Legislative Council Panel on Transport
Subcommittee on matters relating to railways

Railway incidents and performance of the railway systems in Hong Kong

Purpose

Further to the discussion by the Legislative Council Panel on Transport on 20 October 2004, this paper updates Members on the measures taken by the Administration, MTR Corporation Limited (MTRCL) and Kowloon-Canton Railway Corporation (KCRC) to continually improve the corporations' train service performance and safety. Detailed information on the measures carried out by MTRCL and KCRC is set out at ***Annexes A and B*** respectively.

Regulatory regime of railway services

2. MTRCL and KCRC are required to maintain a proper and efficient service at all times in accordance with the Mass Transit Railway Ordinance (Cap. 556) and the Kowloon-Canton Railway Corporation Ordinance (Cap. 372) respectively. The Administration attaches great importance to maintaining the high standards of safety and reliability of our railway services. Details of the Administration's well-established regulatory regime on railway services are set out in the discussion paper (CB(1)63/04-05(01)) considered at the last Panel meeting on 20 October 2004.

3. In gist, the Administration ensures the safety of the railways through the monitoring work of the Hong Kong Railway Inspectorate (HKRI). For service reliability and service level, the railway corporations are required to meet a set of performance requirements including train service delivery, train punctuality and passenger journeys on time as agreed with the Government. The Transport Department (TD) monitors the service performance of the railway corporations by scrutinizing regular returns submitted by them, and convening meetings

with them to review their service performance whenever necessary. If the railway corporations fail to meet one performance level or more, TD will require the corporations to explain such failure together with detailed information on the proposed improvement measures.

Follow-up actions taken by the Administration to improve train service performance and safety

4. The Administration adopts a robust approach in monitoring the safety and reliability of the railway services, and treats each railway incident seriously. For each railway incident, TD and HKRI will follow up with the railway corporation concerned as appropriate and ask for an incident report. They will conduct investigation, provide advice to the railway corporation concerned on preliminary identification of the cause of the incident and the immediate action required. They will monitor the progress of the identification of the root cause as well as implementation of rectification measures. For instance, for the MTR incident on 9 November 2004 where a broken rail track was identified, HKRI, upon notification of the incident by MTRCL, immediately obtained information from MTRCL about the severity and initial cause of the incident. HKRI also subsequently requested MTRCL to immediately conduct a comprehensive check on the entire railway and review the maintenance arrangement for the rails. Those were duly implemented by MTRCL. The frequency of inspection of rails using Ultrasonic Testing Vehicle has since been enhanced from once a month to once every two weeks.

5. In light of the spate of MTRCL incidents and the MTR rail crack incident on 9 November 2004, the Administration wrote to the senior management of MTRCL on the same day expressing the Administration's concerns over the incidents. We also urged MTRCL to take proactive measures before the completion of MTRCL's independent review to ensure that the procedures and arrangements regarding inspection, operation and maintenance of the MTR system are adequate for the safe and efficient operation of the rail services. MTRCL has taken prompt and active steps in response to the Administration's concerns and implemented enhancement measures to further improve the service performance.

6. Likewise, the Administration has asked KCRC to take steps to further enhance its service performance and safety. In particular, the Administration has urged KCRC to ensure a high standard of service performance for the newly opened Ma On Shan Rail based on the experience gathered from the opening of West Rail.

7. The Administration notes that there have been calls from the travelling public that the information dissemination of railway incidents to passengers and the public should be made in a more timely manner and the information disseminated should be more comprehensive. In this regard, we have reminded the railway corporations again to follow closely the agreed notification and alert mechanism system on railway incidents so as to ensure sufficient time for TD and other public transport operators to prepare for emergency supporting transport services where necessary. The Administration has also requested the railway corporations to enhance the transparency of the corporations' handling of railway incidents by way of proactive information dissemination of the facts of the railway incidents and progress of the corporations' follow-up actions.

Conclusion

8. The Administration will continue to closely monitor the enhancement measures to be implemented by the railway corporations to minimise recurrence of railway incidents in future. We will also study carefully the report and recommendations of MTRCL's independent review to determine if other effective measures are required to further enhance the performance of the railway services.

