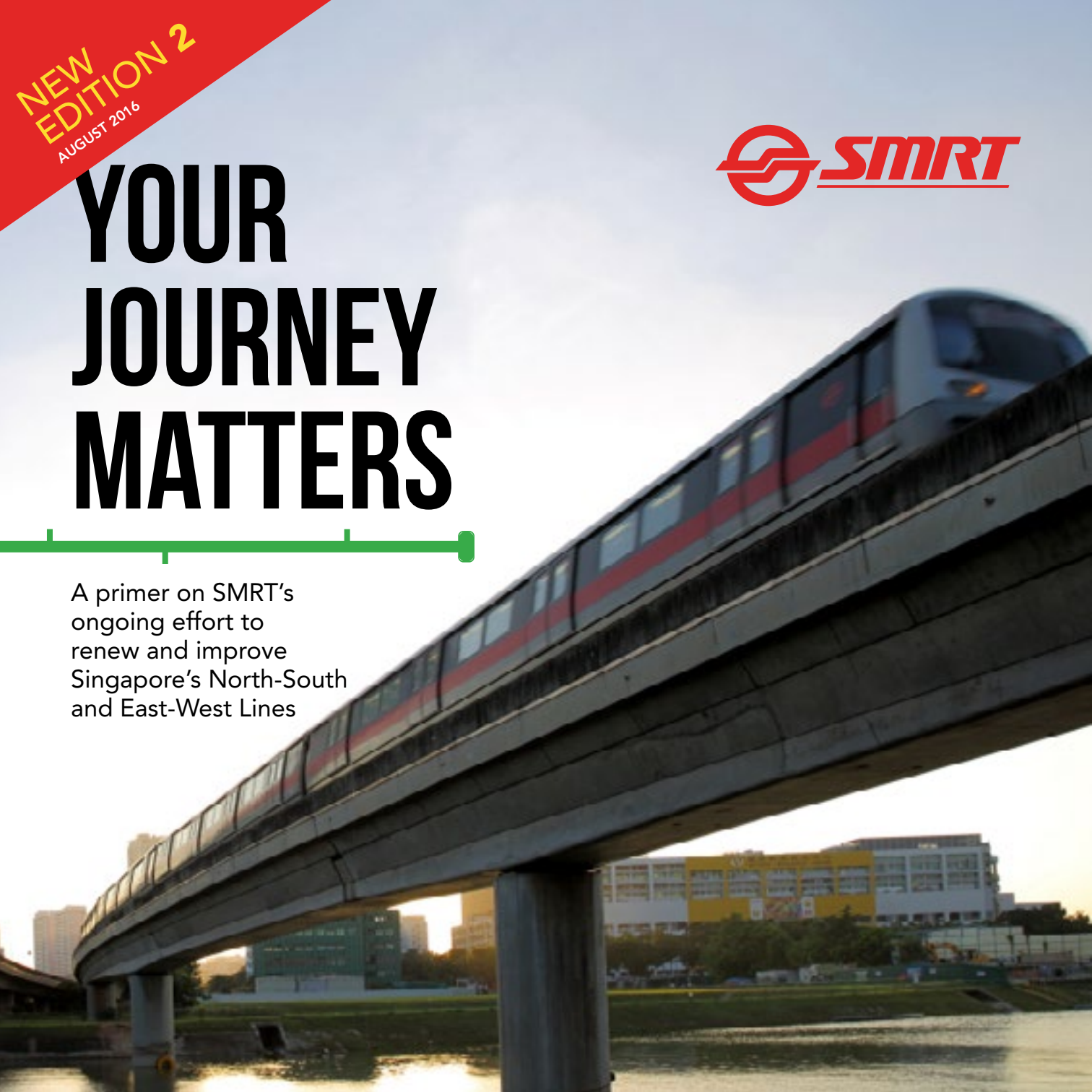


**NEW
EDITION 2**
AUGUST 2016



YOUR JOURNEY MATTERS

A primer on SMRT's ongoing effort to renew and improve Singapore's North-South and East-West Lines



SMRT welcomes the transition of its North-South, East-West and Circle Lines, and the Bukit Panjang Light Rail Transit to the New Rail Financing Framework (NRFF). The NRFF is a more sustainable model that will allow SMRT to continue its commitment to deliver high levels of service and reliability for commuters.

Temasek Holdings has proposed taking SMRT private and delisting the company. This will allow SMRT to better fulfil its role as a public transport operator without the pressures of short-term market expectations. In retooling and reinforcing our core skillsets in engineering and maintenance, we look forward to attaining even higher levels of rail excellence.



INTRODUCTION

A tremendous amount of work is being put into renewing and upgrading the North-South and East-West Lines (NSEWL), Singapore's oldest, longest and most heavily utilised MRT lines. The work takes place every day even as the rail network continues to serve passengers for around 20 hours a day and as the system copes with increased ridership.

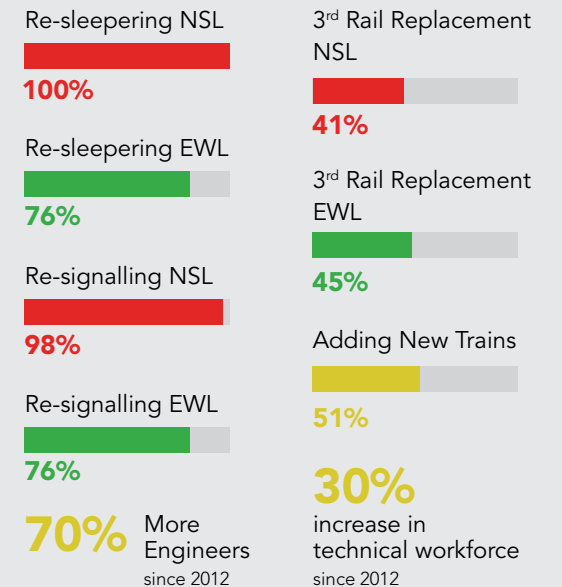
The transformation of the NSEWL is a complex set of engineering projects. It represents the first major upgrade for the lines since they started operations in 1987. Indeed, the renewal of the NSEWL is said to be the biggest modernisation project on a "live" MRT system anywhere in the world.

