

**Legislative Council Panel on Transport  
Subcommittee on matters relating to railways**

**MTR Performance and Asset Management -  
Follow up measures to Lloyd's Report by MTRCL**

**Introduction**

Towards the latter part of last year, there were public concerns over the MTR system's reliability after a number of incidents which, although not service critical, has caused delays and inconvenience to passengers. To address the public concerns and to seek continuous improvement of its service, the Corporation has appointed an Internal Task Force and an independent third party rail expert and validation agency, Lloyd's Register Rail, to review MTR service performance, the condition of service critical assets and its asset management practices as well as to make recommendations for improvement.

2. This paper briefs Members on major recommendations of the independent review, the corresponding follow-up actions of the Corporation and the latest update of the improvement initiatives recommended by the Corporation's Internal Task Force.

**The Lloyd's Review**

3. The objective of the Lloyd's review was to determine if MTR are managing their assets effectively, to deliver the required level of customer services and to verify whether the MTR Asset Management System meets the demands

of service requirements and risk profile, taking into account the age of the assets.

4. The scope of the Independent Review covered the following areas:

- An examination of MTR's current Asset Management system
- An examination of MTR's current performance with both historical and international comparisons as appropriate
- An examination of the current signaling and rolling stock maintenance processes
- An examination of the "system" as it relates to incidents, including the human interfaces, e.g. train operator/Operations Control Centre interface.
- An examination of the current permanent way maintenance processes relating to rail management and the Shek Kip Mei rail crack in particular
- An examination into certain power system maintenance issues arising from incidents.

5. The review commenced in October 2004 and was completed at the end of January 2005. The full review report together with an executive summary which outlines the major findings and recommendations of the review were delivered to Members on 4 February 2005.

## **Recommendations of the Lloyd's Review**

6. The report of the Lloyd's Review has made 16 recommendations for further enhancement of the MTR system which are outlined on page 11 and 12 of the executive summary and in greater detail from page 72 to 76 of the report. The five principal recommendation areas by Lloyd's Register Rail are summarized as follows.

### Minimization of incidents that cause customer "Distress"

7. In view of the fact that even with no safety implication, incidents, in particular where smoke and noise were generated, caused passengers concern and distress. MTR was recommended to promote the use of the current risk management processes and widen their application as a priority. In particular, consideration should be given to reviewing the contribution of public perception issues, i.e. incidents that caused customer "distress", when introducing new equipment or reviewing/optimizing maintenance activities.

### Learning from incidents caused by human factors

8. To address the impact of human factors, i.e. operational errors or passenger actions that impacted railway performance, the review recommended that MTR should capture and analyze the data more fully from those incidents caused by operational errors and passenger actions and use the data to reduce incidents or the impact of incidents. It was also recommended that a single focus, through the allocation of a senior manager with responsibility for human factors, for the many MTR initiatives to be provided in this area.

### Integration of new projects into existing operations

9. Lloyd's recognized that new projects would inevitably cause performance of the system to decline to a lower level than that experienced on a mature system. Therefore, it was recommended that MTR should review the way in which the impact of new projects was assessed in terms of the effect on the operation of the railway with the objective of minimizing disruptions caused by new projects / upgrades. Consideration should be given to further integration of project activities into the overall Asset Management System.

### Management of rail asset

10. The review confirmed that although MTR had drawn together their existing Asset Management and Maintenance Practices into an Integrated Management System, it was recognised that the rail asset management plan was in the early stages of implementation. Therefore, the plan had to be reviewed and developed as experience was gained during implementation.

11. The review, therefore, recommended that MTR should review the type of rail maintenance equipment for better delivery of the plan and consider ways to improve track inspection techniques including the evaluation of acquisition of specialist video inspection equipment.

### Managing expectations of stakeholders

12. The review recommended that MTR should review the management of stakeholder expectations, to minimize the risk of creating unrealistic long term expectations. Further significant performance increase could be

difficult to achieve without considerable increases in cost. MTR should review how these stakeholder expectations could be managed realistically given that 100% reliability is not possible.

#### Other Enhancement

13. In addition to these principal recommendation areas, Lloyd's also made a number of recommendations for MTR to improve its service further. It included recommendations to overcome communication difficulties during railway incidents by speeding up MTR's planned improvements in communication system.

#### **Actions for Further Improvements**

14. MTR Corporation found the recommendations of the Lloyd's report constructive and useful. The Corporation will study the report in detail and set up the necessary organizations and processes to implement the recommendations expeditiously.

15. A number of immediate actions have been taken to address the recommended areas of rail management, issues of customer distress, asset management information, asset condition assessment, projects, communications systems as well as railway operations.

#### Rail Management

16. In looking at MTR's rail grinding program and grinding resources, Lloyd's pointed out that the current rail grinding unit was not specifically designed to grind

turnout sections of the rail where tracks merging and crossing with each other. In response to this observation, the Corporation is in the process of sourcing specialist turnout grinding equipment to take care of points and crossings, which is more appropriate and efficient in carrying out this kind of grinding activity.

