

**RELEASE OF REPORT OF COI INTO 15 AND 17 DECEMBER 2011 MRT
DISRUPTIONS**

Annex B

(A) Key Recommendations on Engineering and Maintenance Issues

Enhance Prevention and Detection of Future Problems Related to the Third Rail System	
1.	<u>More effective and timely detection and rectification of third rail sags and TRSA defects:</u> SMRT to develop improved methods for the timely detection of third rail sags, so that the sags can be treated with utmost urgency as they render adjacent Third Rail Support Assemblies (TRSAs) more vulnerable to failure. SMRT to formalise procedures to manage dislodged claws and TRSA defects to ensure that prompt remedial action is taken.
2.	<u>Strengthen maintenance regime for third rail system:</u> SMRT to fully implement maintenance requirements for the third rail, including annual TRSA inspections as specified in the original MRTC Maintenance Manual. In addition, SMRT to conduct non-destructive testing (NDT) on the third rail, in particular the vulnerable areas.
3.	<u>Review design of TRSA:</u> SMRT and LTA to review current design of the TRSA with view to developing a more robust fastening assembly for implementation on a prioritised basis. In the meantime, the cable ties used as an interim solution should be properly inspected and maintained. Furthermore, SMRT to consider installing steel caps in addition to cable ties to further reduce the likelihood of claw dislodgements. SMRT should also study if the design of the TRSA covers and claws can be improved to facilitate inspection.
4.	<u>Enhance maintenance regime to eliminate third rail gauge fouling:</u> SMRT to enhance the maintenance regime to ensure the third rail alignment is within maintenance tolerance.
5.	<u>Upgrade Multi-Function Vehicle (MFV) capabilities:</u> Besides an additional MFV that SMRT will be purchasing, the existing MFV should be overhauled, or if not cost-effective, be replaced. SMRT to enhance its SOPs for MFV operation.
Enhance Prevention and Detection of Future Problems Related to the Trains	

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6.	<u>Improve monitoring and rectification of wheel defects:</u> To reduce vibration, excessive levels of which may destabilise the third rail system, SMRT should introduce a system for real-time detection of wheel defects, and implement robust measures to ensure that wheels with defects are re-profiled in a timely manner on a prioritised basis. SMRT should also investigate the root causes of wheel defects and take the necessary corrective/preventive actions to reduce their occurrence.
7.	<u>Improve CCD maintenance regime:</u> SMRT should strengthen the CCD maintenance regime by implementing an annual check on the gauging and upward force of the CCD, and explore the feasibility of equipping trains with sensing devices to alert if there are CCD shoe problems. SMRT should also conduct a study to determine the optimum torque for the bolts that secure the copper conductor strips of the CCD shoes to the trains to minimise the occurrence of CCD shoes not detaching cleanly, and to implement a bolt torque check regime. To prevent damaged CCD shoes from further damaging the third rail system, SMRT to consider adopting the practice of immediate removal of damaged CCD shoes from stalled trains before they are hauled away.
8.	<u>Improvements to backup power supply:</u> SMRT should conduct more frequent battery checks, and review the adequacy of the current 45-minute backup power provision.
9.	<u>Examine the feasibility of equipping older trains with Train Integrated Management System (TIMS):</u> LTA and SMRT to study the feasibility of equipping the older (first and second generation) trains with TIMS to provide real-time information to detect train faults.
Improve Overall Maintenance Regime and Regulatory Framework	
10.	<u>Review of asset maintenance and regulatory framework:</u> Given the age and increased usage of NSEWL, SMRT and LTA to jointly review the current asset maintenance framework to ensure safe and reliable train operations. One specific suggestion is for LTA to impose a requirement on SMRT to conduct a Maintenance Management System audit, which can be done on a 3 or 4-yearly basis to identify areas of possible improvements. In reviewing and enhancing the asset maintenance framework, it is critical that both LTA and SMRT ensure that their respective roles for asset maintenance are clearly understood by both parties at all levels.