This modernisation effort will lead to an updated and renewed railway system that will allow SMRT to run more trains, carry more passengers and serve our passengers better with faster connections across the MRT network. The multi-year, multi-project effort takes place seven days a week, all-year round. Much of the work takes place away from the public eye in train depots, deep underground in train tunnels or during the early hours of the morning when trains have stopped running. Progress is made every day to modernise the NSEWL to serve you better.

With just three hours every night for engineering staff to access the track when trains are not running, it is vital for SMRT to prioritise and allocate the engineering hours and resources properly across different projects. Since 5 June 2016, the implementation of later train service start times

on Sundays for 13 stations along the East West Line have given the engineering team much needed additional time to work each night. These extra hours are maximised for urgent maintenance and repair tasks as well as upgrade and renewal projects.

AT PRESENT, OUR ATTENTION IS FOCUSED ON KEY ENGINEERING PROJECTS SUCH AS:



*NSL: North-South Line, EWL: East-West Line
Correct as of 31 Aug 2016

POWERING THE NORTH-SOUTH AND EAST-WEST LINES

HOW WILL THE POWER NETWORK BE IMPROVED

With more trains due to be added to the NSL and EWL, existing power cables have to be replaced with larger capacity cables to accommodate the increase in power demand. SMRT is working with LTA to address the rail network's future power needs.

A number of measures are being implemented to minimise inconvenience to MRT passengers due to power-related faults. These measures tie in with recommendations made by the Independent Advisory Panel, approved by LTA, on rectification measures to improve the rail power supply system.

These measures include renewing power components that are nearing the end-of-life stage on the 30-year old network with completely new components, increasing the power capacity of the network and thirdly, improving the design of the power network.

In order to improve the design of the power network, Voltage Limiting Devices will replace the existing 64P Earth Fault Relay. Works will be done on the 750V DC Switchgear & DC Cables, Direct Current Group (Rectifiers and Inverter) and High Voltage Group (AC Switchgear & HV cables) in order to renew, upgrade and increase the power capacity.



MAINTAINING OUR ESCALATORS

On 7 January 2016, SMRT awarded OTIS Elevator Co. (S) Pte Ltd the contract to refurbish 233 escalators. These escalators are located in 42 stations along the NSEWL network. The \$47.3 million contract will see work take place from August 2016 to August 2021.

The two main objectives are to replace ageing worn out parts such as traction machines, handrail drive, lubrication

system and safety switches, and to add new safety features such as Dual Speed Controller, Variable Speed Device and Balustrade Panels Securing Mechanism.

PRE-START ESCALATOR AND SITE SURVEY EXERCISE

Since February 2016, SMRT and OTIS jointly commenced on the pre-start escalator and site survey exercise.

The objective is to provide an assessment report on pre-existing conditions of each escalator, site and identify suitable holding areas for tools, equipment and components.

This report will provide a comprehensive overview of the condition of all 233 escalators and assist in prioritising of refurbishment work required.

KEY CHALLENGES

This is the first escalator upgrading project to be carried out during service hours. Unlike other major upgrade

projects such as re-signalling, re-sleepering, etc, the key challenge is to minimise inconvenience to commuters.

We will prioritise the refurbishment of each escalator based on a framework of principal considerations which include minimizing where possible the impact to commuters and completing works in as short a time as possible.

Commuters can look forward to more reliable and safer escalator rides as part of their daily journeys once all 233 escalators are fully refurbished.





MAINTAINING PLATFORM SCREEN DOORS

There are 2,880 platform screen doors (PSD) across the NSEWL. A total of 816 of these are the original pneumatic PSD that were installed in underground stations. In addition, 144 electric PSD were installed in three underground stations and all 1,920 half-height platform screen doors (HHPSD) were installed in aboveground stations in 2009, to elevate the level of safety for commuters.

As a safety feature, a train that has pulled into a station cannot depart if any of the 24 screen doors are detected as opened. Occasionally, this occurs as a false positive but there are times when the mechanisms inside the doors are faulty, resulting in the doors not closing tightly.

Each night, maintenance teams are dispatched across the island to carry out maintenance works on the screen doors. A typical work night involves checking all 24 screen doors on one side of the platform of the station, replacing worn out parts such as the rubber nose or guard, as well as cleaning and removing debris that may affect the smooth operation of the doors. The team also checks the emergency release lever, located on the train-facing side of the door to ensure that they work. The team will also test the simultaneous opening and shutting of all the doors

and finally, when train service commences, the team will observe how the doors interact with incoming trains. This is known as preventive maintenance and all works are done from the platform.

Corrective maintenance on faulty doors will take longer and will require the team to access the track as works have to be done on the train-facing side of the doors. This will require close coordination with the Operations Control Centre to ensure a safe working environment for the team. Corrective maintenance for the HHPSD can be back-breaking work as the whole door has to be dismantled in order to gain access to the components that require fixing.

Concurrently, a project to replace ageing parts in all 816 pneumatic doors is underway. The pneumatic doors are almost 30 years old and ageing parts, like the actuator, are being replaced to improve its reliability. The project started in 2015 and is expected to complete in early 2017.