Environment, Transport and Works Bureau
December 2004

Annex A

Legislative Council Panel on Transport
Subcommittee on matters relating to railways

Information Note on
Service Performance and Rail Safety Measures
by MTR Corporation Limited (MTRCL)

Purpose

This paper updates Members on the progress of the Lloyd's Register Rail's independent review on MTR system and the implementation of a series of improvement initiatives identified by the MTRCL internal Task Force.

Independent Review by Lloyd's Register Rail

2. Lloyd's Register Rail has commenced the comprehensive review on MTR's service performance, the maintenance regime in place for its service critical assets as well as asset management practices since October 2004.

3. Scope of the review includes the following dimensions:

- examination of MTR's current Asset Management Systems
- examination of the current Signalling and rolling stock maintenance processes
- examination of the "system" as it relates to incidents, including the human interfaces, e.g. train controller/Operation Control Centre interface
- examination of MTR's current performance with both historical and international comparisons as appropriate
- identification of areas where enhancements can be effectively implemented

4. Furthermore, at the request of the Government's Hong Kong Railway Inspectorate, examination of Track Maintenance and review of Power and Overhead Lines Maintenance Practice have recently been added to the review.

5. The Lloyd's review is in good progress and is scheduled for completion by the end of January 2005.

New Initiatives for Service and Maintenance Improvements

6. Since October 2004, the Deputy Operations Director of MTRCL has led a High-Level Internal Task Force to review the recent railway incidents and seek continuous service improvement.

7. The Task Force has identified a series of improvement initiatives to augment the MTR's maintenance regime and incident handling procedures. These measures aim at reducing the chance of equipment failures affecting train service and causing delays to passengers as well as minimizing cases that may give rise to passenger concerns, e.g. emission of smoke and creation of loud noises. Other recommendations have been designed to minimize inconvenience caused to passengers in the event of a delay.

8. Immediate actions taken include increasing inspection of key railway systems, adopting technology from outside the railway industry, using higher-standard components newly available in the market, accelerating the programme for certain equipment and parts replacement, adopting the British Standards Institute's latest PAS-55 asset management standard, rapid deployment of staff at stations during train service disruptions and improving communications with passengers in case of disruptions.

9. The improvement initiatives identified by the Task Force cover the following five categories:

- Signalling System Initiatives
- Rails and Overhead Lines Initiatives
- Rolling Stock Initiatives
- Service Recovery Initiatives
- Passenger Communications Initiatives

Highlights of Major Initiatives

Singalling System Initiatives

10. One initiative is the replacement of all micro-switches in the track signalling system with a new and higher standard model. These more robust micro-switches are expected to improve train service reliability. Other selected components will also be replaced at an earlier stage in their useful life with newer standards to improve performance and bring down the probability of failures.

Rails and Overheads Lines Initiatives

11. The inspection of track and overhead lines by special purpose rail vehicles has been stepped up to increase the frequency of inspection.

Rolling Stock Initiatives

12. One improvement measure is the use of a dielectric tester, which is more commonly found in the power industry, to inspect the high voltage cables on trains. With the adoption of this new equipment, potential problems can be detected at an earlier stage with a view to minimizing the occurrence of incident events.

Service Recovery and Passenger Communications Initiatives

13. Action plans are in place to deploy more staff to take care of passengers during train service disruptions. A review is also being conducted to strengthen communications with passengers through better

use of information dissemination channels and improving the content and sufficiency of public announcements in case of incidents.

14. Implementation of the major improvement initiatives is in good progress, with one-third of them completed. All initiatives are expected to be completed in 2005. Details of the updated progress of various major improvement initiatives are summarized in Appendix 1.

Conclusion

15. Service performance of the MTR system in October and November 2004 was maintained at the same high level of the first nine months of the same year. Train Service Delivery performance was maintained at 99.9%, while Passenger Journeys on Time at 99.8% to 99.9%.

16. In terms of number of incidents, the monthly average of incidents causing delays of eight minutes or more for the first eleven months of 2004 is 10.8 cases, which is the lowest since 2000. It means the chance of experiencing an incident causing delay of eight minutes or above is down to one in 10,000 trips. A comparison of monthly average number of incidents for recent four years is summarized in Appendix 2.

