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SMRT to be Penalised \$5.4 million for 7 July Incident

The Land Transport Authority (LTA) intends to impose a financial penalty of \$5.4 million on SMRT for the system-wide disruption on the North-South and East-West Lines (NSEWL) on 7 July 2015.

2. As announced during the media briefing on 29 July 2015, the disruption was caused by intermittent tripping of the rail power system at multiple locations by the 64P¹ safety mechanism. A combination of factors had resulted in weak electrical resistance of one of the third rail insulators between Tanjong Pagar and Raffles Place MRT stations, which in turn activated the 64P mechanism.

3. Supported by specialists from Parsons Brinckerhoff and Meidensha Corporation², LTA identified an ongoing water leak in the tunnel close to the insulator as a contributor to the weak electrical resistance. The leak, and inadequate maintenance, had resulted in extensive mineral deposits on the insulator and trackside equipment. Laboratory tests found high chloride content in samples of the water seepage and in the deposits. The consultants deduced that the conductive mineral deposits, together with the wet tunnel environment, had significantly reduced the effectiveness of the insulator.

4. As a result, electricity flowed from the insulator to the ground, resulting in a higher than normal voltage between the running rail and the ground. This abnormal voltage, coupled with the usual voltage fluctuation as trains move, activated the 64P safety mechanism and tripped the power system. LTA's findings are corroborated by the fact that the intermittent tripping stopped after SMRT had replaced the contaminated insulator and rectified the tunnel water seepage.

¹ The 64P, or the Touch Voltage Protection Relay, is a safety feature on the NSEWL network that is used in rail systems all over the world. The 64P is activated when the voltage between the running rail and the ground exceeds a pre-set value.

² On 14 July 2015, LTA appointed a team of five experts from Sweden's Parsons Brinckerhoff and Japan's Meidensha Corporation to identify the root cause of the power trips and propose areas for improvement to prevent recurrence. Parsons was the consultant for mechanical services on the NSEWL while Meidensha designed and installed the power supply system on the NSEWL.



Figure: Tunnel water leak onto third rail at Tanjong Pagar - Raffles Place tunnel

5. LTA has concluded that the incident could have been prevented if SMRT had rectified the tunnel water seepage as required under LTA's Code of Practice for maintenance. Under the Code, SMRT has to attend to any tunnel water dripping directly on trackside equipment, such as the third rail, immediately upon discovery. If grouting works cannot be carried out, the operator has to divert the water seepage away from the trackside equipment. Based on SMRT's records, they had detected seepage in the tunnel section in question on its routine track patrols in mid-June 2015. However, these leaks were attended to only in end-July. The extent of mineral deposits on the trackside equipment also shows that SMRT's maintenance measures had been inadequate.

6. SMRT had also failed to meet requirements under the Code of Practice for incident management. They failed to inform LTA of the intermittent traction power tripping in a timely manner.

Penalty Commensurate with Seriousness of Incident

7. SMRT's maintenance lapses resulted in a system-wide disruption on the NSEWL for more than two hours during the evening peak period. This greatly inconvenienced 413,000 commuters travelling on the MRT network's most heavily-utilised lines.

8. LTA finds SMRT fully responsible for the incident. Given the severity of the disruption and impact on commuters, LTA intends to penalise SMRT a total of \$5.4 million under Section 19 of the Rapid Transit Systems Act³. This is the highest financial penalty imposed on an operator since the two disruptions in December 2011, which affected about 221,000 commuters

³ Under the Act, a licensed rapid transit system operator may be penalised up to \$1 million or 10 per cent of its annual fare revenue of a rail line, which is the subject of the licence, whichever is higher.

and for which SMRT was fined \$2 million. The fine will go to the Public Transport Fund to help needy families with their public transport expenditures.

9. Mr Chew Men Leong, Chief Executive of LTA said, “After a full and comprehensive investigation, LTA concludes that the disruption is due to maintenance lapses by SMRT. LTA hence intends to impose a high financial penalty on SMRT in light of the seriousness of the incident, and given that several hundred thousands of train commuters, as well as motorists and bus commuters, were inconvenienced by this disruption. We require SMRT to review and improve their maintenance regime to prevent future occurrences.”

Enhanced Reliability and Incident Management Measures

10. LTA has asked SMRT to provide a detailed response and rectification programme to address the findings. To prevent a similar recurrence, SMRT has started replacing all third rail insulators since the incident, starting with insulators which have shown signs of electrical resistance weakness.

11. LTA is also increasing its oversight of the operators’ maintenance processes with more frequent audits. LTA has audited the operators’ maintenance of the tunnels and track for the NSEWL, North East Line and Circle Line, and asked the operators to follow up on the issues identified. Another audit is underway.

12. LTA and SMRT have incorporated lessons from the disruption to enhance their incident management procedures for NSEWL in the event of a major disruption. This will ensure that affected commuters are able to continue their journeys as quickly as possible.

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