A pre-emptive renewal project has started on the newer electrical HHPSD. Parts like the rollers and belts will be replaced ahead of the recommended end-of-life date to ensure smooth operations.



IMPROVED AIR CONDITIONER MAINTENANCE

Air conditioning is crucial in keeping commuters cool on the train.

An analysis on the most frequent causes of aircon failure for NSEWL trains has shown that a key cause is fuses in the aircon motors blowing out as a result of arcing caused by build up of carbon dust inside the motor.

The source of the carbon dust is the carbon brush, a component in the aircon unit that is in contact with the aircon motor. A more effective cleaning method to remove excessive carbon dust build up has been implemented and new carbon brushes are being trialed to reduce the carbon build up.

Microcards are like the brains of the aircon unit. When there is a defective microcard, the aircon does not function properly. In some situations, the unit fails to activate when temperatures get too high. Replacing defective microcards with new ones from the manufacturer is one solution, but SMRT has been working on a more sustainable solution. The Integrated Electronics Workshop team at SMRT has studied the microcard and has been refurbishing defective microcards.

The trains' aircon units use a gas known as freon as a refrigerant which cools the air. The freon gas cycles within the unit in a closed system of coils. If freon leaks from these coils, cooling efficiency is reduced. We are stepping up efforts to plug leaks in these tubes through a process known as "brazing". The freon also needs to be topped up when leaks are discovered. The use of a recovery machine ensures that the precise composition of refrigerant is used to ensure cooling efficiency.

The later models of trains on the NSEWL are equipped with the Trains Information Management System, or TIMS. TIMS is a system of sensors that measures various properties of the train during operations, such as measuring the internal temperature of each car. During service, train captains can check TIMS for any aircon faults. When faults are detected, a field team is activated. The team will then verify the fault and where possible, rectify the issue immediately. Further inspections on the reported aircon system will also be carried out when the train returns to the depot.

IMPROVING THE NORTH-SOUTH AND EAST-WEST LINES

SMRT is making good progress in its multi-year, multi-project efforts to renew the NSEWL. This marks the biggest transformation of the Lines since they were built in the 1980s. Here's a snapshot of the work-in-progress.

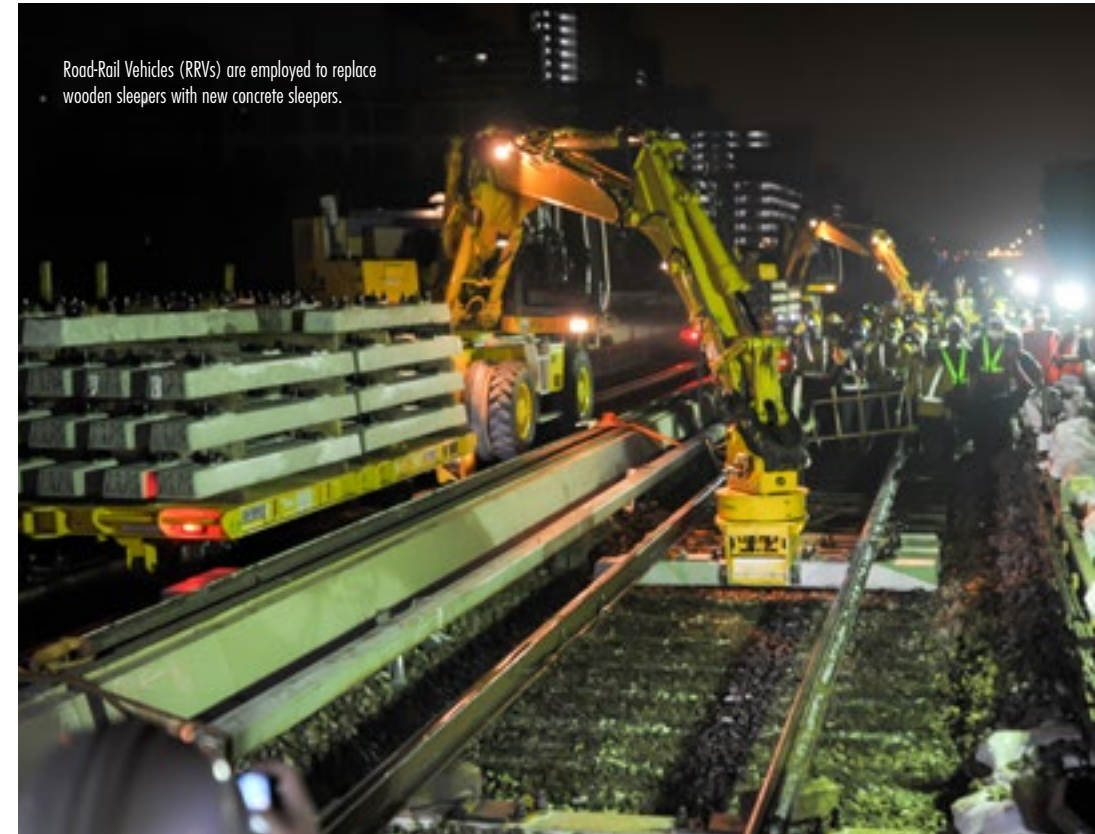


SLEEPER REPLACEMENT

Working closely with LTA and rail contractors, the SMRT team achieved a major milestone when we finished replacing wooden sleepers on the North-South Line (NSL) with concrete sleepers in April 2015.