17. This will also free up capacity on the more sophisticated rail grinding unit in order to optimize utilization of the existing rail grinding unit on the straight track sections, which in turn, help further enhance the overall grinding operations.

18. The Corporation has short-listed potential grinders with a German made equipment identified and targets to complete the sourcing process and put in use the new equipment by the end of 2005.

19. For track inspection work, the Corporation currently uses Ultrasonic Testing Vehicle, which is a state-of-art equipment to monitor track condition. Inspection works are carried out in monthly cycles to help plan the track maintenance and rail replacement programme. Patrolmen supplement the high-tech monitoring work through bi-nightly manual inspections of all the rails on the entire network. To further strengthen the manual track inspection, the Corporation will look to implement Lloyd's recommendation on sourcing a suitable train mounted video camera system.

20. The adoption of a train mounted video camera system enables patrolmen to be more focused on rail inspection work, while minor inspections such as conditions of trackside clips, overhead line fixings or fencing along railway could be taken up by the video camera system.

21. The Corporation has short listed potential suppliers and is in the process of comparing the technical aspects of different systems, in order to identify the most suitable system for MTR. It is targeted that the sourcing process to be completed and initial trial use of the system to be taken place by the end of 2005. Full implementation of the video camera inspection is targeted to commence in the second quarter of 2006 after successful trial use of the system.

#### Issues of Customer Distress

22. To address the issue of customer distress in incidents and their perception towards the overall performance of MTR, the Corporation will augment existing maintenance activities to better take into account public perception / comfort issues.

23. Furthermore, the Corporation will conduct a survey on customer's concerns, including customer distress issues arising from noise or smoke events, with professional input and advice from a third party expert. The survey will commence by the first quarter of 2005 and will be followed by focus group discussions in order to have a more in-depth analysis on the perception of customers and the cause of customer distress upon incidents with an aim to alleviate the impact on customers. The survey and focus group analysis are targeted to be completed by the third quarter of 2005.

#### Asset Management Information

24. To enhance efficiency and contain response time, the report recommended to reviewing the access to asset

management data, and the asset management software support systems to include quantified asset condition information at an appropriate level of detail. A consultancy study will be conducted from March to June this year to identify the information gaps and recommend the software system requirements with the finalized result expected in the third quarter of this year.

#### Asset Condition Assessment

25. With the signalling asset condition assessment carried out at line level and some rolling stock components' condition not assessed, the review recommended a more detailed assessment to facilitate management decision making. A graduated asset condition rating system will be established by mid 2005 to serve this purpose. On the rolling stock side, a quantified scoring system was recommended for a robust and consistent approach across all rolling stock systems. A quantified system will be investigated for adoption by mid 2005.

#### Projects

26. Since new installations are a main cause of adverse effect on the performance of the Railway, the report recommended to review the commissioning and pre-installation testing of new assets to reduce operational disruptions caused by project work. A detailed review will be carried out into the commissioning and pre-installation testing of new assets to reduce their impact and the impact of new lines on the performance of the Railway and asset management will be built into project formation. This is targeted for completion in Oct this year.



## Communication Systems

27. To further improve the functionality and performance of the communications systems in particular during time of incidents, the Corporation will develop a plan to accelerate the communications systems upgrade programme.

## Railway Operations

28. In order to address the possible impact of human factors, including operation errors and customer actions, the Corporation will appoint a professional expert to gain a fuller understanding of human factors in railway operations.

## **Improvement initiatives taken by MTR's Internal Task Force**

29. As reported to members at the meeting of the Subcommittee on matters relating to railways on 7 January 2005, MTR has also formed an Internal Task Force to review the railway incidents and seek continuous service improvement. In November, this Task Force has put forward a series of recommended actions to further strengthen MTR's maintenance and incident handling processes. These measures included the roll-out of new asset management standards, enhancing inspections, installing higher-standard components, importing inspection technology from outside the railway industry, improving service recovery effort and strengthening communications with passengers during delays.

30. Since the last meeting, additional initiatives including the acceleration of replacement programme for more heavily utilized sections of track as well as trackside signaling cables were identified and implemented.

### **Conclusion**

31. The Lloyd's Review made 16 recommendations to further enhance the MTR system. The Corporation has accepted all of these recommendations and would have most of them substantially completed by the second quarter of next year.

32. The Corporation is encouraged to note that the Lloyd's Register Rail report has found no evidence to suggest that MTR assets are declining as the system enters its 25<sup>th</sup> year of operation and its asset management system is recognised to be in line with international best practice, and that compare with the world's other largest metros, MTR provides a safe, reliable service at a reasonable cost.

33. Lloyd's also recognized that MTR had achieved a good balance on its overall performance when compared to other CoMET metros and provided the highest level of service quality with measures in the percentage of passenger journeys that were completed without a delay.

34. The public concern on the alleged upsurge of incidents towards the end of 2004, the review concluded that analysis of available data did not support the view that there was an upsurge of incidents.

35. The analysis of performance confirmed that there were marked reductions in the number of incidents between year 2001 and 2004 as well as a reduction of more than a third in the number of customers affected by a delay.

