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Legislative Council Panel on Transport
Subcommittee on Matters Relating to Railways

Retrofitting of Automatic Platform Gates
along the East Rail Line and Ma On Shan Line

Purpose

1. This paper reports on the latest progress of the retrofitting of automatic platform gates ("APGs") along the East Rail Line ("EAL") and the Ma On Shan Line ("MOL") and their related financial arrangements.

Background

2. At the meeting of the Subcommittee on Matters Relating to Railways in January 2011, January and March 2012, the MTR Corporation Limited ("MTRCL") presented to the Subcommittee the retrofitting of APGs along EAL and MOL, and that the retrofitting would be carried out in tandem with the projects of the Shatin to Central Link ("SCL") which will be completed by phases in 2018 and 2020.

3. The technical studies conducted by MTRCL revealed that the retrofitting of APGs on EAL encounters numerous difficulties and challenges. They include:

(a) safety risk associated with wide platform gaps;

(b) limitations of existing signalling system;

(c) limitations of existing trains; and

(d) limitations of platform structures.

4. The commencement of the SCL projects has provided an opportunity to solve the above issues. The following paragraphs will elaborate the latest progress of the retrofitting works.

Retrofitting APGs along the EAL

To resolve technical difficulties and challenges

(A) Narrowing platform gaps

5. As the EAL has to cater for the operation of different types of trains, including intercity trains from the Mainland China, the gap at platforms with curve is comparatively wider. Retrofitting APGs at these platforms would block passengers' view from noticing the platform gap, creating a significant safety risk. Therefore, the problem of wider gaps must be resolved before retrofitting of APGs. As the new 9-car trains of SCL will replace the existing 12-car trains of EAL, trains can berth at the relatively straighter parts of platforms when SCL comes into service in future. Moreover, the new trains with wider body will significantly reduce the gap between platforms and trains. It is expected that the platform gaps will be narrowed to less than 150 mm.

(B) Replacing signalling system

6. The existing EAL signalling system, which has been in commission for many years cannot meet the many requirements on higher accuracy, for example that the trains have to stop precisely to align the train doors with the APGs. Besides, the existing signalling system may not be able to detect APGs that are not completely closed, which in turn creates safety risks easily. The signalling system has to be replaced and upgraded before retrofitting the APGs along EAL, in order to ensure safe operation of trains and to maintain the current highly reliable train service. Following the commencement of SCL works, EAL will be replaced with a new signalling system, the problems brought about by the old signalling system can be altogether resolved.

(C) New rolling stocks

7. Existing EAL trains are not equipped with train motoring and braking systems suitable for use with APGs. If the current fleet is to be refurbished to add such systems, the additional stress will damage the structural integrity of the train cars and shorten their asset life. The SCL project has procured new trains to replace the existing EAL train fleet and the above technical limitation can thus be resolved effectively.

(D) Strengthening platform structure

8. The structure of the EAL platforms is different from that of the Urban Lines and other recently-built lines. The EAL platforms cannot support the extra weight brought by the retrofitting of APGs. It is estimated that one set of APG together with tempered glass panels weigh

around 500 kilograms. Around 45 sets of APGs will be retrofitted, totalling 22.5 tonnes of extra weight, at each platform. As most of the EAL stations are located above ground with platforms of an open design, the platforms and APGs must withstand the large horizontal force caused by the wind loads as well as the loading of passengers. The structure of these platforms with relatively older design may not be able to bear the abovementioned additional weights and wind loads. As such, the platform structure must be strengthened before any APGs can be retrofitted.

9. Strengthening works mainly involve the installation of steel bars and brackets at platforms. Work procedures include removal of coping stones and concrete surface, as well as the saw-cutting of platform edge, etc. Furthermore, owing to normal wear and ageing, irregularities were found at the edges of some EAL station platforms. The irregular edges do not affect daily train operation. However, if APGs are to be retrofitted, these must be rectified. Meanwhile, MTRCL will also fully enhance the platform environment by modifying the platform floor and laying new tiles. This is to provide a better and more comfortable travelling environment for passengers.

10. Retrofitting APGs along an operating railway is highly challenging. To prevent any interruption to normal train operation, all works can only be carried out during the three to four hours every night after service hours. MTRCL also have to reserve sufficient time to restore the platform area for train service; this is hence under a very tight work schedule.

11. To minimise the impacts of night works on the neighbourhood, MTRCL and the contractors have taken various mitigation measures including the development of a “mobile sound insulation booth” which effectively reduces noise levels by around 20 decibels. Noisy works will be conducted inside the “mobile sound insulation booth”.

Latest work progress

12. The contracts on new rolling stocks and new signalling system for SCL were awarded to Hyundai Rotem Company and Siemens Limited respectively in December 2012. According to the contract scope, Hyundai Rotem Company will be responsible for the design, supply, manufacture, testing and commissioning of the 37 sets of new trains for SCL. The design and manufacture procedures have commenced in end 2012, and the first train is scheduled to be delivered to Hong Kong for

testing and commissioning in 2015.

13. Signalling system is the most complicated part in railway operation which directly affects train safety. As the intercity through train also operates on the over 40-kilometre EAL, the design of the new signalling system will have to handle enormous data processing and develop software and hardware. The contractor is currently working on the design and manufacturing of the new signalling system. It is expected that overnight installation, and testing and commissioning will start in 2015, at which static tests, dynamic tests, joint tests with other electrical and mechanical systems and train fleet, new and old systems interface testing procedures, etc. will be conducted. With reference to the experiences in Singapore and London, it took 6 to 8 years to just upgrade a signalling system in an operating railway line. Nevertheless, MTRCL will continue to seek for any viable solutions to speed up the programme.