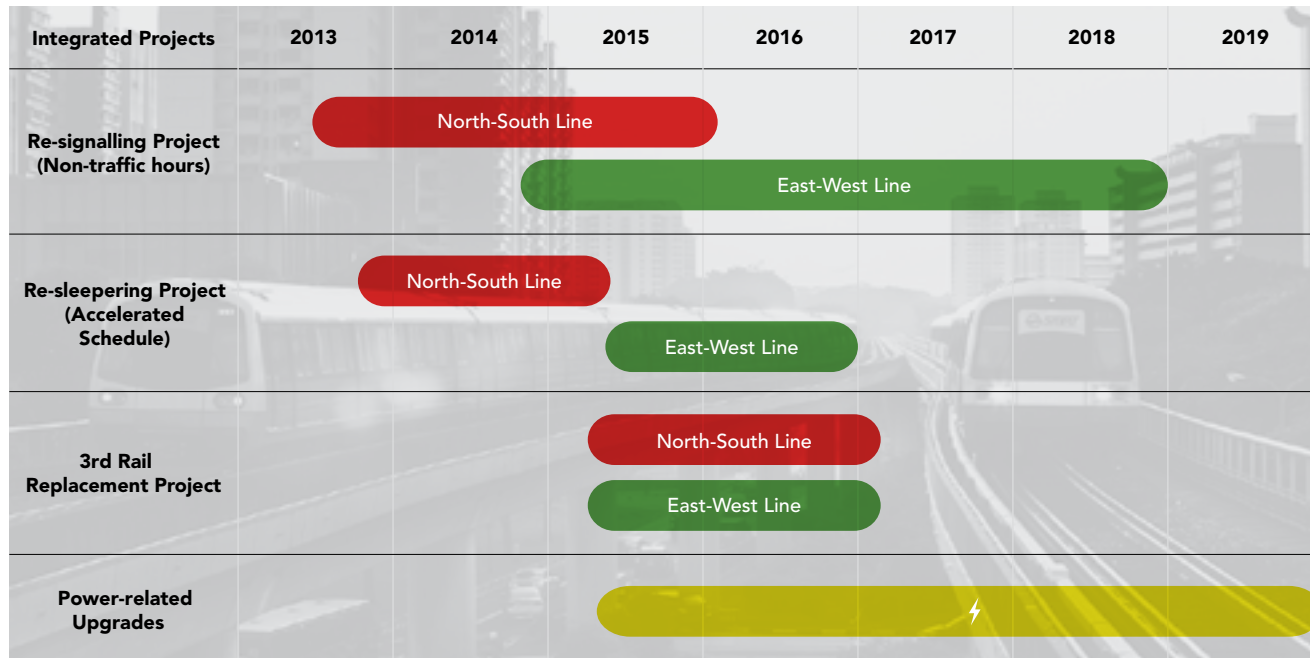
The NSEWL were built with wooden sleepers. These sleepers support the rails on which our trains run. Some 188,000 sleepers are nearing the end of their 25-year lifespan. Exposure to the sun and rain over the years, vibration from moving trains and the weight each sleeper has to bear when a train passes over it add to the wear and tear.

By renewing wooden sleepers with concrete sleepers that have a 50-year lifespan, journeys on the NSEWL will be safer and smoother for decades to come. Positive results from the sleeper replacement are already felt on the NSL. Journey times on the NSL have been reduced by around 10 per cent after the speed restrictions were fully lifted in May 2015.



Road-Rail Vehicles (RRVs) are employed to replace wooden sleepers with new concrete sleepers.

Wooden sleepers along the East-West Line (EWL) are now being replaced nightly. Steady progress is being made thanks to the experience gained by our engineers while carrying out the NSL sleeper replacement project. When the work is completed by the end of 2016, passengers travelling from Pasir Ris to Joo Koon on the EWL will also experience smoother train rides.



RE-SIGNALLING

The project is progressing well with 98% of the NSL completed and 76% of the EWL re-signalling work done. We have started trials to test the new signalling system on the NSL. Re-signalling is expected to be completed on the NSL in 2016 and on the EWL in 2018.

The new signalling system will substantially improve the capacity of the NSEWL to run trains at shorter intervals. This would mean a shorter wait for trains, which would ease congestion at station platforms during peak periods. The capability will be maximised as the train fleet is progressively enlarged by end 2016 to allow more trains

to be deployed on the NSEWL. More than half of the 57 new C151B trains for the NSEWL have been delivered by the middle of 2016. This underlines the importance of coordinating the multi-year, multi-project effort in rail renewal so that the combined benefits of these projects will give you a better journey on the rejuvenated NSEWL.

Under the re-signalling project, the new signalling system supplied by Thales will see one of the most advanced train signalling systems in the world installed on the NSEWL.

The current signalling system, which dates back to the 1980s, keeps trains a safe distance from one another by

dividing the rail network into fixed segments of track length called blocks, with only one train allowed into each block at any time. These blocks measure between 800m to 1,000m in length. This Fixed Block system protects passengers in one train from other trains operating along the same line.

The new signalling system uses advanced communications technology installed on trains to constantly update the traffic management system on the identity, location and speed of every train. The new system, which is more precise than the system it replaces, will lead to better use of the rail network because the footprint for each train, which includes the length of the train and the safety distance in front and behind the train, will be much smaller. This Moving Block system can be imagined as a safety bubble that moves with and protects the train, and will automatically slow down when it approaches a train ahead.

This shorter distance will allow us to deploy more trains at shorter intervals on the rail network while maximising safety for passengers. When fully operational, the new system will allow trains to be spaced 100 seconds apart, which is a significant improvement from the 120 seconds between trains under the current system. The new signalling system



Maintenance Operations Centre at Bishan Depot

is also designed with more redundancies, which makes it more reliable because major disruptive signal faults are less likely to occur.

THIRD RAIL REPLACEMENT

SMRT passenger trains are powered by electricity supplied by a powered steel rail. This rail is called the Third Rail because it is fixed next to and slightly above the two running rails on which the train wheels travel.