17. Safety is always the top priority of the Corporation. With all these improvement measures in place, the Corporation will continue to seek further improvements with the aim to providing passengers with a safe and reliable railway service.

MTR Corporation Limited
December 2004

Appendix 1

Major Improvement Initiatives and Updated Progress

Improvement Initiative	***Progress***
Signalling Systems Initiatives:	
1. Early replacement of the track side signalling equipment of micro-switches with improved standards.	• Replacement work is in good progress for completion by the 3rd quarter of 2005.
2. Upgrade standards of trackside cables.	• Upgrading works has been started and target to be completed by the end of 2005.
Rails and Overheads Lines Initiatives:	
3. Enhance Ultrasonic Testing Vehicle inspection of rails on the Kwun Tong and Tsuen Wan Lines from once a month to once every two weeks. (International standard is once every 2 to 3 months)	• The enhanced ultrasonic testing was completed in November 2004 and no rail flaws have been detected.
4. Enhance inspection of tracks and overhead line equipment with the Track and Overhead Line Geometry Recording Vehicle from once every three months to once a month.	• Enhanced inspection is due to be completed by the end of 2004.

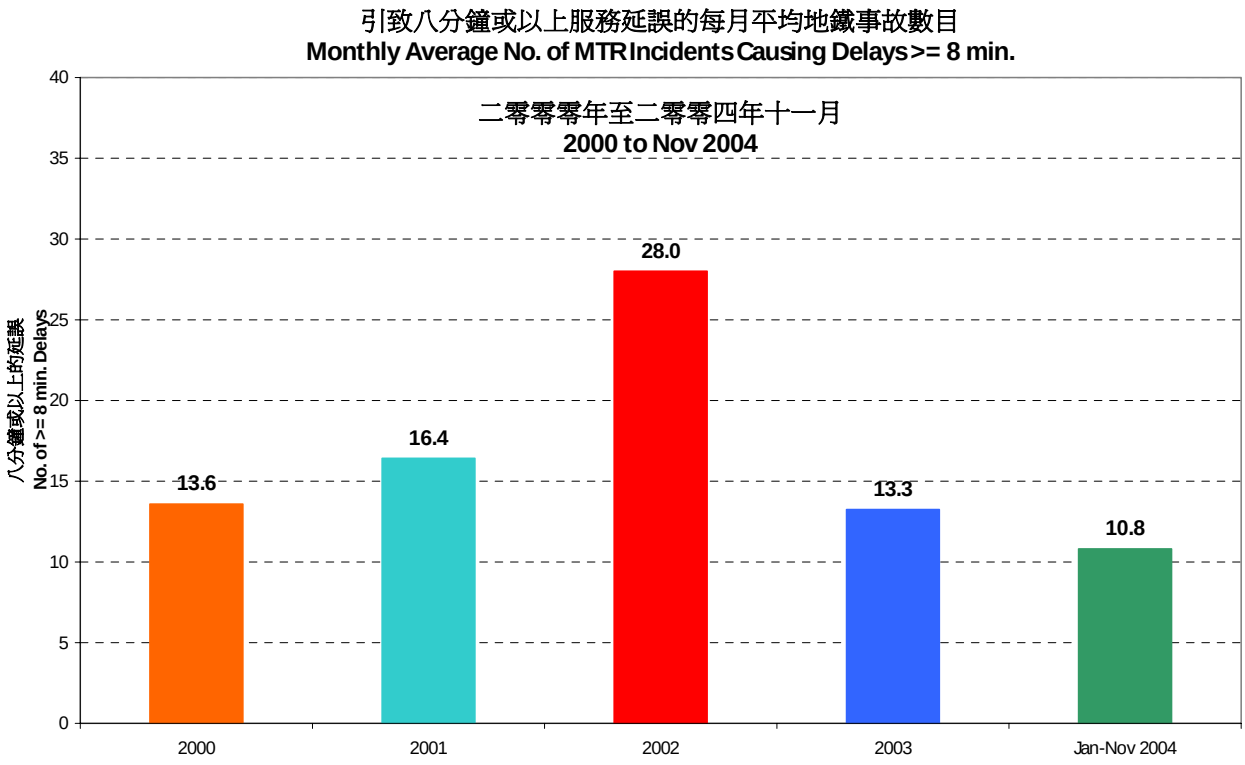
Improvement Initiative	***Progress***
Rolling Stock Initiatives:	
5. Enhance inspection of train-borne high voltage cables using dielectric tester, technology adopted from the power industry.	• Cable inspection by dielectric tester has been incorporated as part of the preventive maintenance. The first round of inspection is due to be completed by the 2nd quarter of 2005.
6. Install new rubber nosing on doors on all modernized trains.	• Subsequent to satisfactory trial, modification of all modernized trains has just begun and is targeted to be completed by the end of 2005.
7. Upgrade weather protection for signalling antenna on Airport Express and Tung Chung Line trains.	• Subsequent to satisfactory trial, installation and modification of all Airport Express and Tung Chung Line trains has started and is targeted to be completed by mid 2005.
8. Enhance inspection of the Brake Control Unit on Airport Express and Tung Chung Line trains.	• Inspection of the Brake Control Unit of Airport Express and Tung Chung Line trains was completed.
9. Monitor brake pad temperature to minimize the occurrence of incidents of stuck brake on individual wheel.	• The first round of monitoring was completed in November 2004. The temperature monitoring will become an

