response to some Members' concern that whether the service disruption of four MTR lines on 16 October 2018 ("the incident") was related to the signalling system upgrading project, the Administration advised that based on the signalling system data records of MTRCL, the incident indeed occurred only after MTRCL had switched the signalling system back to the existing one and had operated normally for some time. Hence, there was no evidence showing correlation between the incident and signalling system upgrading project and its testing.¹

6. When discussing the incident at the Subcommittee meeting on 29 October 2018, a member was concerned about the ageing problem of the existing signalling system and the target completion of the signalling upgrading project. MTRCL advised that it would take reference from this

¹ MTRCL submitted a report to the Government on 19 December 2018 on its investigation on the incident. The report confirmed that the incident had no correlation with the signalling system upgrading project and its testing. For details, please refer to the [press release](#) issued by the Transport and Housing Bureau on 19 December 2018.

experience to avoid recurrence of similar incidents from happening in the new signalling system. The replacement of signalling systems was expected to complete in 2026.

7. Noting that the corrosion of a copper data-link was the cause of train service disruption of Kwun Tong Line on 5 August 2017, some members were dissatisfied that such problem had not been discovered during regular maintenance. They also urged MTRCL to make timely investment to renew its railway assets including the signalling systems, with a view to keeping abreast of the technological advancement and enhancing the reliability and safety of the railway system. MTRCL advised that the problem had not been encountered before and that it would take into account the lessons learnt from the incident and to enhance the maintenance of parts and components of the signalling system having regard to weather conditions.

8. On some members' concerns regarding the life expectancy of the new signalling system, and whether the electronic components of the signalling system would be updated regularly within its overall system life-cycle to keep pace with technological advancements, MTRCL advised that normally a signalling system should have 20 to 30 years' lifetime. It had requested its service contractors to provide adequate technical support to regularly update the parts and software of the signalling system within its overall system life-cycle. In addition, a stringent asset management system was in place to set out appropriate procedures for the maintenance of various components of the railway system, including signalling system equipment. Timely renewal would be arranged in accordance with the functions and performance of the railway components.

9. An enquiry was raised regarding the deployment of the newly procured urban lines trains, which were only compatible with the new signalling system, in the event of a train service disruption. MTRCL advised that 36 sets of trains on Tsuen Wan Line were compatible with both the existing and the new signalling systems, and that should be sufficient for deployment to other urban lines to meet operational needs.

Latest development

10. The Administration plans to update the Subcommittee on the progress of upgrading the signalling systems for railway lines at the meeting to be held on 1 February 2019.

Relevant papers

11. A list of relevant papers is in **Appendix II**.

Council Business Division 4
Legislative Council Secretariat
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Timeframe of Expected Completion of New Signalling Systems

Timeframe of Expected Completion of New Signalling Systems Railway Line	Expected Completion
Tsuen Wan Line	End of 2018
East Rail Line	2019
Island Line	2019
Kwun Tong Line	2020
Tseung Kwan O Line	2021
Tung Chung Line, Disneyland Resort Line and Airport Express	2026

Source: LC Paper No. CB(4)260/17-18(03)

Upgrading signaling system for railway lines

List of relevant papers

Date of meeting	Meeting	Minutes/Paper	LC Paper No.
1 December 2017	Subcommittee on Matters Relating to Railways	Administration's paper on progress on upgrading signalling system for railway lines	CB(4)260/17-18(03) https://www.legco.gov.hk/yr17-18/english/panels/tp/tp_rdp/papers/tp_rdp20171201cb4-260-3-e.pdf
		Minutes of meeting	CB(4)355/18-19 https://www.legco.gov.hk/yr17-18/english/panels/tp/tp_rdp/minutes/rdp20171201.pdf
2 February 2018	Subcommittee on Matters Relating to Railways	Administration's response to the joint letter from Dr Hon KWOK Ka-ki, Hon Jeremy TAM Man-ho, Hon Tanya CHAN and Hon Alvin YEUNG and the letter from Hon LAM Cheuk-ting on the signalling fault of the East Rail Line on 11 January 2018	CB(4)554/17-18(01) https://www.legco.gov.hk/yr17-18/chinese/panels/tp/tp_rdp/papers/tp_rdp20180202cb4-554-1-c.pdf (English version to follow)
9 October 2018*	Subcommittee on Matters Relating to Railways	Letter dated 9 October 2018 from the Administration on "Progress of MTR Railway Services"	CB(4)1612/17-18(01) https://www.legco.gov.hk/yr17-18/chinese/panels/tp/tp_rdp/papers/tp_rdp20181009cb4-1612-1-c.pdf (English version to follow)

Date of meeting	Meeting	Minutes/Paper	LC Paper No.
24 October 2018	Council meeting	Hon Gary FAN Kwok-wai raised a question on the urgent measures to prevent and deal with large-scale disruptions of railway services	https://www.info.gov.hk/gia/general/201810/24/P2018102400409.htm
29 October 2018	Subcommittee on Matters Relating to Railways	Administration paper on service disruption of four MTR lines on 16 October 2018	CB(4)110/18-19(03) https://www.legco.gov.hk/yr18-19/english/panels/tp/tp_rdp/papers/tp_rdp20181029cb4-110-3-e.pdf
7 December 2018	Subcommittee on Matters Relating to Railways	Administration's response to the letters from Hon Claudia MO and Hon LAM Cheuk-ting requesting to discuss service disruption of several MTR lines on 16 October 2018 due to signalling system faults as set out in LC Paper Nos. CB(4)73/18-19(01)-(02)	CB(4)149/18-19(01) https://www.legco.gov.hk/yr18-19/english/panels/tp/tp_rdp/papers/tp_rdp20181207cb4-149-1-e.pdf

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