The Third Rail replacement project currently being carried out on the NSEWL marks the first network-wide replacement for the 200km-long NSEWL Third Rail since SMRT operations began in 1987. The trains draw electricity from the powered rails through Current Collector Devices (CCD) that make contact with the rail and transfer

electricity to the train's electrical system. Each six-car MRT train has 24 CCD shoes that are in constant contact with the Third Rail when in motion and even when it makes a stop at MRT stations.

Over the years, this constant contact adds to wear and tear of the Third Rail and the brackets that are used to support the weight of this steel rail. If the Third Rail sags due to worn out supports, power faults could occur.

The Third Rail replacement project is timely as it will increase the reliability of the electrical system. The work involves turning off the power, unbolting the old Third Rails, replacing them with new ones and re-connecting the rails to the electricity network. We are making steady progress and expect to complete the work in early 2017.



A Siemens C651 train (left) flanked by a Kawasaki Heavy Industries & CSR Qingdao Sifang C151A train in a train maintenance bay. The Siemens C651 trains are the only NSEWL train type painted in a white paint scheme with a red stripe.

UPGRADING OLDER TRAINS

The C151 Kawasaki Heavy Industries (KHI) train entered service in 1987 while the C651 Siemens was introduced in 1994. SMRT is upgrading the 19 C651 Siemens trains as they have logged a higher number of train faults compared to other train models.

Singapore Rail Engineering has completed two prototype trains and will be proceeding with the upgrade works on the C651 trains.

When completed in 2018, the upgraded C651 Siemens trains will have new or refurbished train sub-systems such as new air conditioning, electric doors, brakes and propulsion systems. These have been the primary causes of delays due to train faults. Upgraded trains will also have sensors that furnish the Train Captain and engineering staff with the train's state of health, thus making it easier to operate and maintain the train. The upgrade will include a makeover that gives our passengers a new-look cabin.



A C151B train in the new paint scheme for SMRT trains.

NEW TRAINS INCREASE PASSENGER CAPACITY

Thirty new C151B trains, part of a fleet of 57 new trains for the NSEWL, have been delivered to Bishan and Tuas Depots where the trains are being fitted out and will be tested extensively. These trains, designed to operate with the new signalling system, will allow more trains to be run on the NSEWL.

Before a new train enters operational service, SMRT's engineering staff will work closely with LTA and the train manufacturer to get the new train ready. It takes about

a year to do this. The work involves testing the air-conditioning, automatic doors and sensors, propulsion and brakes, communication equipment as well as interior fittings like seats, poles and handles. Every item will be rigorously tested before it is certified safe for passenger service.

More new trains are on their way to Singapore and more than half of the 57 trains will be delivered by the end of 2016.

“ Safety, reliability and service excellence are key in our ongoing efforts to improve the system and overall travel experience for our commuters. We have made good progress and are encouraged by the support and understanding of our commuters. We recognise too that clearly there is more to be done, and as quickly as possible. SMRT affirms its continued commitment to serve the needs of our commuters. We are focusing relentlessly on building our engineering and technical capability, strengthening our maintenance and service recovery, as well as upholding the morale and competency of our people.”

— Mr Desmond Kuek,
SMRT President and
Group Chief Executive Officer





A NOTE ON THE CRACKS ON C151A TRAINS

A total of 26 C151A trains, which were put into service for less than five years, are being shipped back to their manufacturer, Qingdao Sifang, after defects were found in Singapore's first China-made MRT trains.

Hairline cracks were found in the structure connecting the car body and the bogie of the C151A trains made by China Southern Railway and Qingdao Sifang Locomotive and Rolling Stock Company during inspections in 2013.

The affected trains are the newest in the fleet serving the NSEWL. These trains were delivered in two batches: 22 in 2011 and another 13 in 2013. The cracks were detected on all C151A trains from the first batch and four trains from the 2013 batch.

The defects were being monitored closely and a monthly safety assessment was conducted by the LTA and manufacturer before the train is put into service. Based on laboratory tests conducted by LTA, the hairline cracks were caused by impurities in the aluminium car-body material which occurred during the manufacturing process. The TÜV consultants, Ministry for Transport and LTA confirmed that these defects are not safety-critical and that the trains were safe for service.

Passenger safety is paramount to SMRT, and under no circumstances will this be compromised. Any train that is assessed to be defective or unfit for passenger service is not put into service. The decision to send small batches of trains back to the manufacturer for rectification does not affect train service availability or frequency.



♥ We are proud to be part of the development of a “first-of-its-kind” MRT Maintenance Operations Centre, which allows for better coordination and stronger support for maintenance teams as they respond to rail incidents on the North-South and East-West Lines. ♥



Neo Kim Hee, 58
Engineering Maintenance Manager, father of three, Hougang resident

Muhammad Farhizzam Bin Selamat, 28
Executive Engineer, married, Hougang resident



smrt.com.sg



YOUR JOURNEY MATTERS

MAINTENANCE OPERATIONS CENTRE

REINFORCING OUR ENGINEERING WORKFORCE

To strengthen our repair and maintenance capability, we have substantially reinforced our engineering workforce. Over the last three years, SMRT increased the number of Rail Maintenance staff by 30%. For Executive Rail Engineers alone, the numbers grew by 70%. By 2018, SMRT aims to have more than 400 engineers (127% increase from 2011) and more than 2,600 technicians (50% jump from 2011). This will complement the enlarged train fleet and keep the renewed NSEWL network in good working order.

ENGINEERING MAINTENANCE MANAGER

SMRT implemented the Trains Career Scheme in 2014 and the SMRT Train Engineer Professionalisation (STEP) Roadmap in 2015, as part of an effort to strengthen the professionalism of our workforce, and provide fulfilling life-long careers for our staff.