Improvement Initiative	***Progress***
	ongoing exercise.
10. Modify computer software to enhance the Train Information System in driving cabs for earlier detection of potential defects.	• Modification work of the software has been carried out for completion by the end of 2004.
11. Step up in-service examination of trains during peak periods by technicians.	• In-service examination has been stepped up since November 2004.
Service Recovery Initiatives:	•
12. Increase the manning level in the Infrastructure Maintenance Engineering Centre during peak hours.	• Manning level strengthened since October 2004.
13. Increase the number of staff in the Rapid Recovery Unit.	• Staff level has been increased since October 2004.
14. Increase the quantity of spare parts on hand and deploy them to strategic locations.	• Work has been progressing on track to be completed by the end of 2004.
15. Increase manning levels at train platforms during service disruptions.	• Recruitment of additional station assistants is targeted to be completed by the end of 2004.

Improvement Initiative	***Progress***
Passenger Communications Initiatives:	
16. Enhance the content and sufficiency of public announcements during delays.	• Key messages delivered by the centralized Public Announcement System is revised and strengthened. Uploading of pre-recorded messages will be completed by the end of January 2005. • As an interim measures, revised announcements are made by station and train staff live when necessary.
17. Refresher training for train and station operators on making informative and reassuring public announcements during delays.	• Training course materials are being prepared for implementation in April 2005.

MTRCL
December 2004

Appendix 2


引致八分鐘或以上服務延誤的每月平均地鐵事故數目
Monthly Average No. of MTR Incidents Causing Delays >= 8 min.
二零零零年至二零零四年十一月
2000 to Nov 2004
八分鐘或以上的延誤
No. of >= 8 min. Delays
40
35
30
25
20
15
10
5
0
13.6
16.4
28.0
13.3
10.8
2000
2001
2002
2003
Jan-Nov 2004

Annex B

Legislative Council Panel on Transport
Subcommittee on Matters Relating to Transport

Information Note on
Service Performance and Rail Safety Measures
by Kowloon-Canton Railway Corporation

Purpose

This paper informs Members about Kowloon-Canton Railway Corporation (KCRC)'s safety management system, the progress of the safety audit, the measures undertaken to continuously improve the service performance of East Rail, Light Rail and West Rail, and measures to ensure the reliability of the Ma On Shan Rail.

Safety Management System

2. KCRC has a comprehensive safety management system in line with international practices. The system adopts a risk-based management approach incorporating a hazard management system which proactively and systematically manages the safety of assets, system, people and the environment.

3. Safety is a top priority of KCRC. Safety management is overseen by an internal high-level Safety Management Committee chaired by the Senior Director, Transport. A continuous improving approach is adopted to ensure the safe and reliable operation of the railway systems. The safety roles and responsibilities of individual managers are clearly defined to ensure safety critical procedures are under good command and control. The system places high importance on emergency preparedness, and drills and exercises are planned throughout the year to improve staff competencies. A training and qualification system is also established to ensure that staff can perform to high safety standards. Rules and procedures are constantly reviewed and updated to cope with the changing operating environment.