36. Lloyd's confirmed that MTR's outsourcing of maintenance activities had been professionally conducted and did not appear to have affected the performance of the systems contracted out or performance of MTR as a whole. Nevertheless, it suggested that continuous scrutiny over the coming years to monitor the contractor's performance was required.

37. MTR is making good progress of the improvement initiatives put forward by its Internal Task Force, with two-third of them completed by early February 2005. All initiatives are targeted to be completed in 2005. The latest progress report of these improvement initiatives is summarized in Annex I.

38. MTR continues to strive to provide better service for our passengers and is committed to operating a safe, reliable and efficient mass transit service. We are determined to provide the people of Hong Kong with one of the world's best metro railway networks.

MTR Corporation  
February 2005

**MTR High-Level Internal Task Force  
Major Improvement Initiatives and Progress Update**

<u><i>Improvement Initiative</i></u>	<u><i>Progress</i></u>
<b>Signalling Systems Initiatives:</b>	
1. Early replacement of the track side signalling equipment of micro-switches with improved standards.	<ul style="list-style-type: none"> <li>• Replacement work is in good progress with 45% completed. All replacement work is targeted for completion by the 3<sup>rd</sup> quarter of 2005.</li> </ul>
2. Upgrade standards of trackside cables with an accelerated replacement programme.	<ul style="list-style-type: none"> <li>• 36% of upgrading work completed. All upgrading work is targeted to be completed by the end of 2005.</li> </ul>
<b>Rails and Overheads Lines Initiatives:</b>	
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)	<ul style="list-style-type: none"> <li>• Implemented</li> </ul>
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.	<ul style="list-style-type: none"> <li>• Implemented</li> </ul>

<u><b>Improvement Initiative</b></u>	<u><b>Progress</b></u>
5. Acceleration of rail replacement program on heavily-utilized sections.	<ul style="list-style-type: none"> <li>• Replacement rate increased by 25% in the next 3 years.</li> </ul>
<b>Rolling Stock Initiatives:</b>	
6. Enhance inspection of train-borne high voltage cables using dielectric tester, technology adopted from the power industry.	<ul style="list-style-type: none"> <li>• Cable inspection by dielectric tester has been incorporated as part of the preventive maintenance process. The first round of inspection has been completed.</li> </ul>
7. Install new rubber nosing on doors on all modernized trains.	<ul style="list-style-type: none"> <li>• Subsequent to a satisfactory trial, modification of all modernized trains has just begun and is targeted to be completed by the end of 2005.</li> </ul>
8. Upgrade weather protection for signalling antenna on Airport Express and Tung Chung Line trains.	<ul style="list-style-type: none"> <li>• Subsequent to a satisfactory trial, installation and modification of all Airport Express and Tung Chung Line trains has been in good progress with 37% completed. All the works is targeted to be completed by mid 2005.</li> </ul>
9. Enhance inspection of the Brake Control Unit on Airport Express and Tung Chung Line trains.	<ul style="list-style-type: none"> <li>• Implemented</li> </ul>

<b><u>Improvement Initiative</u></b>	<b><u>Progress</u></b>
10. Monitor brake pad temperature to minimize the occurrence of incidents of stuck brake on individual wheel.	<ul style="list-style-type: none"> <li>• Incorporated as part of the preventive maintenance process.</li> <li>• The first round of monitoring was completed in November 2004.</li> </ul>
11. Modify computer software to enhance the Train Information System in driving cabs for earlier detection of potential defects.	<ul style="list-style-type: none"> <li>• Completed end of 2004.</li> </ul>
12. Step up in-service examination of trains during peak periods by technicians.	<ul style="list-style-type: none"> <li>• In-service examination has been stepped up since November 2004.</li> </ul>
<b>Service Recovery Initiatives:</b>	
13. Increase the manning level in the Infrastructure Maintenance Engineering Centre during peak hours.	<ul style="list-style-type: none"> <li>• Manning level strengthened since October 2004.</li> </ul>
14. Increase the number of staff in the Rapid Recovery Unit.	<ul style="list-style-type: none"> <li>• Staffing level has been increased since October 2004. Four additional staff have joined the unit.</li> </ul>
15. Increase the quantity of spare parts on hand and deploy them to strategic locations.	<ul style="list-style-type: none"> <li>• Procedure established.</li> </ul>

<u><b>Improvement Initiative</b></u>	<u><b>Progress</b></u>
16. Increase manning levels at train platforms during service disruptions.	<ul style="list-style-type: none"> <li>• Additional station assistants have been recruited.</li> </ul>
<b>Passenger Communications Initiatives:</b>	
17. Enhance the content and sufficiency of public announcements during delays.	<ul style="list-style-type: none"> <li>• Key messages delivered by the centralized Public Announcement System has been revised and strengthened.</li> <li>• Content and wordings of live announcements made by station and train staff are improved.</li> </ul>
18. Refresher training for train and station operators on making informative and reassuring public announcements during delays.	<ul style="list-style-type: none"> <li>• Training course materials are being prepared for implementation in April 2005.</li> </ul>

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