In 2016, SMRT continued this effort with an initiative to upgrade our middle management in engineering and maintenance skills so that they can more effectively lead the technical workforce in our drive towards higher rail reliability. In doing so, we create multiple pathways to success that go beyond academic qualifications. Our people have opportunities to develop to their fullest potential throughout their career with SMRT, in line with the Government's SkillsFuture programme. An Engineering Maintenance Manager role was created for deeper technical competence and has expanded leadership responsibilities. It will fulfil career aspirations of the best and most experienced diploma talents as well as hone maintenance operations competence of young engineering graduates.



PART TIME DIPLOMA IN ENGINEERING SYSTEMS FOR RAPID TRANSIT TECHNOLOGY

In November 2015, Senior Minister of State for Transport, Josephine Teo announced a \$12.5 million Public Transport Manpower Development Fund that LTA will invest in to develop talent in the public transport industry. The Public Transport Manpower Development Fund will be used for initiatives spearheaded by LTA, WDA and public transport operators, like SMRT.

SMRT has played a crucial role in developing initiatives to nurture both current and future rail professionals. A **Part-Time Diploma in Engineering Systems for Rapid Transit Technology** was developed with Singapore Polytechnic for staff who wish to upskill themselves in the rapid transit industry with more knowledge and practical skills about the various areas of rail operations and maintenance.

MEMORANDUM OF UNDERSTANDING WITH UNIVERSITY OF BIRMINGHAM

SMRT is also working with Birmingham Centre for Railway Research and Education, University of Birmingham to develop and deliver a Post Graduate programme in Urban Railway Engineering (Singapore). This programme is a core part of the SMRT Train Engineer Professionalisation (STEP) programme.

STEP-IN AND STEP-UP

For **early and mid-career engineers, the comprehensive STEP-IN and STEP-UP** schemes were created. STEP is essentially about providing our rail engineers with professional development and accreditation. It anchors on the professional development of engineers through the acquisition of necessary competencies in three areas: Values, Leadership, and Functional Skills.

Fresh graduates from Singapore Polytechnic and the Institute of Technical Education will be able to participate in **Earn & Learn** programmes which will give them a head-start in their careers.

At the degree level, SMRT supports the Singapore Institute of Technology's new **Sustainable Infrastructure Engineering** programme by taking in 15 students for a 12-month integrated work-study arrangement.

These initiatives will help in building a sustainable workforce to support the growing rail network.

Seven engineers from SMRT were in the pioneering batch of Chartered Engineers in Railway and Transportation Engineering. These seven were awarded the prestigious "CEng" title in March 2016 by the Institution of Engineers Singapore, recognising their deep expertise in the specialised field of rail engineering. SMRT will continue to mentor and nurture the next generation of engineers, providing them with the technical experience and knowledge to pursue chartership as well.