Safety audit

4. In addition to regular quality audits and risk assessments, a safety audit is conducted every three years by independent experts on all railway systems including East Rail, West Rail and Light Rail. A pre-audit assessment of KCRC's safety management system covering areas such as operational rules and procedures, accident investigation procedures, training, equipment maintenance and repair, safety awareness, security efforts and station operations was conducted by the American Public Transportation Association (APTA) and completed in August 2004.

5. The pre-audit assessment confirmed that good safety practices are in place in KCRC. The auditor also noted that KCRC has established a sound system of command and control over safety critical procedures and practices. These processes are regularly reviewed and updated to ensure continuous improvement.

6. A full-scale safety audit will be carried out by the same independent consultant in March 2005.

7. KCRC also invites independent experts and consultants to review and audit its operating systems on a need basis. For example, KCRC commissioned Parsons, a US-based consultant in July 2004 to conduct an independent review into the West Rail signalling system. The review looked into the following areas:

- Design and operation of the signalling system
- Systems integration issues
- Human factors considerations
- Operations and maintenance practices.

8. The review was completed in August 2004. In its final report, Parsons concluded West Rail was "a world class transit system with attractive, spacious and passenger-friendly stations, offering a quiet, comfortable and fast ride with safe and reliable service".

9. Parsons also found that when compared with other similar projects worldwide, the start-up period on West Rail had in fact been relatively trouble-free. The vast majority of the signalling system hardware and software has functioned reliably after rectification of the teething problems.

Service performance

10. The performance of KCRC's railway services has remained high over the years and compares favourably with other similar railway systems from around the world. Over the years, the train service delivery and train punctuality rates of KCRC's railway services have been well above KCRC's service pledges and the terms of the service agreements with the Government. Up to November 2004, the train service delivery rates of East Rail, West Rail and Light Rail are 99.88%, 99.6% and 100% while the train punctuality of respective railways stood at a high standard of 99.65%, 99.4% and 99.5%.

11. Safety performance of the railways has improved over the years. East Rail and Light Rail have both recorded a decline in the numbers of incidents resulting in a service disruption lasting over eight minutes over the past five years. The safety performance of Light Rail recorded significant improvement with the total number of incidents dropping from an average of 9.58 a month in 2001 to 2.27 in 2004 (up to November 2004). (Appendix). Apart from some teething problems causing slight service delays, West Rail has been operating smoothly since its commissioning in December 2003. Measures have been taken to improve the reliability of the signalling system and it is noted that towards the last quarter of 2004, the number of incidents has been on a decline.

Inspection and maintenance

12. KCRC has established comprehensive inspection and maintenance procedures. Its maintenance regime is constantly improved to enhance the safety and reliability of the railway system. A preventive approach is adopted to ensure that all equipment is renewed or replaced before it ages or wears out and affects system performance. The Corporation annually reviews the quantity and appropriateness of spare parts placed at strategic locations along its various routes and makes changes as appropriate.

13. Over the past five years, KCRC spent a total of $8,130 million on maintenance, asset renewal, replacement and upgrading of various railway system, of which $1,420 million was spent in 2004.

Improvement initiatives

14. KCRC takes a proactive approach in enhancing the safety and reliability of its railway services and implements improvement measures from

time to time. The following paragraphs listed the improvement measures adopted by respective railways.

East Rail

15. All micro switches on the East Rail point machines have been replaced with ones that conform to the local environment of high ambient temperature and high humidity, resulting in higher overall reliability.

16. All East Rail trackside cables were replaced in 2000. Their performance are regularly checked and reviewed to ensure reliable and safe operation.

17. Since 2002, the Corporation has been using the "partial discharge test" technology to check the insulation integrity of refurbished trains' high voltage cables to enable early detection of any abnormality.

18. Since the start of 2004, the frequency of rail inspection with ultrasonic equipment has been increased to once every three weeks.

19. The Corporation regularly reviews its service recovery performance. A new signalling recovery team will be established at Tai Po Market Station in late 2005 and a traction power team at Sheung Shui Station in 2006.