14. Whilst the preparation works for replacing trains and signalling system are ongoing, platform strengthening works have already taken place at the Racecourse Station during the summer break of horse racing. The works will also start in other EAL stations by phases starting November. As mentioned, in view of the very limited time and complexity of the works, it will take 6 years to complete the works. The new trains and signalling system is expected to commission in early 2019. By then the APGs can be retrofitted. The first gate will also come into operation at that time. It is estimated that the retrofitting of APGs along all EAL stations will take around 1.5 years. In other words, we expect that all APGs along EAL will be in full operation by 2020.

Retrofitting APGs along the MOL

15. To cater for the future community development in Ma On Shan, MOL will run by 8-car trains instead of the existing 4-car trains along with the SCL project. Therefore, the platforms and roofs of all MOL stations will have to be extended. More electrical and mechanical facilities will also be built to pave way for the retrofitting of APGs. Modification works on MOL have commenced in 2012 and are in good progress. It is expected that the works will be completed in 2017 to tie in with the commencement of SCL (Tai Wai to Hung Hom Section) in 2018.

16. The contract for retrofitting APGs along the MOL was awarded in

mid-December 2012. The design of the new APGs is similar to that currently at the above ground and at-grade stations of the Urban Lines and the Disneyland Resort Line. The prototype of the new APGs was delivered to Hong Kong in October 2013. Reliability tests are currently ongoing.

17. MTRCL understands public's desire to complete the APG retrofitting works as early as possible. Therefore, after some coordination works, the APG retrofitting on MOL will be completed in 2017, one year ahead of original schedule.

Financial arrangements

18. For EAL, having regard to the Government's suggestion and to thank passengers for their support, MTRCL will absorb the construction costs through internal resources allocation. Among which the costs of stations and platforms strengthening would be approximately $800 million. The contract for retrofitting APGs along EAL will be awarded later. The cost of retrofitting APGs on MOL is approximately $400 million. Half of which will be borne by the overall works of the SCL, while the other half will be borne by MTRCL. Passengers do not have to pay extra costs for the above retrofitting works.

19. Besides, regarding the $2.3 billion capital cost for the Platform Screen Door and APG retrofitting works at 30 underground stations and eight at-grade and aboveground stations in the pre-merger Tsuen Wan Line, Kwun Tong Line and Island Line, half of the capital cost was borne by MTRCL, while the remaining half was met by collecting 10 cents from each journey on the pre-merger MTR network taken by passengers using Octopus cards starting July 2000. According to the latest estimate, half of the capital cost (i.e. $1.15 billion) will be fully collected by February 2014.

20. Having regard to the Government's suggestion, and to thank passengers for their support, MTRCL decided to withdraw the 10-cent Octopus passenger contribution from 1 December 2013 (Sunday), two months earlier than planned. The early withdrawal will save passengers about $20 million. About 30,000 trip combinations of adult and concessionary Octopus fares will be reduced by 10 cents. It is expected that around 70% (i.e. around three million) of all daily passenger trips will be benefitted. Applicable journeys with fares reduced by 10 cents are listed in **Annex**. Revised fare charts have been uploaded onto the MTR website (www.mtr.com.hk).

Conclusion

21. Upgrading of signalling system and renewal of train fleets have to be taken place in parallel with the retrofitting of APGs along EAL. This is the first time in the world for an operating railway to undergo these three major system enhancement at the same time. Amongst the above, the design, manufacture, installation and testing procedures for the new signalling system are the most complicated parts, which involve various integrated tests with other electrical and mechanical systems, new trains, interface works between the new and old signalling systems, etc. The required operational accuracy must be achieved to ensure train safety. In the meantime, MTRCL and the contractors are striving to minimise the noise and disturbance caused to the nearby environment. Through close communication with passengers and the nearby community, we aim to better the works arrangements and complete the retrofitting works on time.

22. MTRCL will draw reference from past experiences of retrofitting Platform Screen Doors and APGs on the Urban Lines to maintain its reliable train service and minimise the disturbance to passengers during works period in the coming few years.

MTR Corporation Limited

November 2013

Annex

Applicable Journeys under the Early Withdrawal of 10 Cents Octopus Fares per Passenger Trip

Starting from 1 December 2013, the adult and concessionary Octopus fares of the following journeys will be reduced by 10 cents:

1.	Pre-merger MTR stations	● all trips to or from any stations along Kwun Tong Line, Tsuen Wan Line, Island Line, Tseung Kwan O Line, Tung Chung Line and Disneyland Resort Line
2.	Interchange stations between the pre-merger MTR and KCRC network	● all trips[1] to or from Kowloon Tong, East Tsim Sha Tsui/Tsim Sha Tsui, Nam Cheong and Mei Foo Stations
3.	East Rail Line ("EAL")	● trips between Hung Hom and Mong Kok East Stations [1&2]

[1] As the standard class Octopus fares for these EAL-related trips will be reduced by 10 cents, their corresponding First Class Premium will also be reduced by 10 cents.

[2] Currently, the Octopus fares for the two trip combinations of Hung Hom to Kowloon Tong Stations (covering three stations) and Hung Hom to Mong Kok East Stations (covering two stations) are the same (i.e. $3.5). After the 10-cent reduction of fare for Hung Hom to Kowloon Tong Stations, although this train trip is longer than that from Hung Hom to Mong Kok East Stations, its fare is lower. To prevent the fares of shorter trips from being higher than that of longer trips, the Octopus fare for the trip between Hung Hom and Mong Kok East Stations will also be reduced by 10 cents (i.e. $3.4).