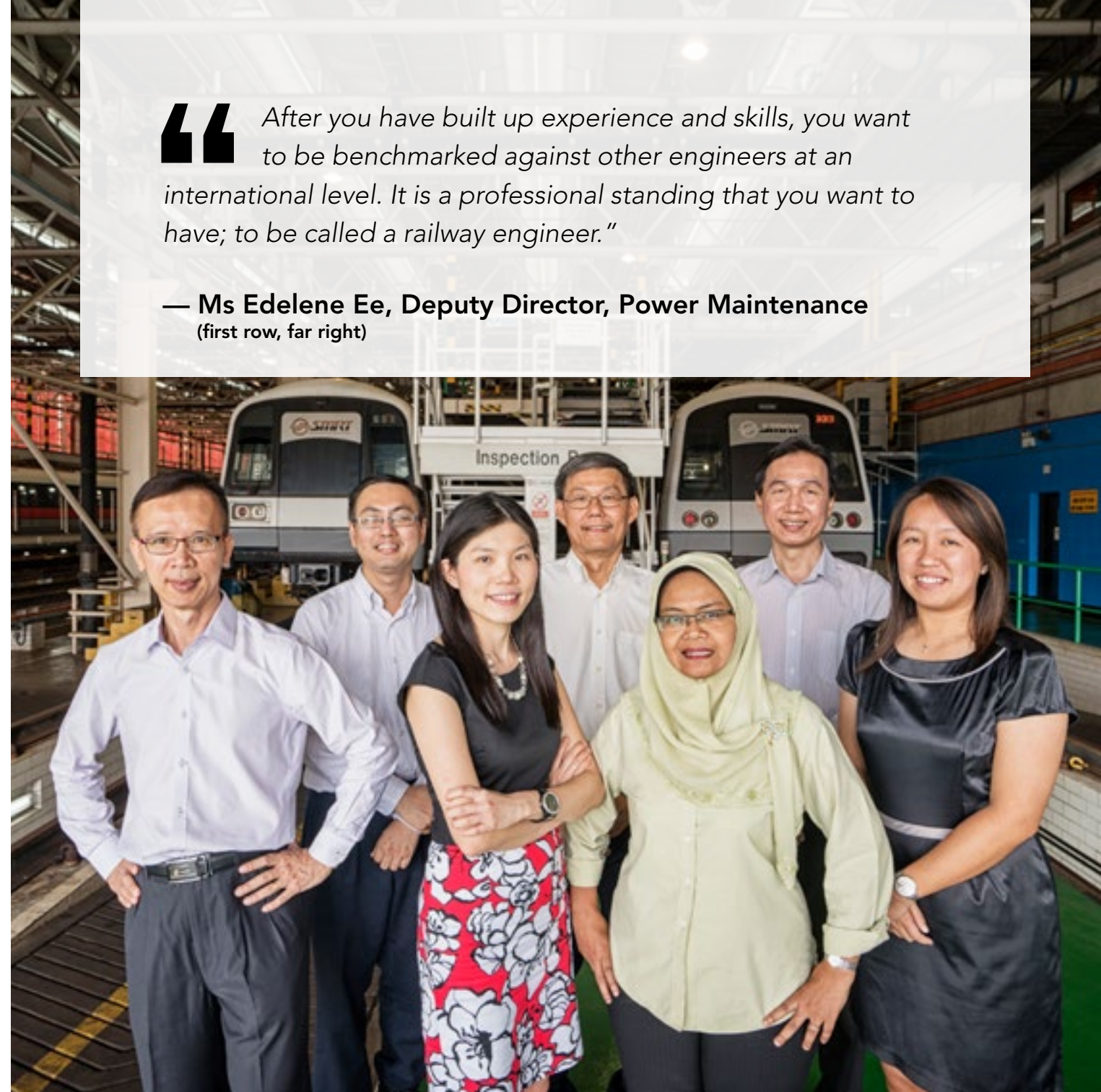
STRENGTHENING MAINTENANCE SYSTEMS, PROCESSES AND CULTURE

We want to sustain higher levels of reliability, safety, convenience and comfort for our passengers and we will do this by strengthening the way we maintain our rail network and train fleet.

To keep the rail network running safely for 20 hours a day, every day, even as the NSEWL serves increasing ridership, calls for a high standard of engineering excellence. We have a comprehensive, structured maintenance programme to look after the rail network. Our engineering

“ After you have built up experience and skills, you want to be benchmarked against other engineers at an international level. It is a professional standing that you want to have; to be called a railway engineer.”

— Ms Edelene Ee, Deputy Director, Power Maintenance
(first row, far right)





staff step up maintenance checks as railway components reach their end of life. Safety is paramount and we will update maintenance schedules regularly to factor in ageing components that may need to be checked more intensively.

We are advancing our emphasis on Predictive Maintenance with the introduction of condition monitoring for rail assets and infrastructure. These include fitting trains with cameras for early detection of track faults, placing devices on tracks to check the condition of train wheels as well as installing sensors and data loggers across the network to measure the health of the power supply network. More specialised condition monitoring devices, such as lasers that check track alignment, have been introduced to supervise critical components in the NSEWL.

Our efforts to institutionalise a lifecycle asset management system have been recognised. SMRT is the second company in Asia to have achieved the ISO 55001. It demonstrates that assets are being appropriately maintained whilst short-, medium- and long-term issues and risks are being properly identified and addressed. In addition, independent certification provides evidence of compliance to safety critical systems and procedures. It shows, most importantly, that SMRT is on the right track to achieve better rail reliability.

Another significant step forward is in setting up a new Maintenance Operations Centre (MOC), the first of its kind in the region. Opened in August 2015, it allows SMRT to better coordinate and provide stronger support to maintenance teams as they respond to rail incidents. The MOC allows rail engineering experts to guide staff attending to faults on our network with more precise technical advice, leading to faster recovery. When fully operational, the MOC will provide a 24/7 health status of each train and all of critical components across the rail network.

PROVIDING OUTSTANDING CUSTOMER SERVICE

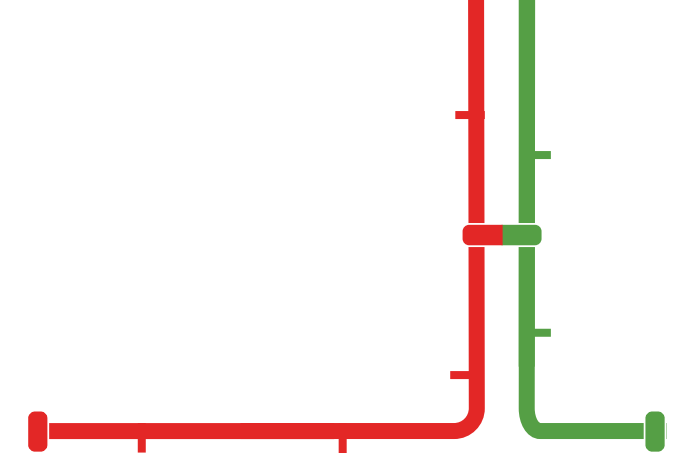
On average more than two million passenger trips are made on the SMRT rail network every day. Every journey is important to us. As hardware is improved, our commitment to providing quality *heartware* is no less important.

All NSEWL MRT stations are manned during service hours. Passengers at all our NSEWL stations will find staff close at hand to help from the first train till the last train. There are countless examples of how SMRT staff have gone the extra mile to help passengers in need. Our station staff receive many notes for extending a helping hand to passengers who lost their way along our network or needed help finding lost items.

We constantly improve customer service touch points in our network to serve our passengers. Since 2014, we have launched several programmes to enhance customer service: Care Stickers to identify passengers who would appreciate a seat, Priority Queues at elevators for passengers with needs and Charging Points for passengers requiring a quick charge for their mobile devices. We have received very positive feedback to these initiatives.

We have also introduced Escalator Safety announcements, Care Zones which allow station staff to keep an eye on and respond quickly to passengers who need help, and SNAP-REP (Snap and Report) which allows passengers to give quick comments and share pictures via Whatsapp. We value the feedback by our commuters in improving the service quality and travel experience.





“ We are confident that when the North-South and East-West Lines are successfully renewed and the range of enhanced maintenance measures are fully implemented, commuters can look forward to a rail network with improved reliability. The task ahead is for SMRT to continue building trust by delivering improvements as part of this multi-year reliability enhancement programme.”