20. All new trains are equipped with a train management system, which allows for an early detection of premature defects by both the operator and the maintainer. To boost the reliability of refurbished trains, all of them will be fitted with a similar system in 2006 - 2007.

West Rail

21. KCRC has commenced an improvement programme to further enhance the stability of the signalling system. These include:

- Installation of individual uninterrupted power supplies for all signalling and communications installations with remote control and alarm indications at the control centre to increase reliability and availability of the power supply system.
- Modification of axle counters at strategic locations to ensure a speedier recovery of service.
- Installation of independent power feeds to each inductive loop to confine any failure to one loop only.

22. Major works, including improvements to the hardware and software and the addition of an axle counter remote reset function which enables a quicker service recovery, will be completed by January 2005. The remaining works are scheduled for completion by the fourth quarter of 2005.

Light Rail

23. The Corporation is planning a mid-life refurbishment programme for all 69 Phase 1 light rail vehicles with an aim to optimising the interior layout for better passenger comfort, and improving the performance of service critical equipment, including the doors and the auxiliary power supply.

24. An independent audit of all trackside cables in Light Rail was carried out in 2003, which confirmed the cables were fit for purpose.

25. KCRC also adopts proactive measures in continuously improving the safety and performance of LRVs. These measures include on-train door control enhancements, modifications of the air-conditioning systems and hopper windows, and installation of detrainment ladders which have resulted in greater LRV stability and reliability.

26. A new fault reporting centre will be established in the Light Rail Operations Control Centre in early 2005.

27. Following the broken wheel incident on 10 September, KCRC has strengthened inspections and tests on all Light Rail tyres. On top of a routine inspection once every three weeks, and ultrasonic flaw inspections during the 24th and 40th month of operation, the following additional measures have been implemented:

- Ultrasonic flaw inspections before installing all new wheel tyres
- Ultrasonic flaw inspections every six weeks
- Hammering tests once every week.

28. The Corporation has also accelerated the wheel replacement programme and all wheel tyres will be replaced by the end of 2005.

<u>Measures to ensure reliability of Ma On Shan Rail</u>

29. Ma On Shan (MOS) Rail was put into operation on 21 December 2004 following successful testing and commissioning of all railway systems

including signalling, traction power supply, tracks and communications. Enhancements based on the experience gained in commissioning West Rail have all been incorporated, resulting in obvious benefits to the reliability and stability of the MOS Rail trial operation. All MOS Rail electric trains successfully passed the 1000 km fault-free test runs before they were commissioned.

30. Before commissioning of the new railway, about 800 drills and exercises were conducted, some jointly with various Government Departments, to build up the capability of staff in the handling of incidents and emergencies.

31. During the first 12 weeks of operation, the Corporation deploys 130 temporary service ambassadors and sets up information counters at the concourse of all MOS Rail stations to provide assistance to passengers. A Passenger Information Centre has been set up at Tai Wai Station, the interchange station for MOS Rail and East Rail, to answer enquiries. The station also has a total of 94 permanent and temporary staff to ensure a smooth passenger flow. Signalling and rolling stock staff have also been stationed at Tai Wai and Wu Kai Sha stations to ensure prompt recovery of services in the event of unanticipated interruptions.

32. Since 6 December 2004, East Rail has stepped up its morning peak frequency from 22 to 24 trains per hour per direction and is well poised to take up the additional passengers from MOS Rail.