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11.	<u>Move to a risk and reliability-based maintenance approach:</u> SMRT to move towards a risk and reliability-based maintenance approach and adopt more condition monitoring and predictive maintenance.
12.	<u>Improve internal processes and harness technology to enhance maintenance regime:</u> SMRT to institute processes and harness technology to improve maintenance capabilities, including harmonising inspection and maintenance procedures, reviewing its maintenance documentation processes with a view to ensuring a higher level of accuracy and reliability, reviewing the time that maintenance records are kept, enhancing maintenance IT systems, and other measures to ensure greater collaboration among SMRT technical departments for more effective and systematic failure identification and improvement of maintenance practices.
13.	<u>Formalise forensic investigation procedures:</u> LTA and SMRT to review and formalise the procedures to ensure thorough forensic investigations and risk assessments following significant incidents.
14.	<u>Scheduled closures for maintenance work:</u> LTA and SMRT to study further the need for scheduled closures of sections of the system for more comprehensive maintenance work to be carried out, taking into account the impact on commuters, once a more comprehensive maintenance plan has been developed.

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(B) Key Recommendations on Incident Management

Ensure Greater Clarity in Roles of and Effective Communications between Stakeholders across and within Organisations	
1.	<u>Develop an integrated Land Transport Emergency Plan:</u> LTA to take the lead in working out an overall integrated land transport emergency plan articulating response strategies and the roles of various stakeholders and their communication and co-ordination protocols, and to ensure that the other stakeholders also develop and document their respective supporting plans. LTA to also review the timeliness of its activation of the LTA Public Transport-Crisis Management Team (PT-CMT), which is currently stipulated to be convened within two hours upon activation to assist the Land Transport Operations Centre (LTOC) to oversee the critical system-wide issues that are beyond the PTO's role.
2.	<u>Review SMRT command structure:</u> SMRT currently has a command and control structure centred on the OCC of the incident line. For major incidents that have SMRT-wide impact, SMRT should review if this current arrangement is adequate. In particular, SMRT should consider having an overarching SMRT incident "command centre" suitably staffed and equipped to manage large-scale incidents, to better integrate and manage the train recovery operations, bus bridging operations, public communications, and interaction with other agencies and stakeholders.
3.	<u>Simplify SMRT's command and control structure, and ensuring greater clarity of roles at different levels:</u> SMRT to review its command and control structure to see how it can be simplified to make it more effective and clear, ranging from management and OCC to ground staff like station managers. The SMRT Rule Book, which follows the traditional style of the Railway Rule Book, to be reviewed and simplified.
Improving incident management plan with an emphasis on passenger well-being	
4.	<u>Review of the Railway Incident Management Plan (RIMP):</u> SMRT to review its RIMP with an emphasis on passenger well-being, as well as to cater adequately to larger-scale disruptions.
5.	<u>Review alternative transport modes:</u> LTA and operators to study how to enhance the current bus-bridging plan, as well as to study alternative

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	transport modes during service disruptions.
6.	<u>Review train-to-track detrainment SOPs:</u> LTA and the operators to holistically review train-to-track detrainment SOPs and equipment with a view to enhancing safety and improving the passenger experience.
7.	<u>Improve information dissemination:</u> SMRT to improve communications and information dissemination to the public, with the police and SCDF, and between its command elements and its ground elements at the stations during disruptions.
Ensuring incident management readiness	
8.	<u>Enhance in-house capabilities:</u> SMRT to look into enhancing in-house incident management capabilities such as in customer service to assist passengers during disruptions and crowd control. SMRT to also ensure that relevant staff are briefed in a timely manner about causes and details of significant incidents post-incident, and provide more comprehensive training to staff on how to respond to disruptions.
9.	<u>Enhance incident readiness:</u> LTA and the PTOs, together with other relevant government agencies, to conduct train service disruption exercises, including involving ground deployments.
10.	<u>Review of risk identification process:</u> SMRT to review its risk identification process to better identify risk scenarios for which it should develop preventive measures and contingency plans.