**— Mr Lee Ling Wee,
Managing Director, SMRT Trains**



CONCLUSION

YOUR JOURNEY MATTERS

Our multi-year, multi-project effort to renew and improve the North-South and East-West Lines represents the biggest transformation for Singapore's oldest rail lines.

With trains serving passengers for some 20 hours a day, our engineering staff are making the best use of the remaining hours for essential maintenance work as well as projects that will renew the ageing network, which is now in its 29th year of service.

These important projects are prudently timed and executed to ensure optimal efficiency. At the same time, we need to keep the current system going and serve more passengers even as these renewal efforts are taking place.

The transformation is making steady progress. Soon, passengers will enjoy smoother, safer rides and faster journeys on a modernised rail network with higher levels of reliability and increased capacity.

We have already achieved much but more needs to be done. This progress update keeps you informed of the developments along the entire NSEWL network, because your journey matters to us.

Please be patient and give us your support, as our team concentrates fully and works diligently and carefully to deliver a rejuvenated NSEWL that Singaporeans will be proud of.

SUMMARY OF OUR ACHIEVEMENTS

88% OF WOODEN SLEEPERS HAVE BEEN REPLACED ON THE NSEW LINES

As of 31 August 2016, we successfully replaced 69,900 of all 92,000 wooden sleepers on the East-West Line. We remain on track to finish this by end 2016. All the sleepers on the North-South Line were replaced with concrete sleepers by April 2015.

WE ARE ON TRACK TO UPSIZE THE NSEWL TRAIN FLEET

More than half of the 57 new C151B trains for the NSEWL will be delivered by the end of 2016. For the new C151B trains already delivered to Bishan and Tuas Depots, they are currently being fitted out and a multitude of features such as air-conditioning, automatic doors and sensors, propulsion and brakes, and communication equipment as well as interior fittings like seats and poles are being tested extensively before they are rolled out for service.

RE-SIGNALLING CONTINUES TO MAKE GOOD PROGRESS

The existing 30-year-old signalling system is being replaced by a state-of-the-art train signalling system – one of the most advanced in the world. The new system, coupled with the insertion of more trains, will enable us to increase train frequency. This will allow trains to be deployed closer to each other, which translates to shorter waiting times for commuters. The re-signalling work is making good progress with 98% of the North-South Line and 76% of the East-West Line completed.

OUR 1-YEAR-OLD BLOG CONTINUES TO KEEP YOU UPDATED

With behind-the-scenes exclusive stories and updates, the SMRT Blog keeps our commuters well informed and updated on interesting rail topics. (blog.smrt.com.sg)

TWITTER FEEDS PROVIDE REAL-TIME TRAVEL UPDATES AND ADVICE

SMRT's Twitter feed is one of the most active in Singapore with more than 257,000 followers. By providing real-time updates, commuters have access to 'LIVE' travel advisory and updates.

OUR FACEBOOK AND YOUTUBE PLATFORMS' SUBSCRIBER BASE CONTINUES TO GROW ORGANICALLY

SMRT's Facebook (www.facebook.com/SMRTCorpSG) has more than 83,000 followers at the end of August 2016. More than 2,000 individuals subscribe to our SMRT YouTube channel. We continue to publish engaging video content on our YouTube channel for our commuters.

DID YOU KNOW?

Every day, SMRT trains cover a total distance equivalent to 1.5 times round the Equator and carry more than 2 million passengers.

TRACKING IMPROVEMENTS



Much progress has been made over the past few years, thanks to significant and sustained efforts to improve train service reliability to serve our commuters better. Improvements can be seen from charts showing key performance indicators like NSEWL train delays of more than five minutes.

Our engineering staff achieved these improvements through a number of reliability improvements and modifications on our trains. These include upgrading the propulsion software on Kawasaki Heavy Industries & Nippon Sharyo trains, the replacement of power supply units

on Kawasaki Heavy Industries trains and improvements to the signalling system to reduce power and signalling faults.

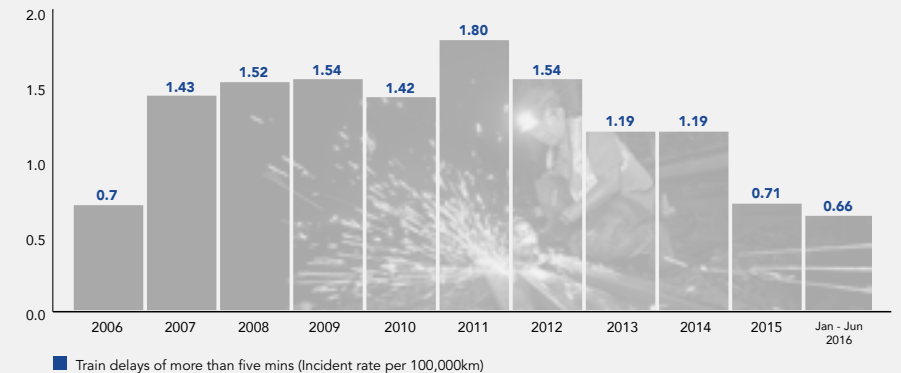
Efforts to refurbish ageing components on older trains are now underway. SMRT also plans to conduct a mid-life upgrade on its fleet of Siemens trains, which have logged a higher number of train faults compared to other train models.

More is being done. The rise in service disruptions of more than 30 minutes since 2012 is closely monitored. We will bring down this figure as we strive towards higher rail reliability.

Train Delays of more than five mins*

The average number of train delays exceeding five mins for every 100,000 kilometres travelled. Our rates are now better than in 2006 despite an older system and we will strive to bring this number down even more.

**figures exclude external factors such as weather*





Your Journey Matters was produced by **SMRT Corporation Ltd**. Information correct as of August 2016. Follow our rail transformation journey online:

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