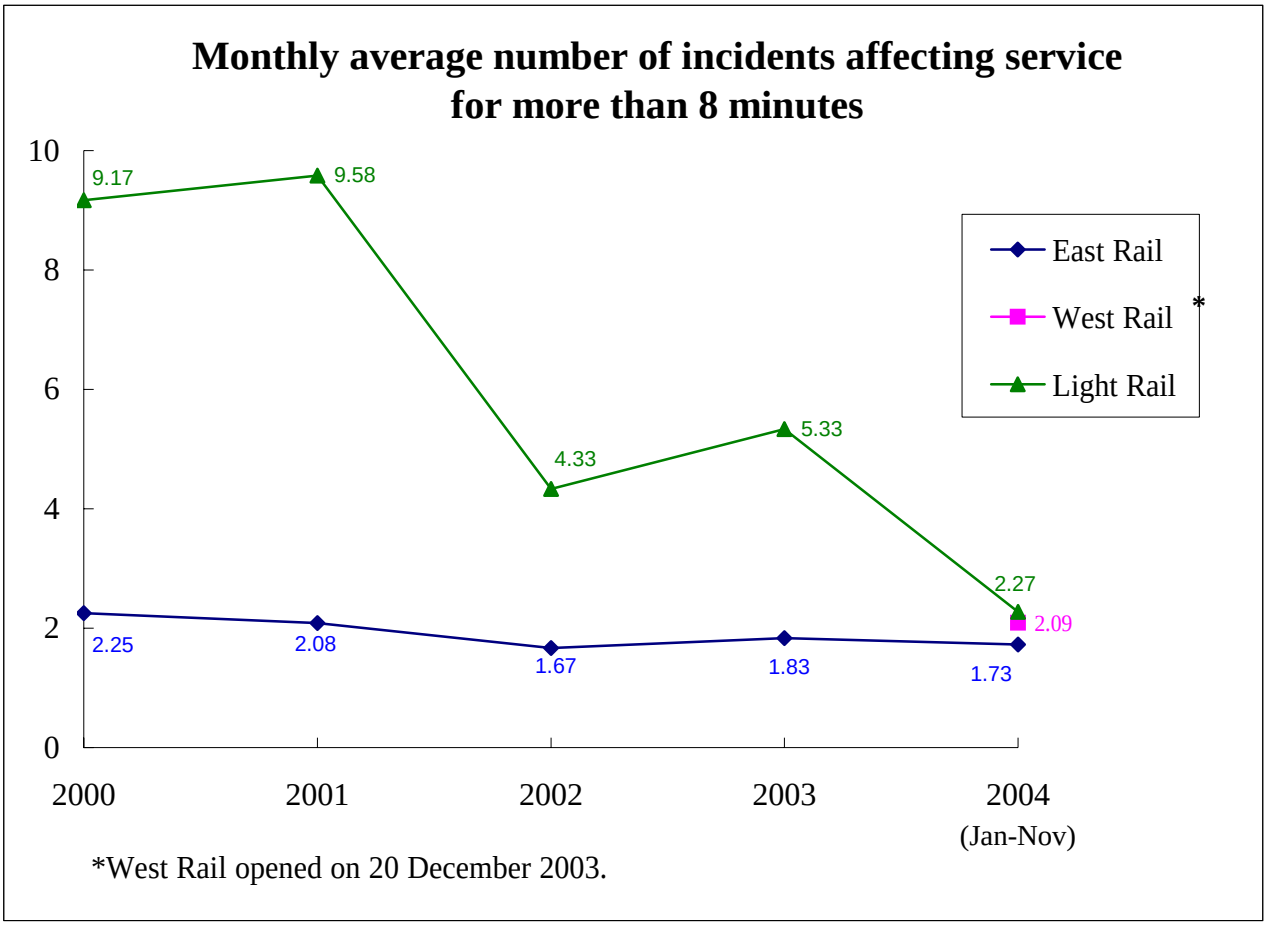
33. On the first three days (December 21, 22 and 23) after commissioning, MOS Rail had a smooth operation, achieving a train service delivery of 100% on all three days and train punctuality rate of 99.35% on the first day and 100% on the 2nd and 3rd day. KCRC will continue to closely monitor the traffic situation and arrange additional trains to cope with passenger demand should there be a need.

Conclusion

34. The Corporation has always adopted a proactive and continuous improving approach in operating the railway services. Appropriate improvement measures will continue to be taken to ensure the safe and reliable operation of the railway systems.

Kowloon-Canton Railway Corporation
December 2004

Appendix


Monthly average number of incidents affecting service for more than 8 minutes
10
8
6
4
2
0
9.17
9.58
4.33
5.33
2.27
2.09
2.25
2.08
1.67
1.83
1.73
East Rail
West Rail *
Light Rail
2000
2001
2002
2003
2004
(Jan-Nov)
*West Rail opened on 20 December 2003.