

= Mass Rapid Transit (Singapore) =

The Mass Rapid Transit , or MRT , is a rapid transit system forming the major component of the railway system in Singapore , spanning the entire city @-@ state . The initial section of the MRT , between Yio Chu Kang and Toa Payoh , opened on 7 November 1987 , making it the second @-@ oldest metro system in Southeast Asia , after Manila 's LRT System . The network has since grown rapidly in accordance with Singapore 's aim of developing a comprehensive rail network as the backbone of the public transport system in Singapore , with an average daily ridership of 3 @. @ 031 million in 2015 (including the Light Rail Transit (LRT)) , approximately 78 % of the bus network 's 3 @. @ 891 million in the same period .

The MRT network encompasses 170 @. @ 7 kilometres (106 @. @ 1 mi) of route , with 102 stations in operation , on standard gauge . The lines are built by the Land Transport Authority , a statutory board of the Government of Singapore , which allocates operating concessions to the profit @-@ based corporations , SMRT Corporation and SBS Transit . These operators also run bus and taxi services , thus facilitating full integration of public transport services . The MRT is complemented by a small number of local LRT networks in Bukit Panjang , Sengkang and Punggol that link MRT stations with HDB public housing estates .

= = History = =

The origins of the Mass Rapid Transit (MRT) are derived from a forecast by city planners in 1967 which stated the need for a rail @-@ based urban transport system by 1992 . Following a debate on whether a bus @-@ only system would be more cost @-@ effective , Ong Teng Cheong , came to the conclusion that an all @-@ bus system would be inadequate , as it would have to compete for road space in a land @-@ scarce country . The initial S \$ 5 billion construction of the Mass Rapid Transit network was Singapore 's largest public works project at the time , starting on 22 October 1983 at Shan Road . The network was built in stages , with the North South Line given priority because it passed through the Central Area that has a high demand for public transport . The Mass Rapid Transit Corporation (MRTC) , later renamed as SMRT Corporation ? was established on 14 October 1983 ; it took over the roles and responsibilities of the former provisional Mass Rapid Transit Authority . On 7 November 1987 , the first section of the North South Line started operations , consisting of five stations over six kilometres . Fifteen more stations were opened later , and the MRT system was officially launched on 12 March 1988 by then Prime Minister Lee Kuan Yew . Another 21 stations were subsequently added to the system ; the opening of Boon Lay on the East West Line on 6 July 1990 marked the completion of the system two years ahead of schedule .

The MRT has subsequently been expanded . The first expansion was in 1996 . This was a S \$ 1 @. @ 2 billion expansion of the North South Line into Woodlands , merging the Branch Line into the North South Line and joining Yishun and Choa Chu Kang Stations . The concept of having rail lines that bring people almost directly to their homes led to the introduction of the Light Rail Transit (LRT) lines connecting with the MRT network . On 6 November 1999 , the first LRT trains on the Bukit Panjang LRT went into operation . In 2002 , the Changi Airport and Expo stations were added to the MRT network . The North East Line , the first line operated by SBS Transit , opened on 20 June 2003 , one of the first fully automated heavy rail lines in the world . On 15 January 2006 , after intense lobbying by the public , Buangkok station was opened . The Boon Lay Extension of the East West Line , consisting of Pioneer and Joo Koon stations , began revenue service on 28 February 2009 . The Circle Line opened in four stages from 28 May 2009 to 14 January 2012 . Stage 1 of Downtown Line opened on 22 December 2013 with its official opening made on 21 December 2013 by Prime Minister Lee Hsien Loong . Stage 2 opened on 27 December 2015 , with its official opening on 26 December by Prime Minister Lee .

= = Infrastructure = =

=== Network ===

The following table lists the Mass Rapid Transit lines that are currently operational :

=== Facilities and services ===

Except for the partly at @-@ grade Bishan , the entirety of the MRT is elevated or underground . Most below @-@ ground stations are deep and hardened enough to withstand conventional aerial bomb attacks and to serve as bomb shelters . Mobile phone and 3G service is available in every part of the network . Underground stations and the trains themselves are air @-@ conditioned , while above @-@ ground stations have ceiling fans installed .

Every station is equipped with General Ticketing Machines (GTMs) , a Passenger Service Centre and LED or plasma displays that show train service information and announcements . All stations are equipped with restrooms and payphones ; some restrooms are located at street level . Some stations , especially the major ones , have additional amenities and services , such as retail shops and kiosks , supermarkets , convenience stores , automatic teller machines , and self @-@ service automated kiosks for a variety of services . Heavy @-@ duty escalators at stations carry passengers up or down at a rate of 0 @. @ 75 m / s , 50 % faster than conventional escalators .

The older stations on the North South and East West lines were originally built with no accessibility facilities , such as lifts , ramps , tactile guidance systems (Braille tactiles on the floor surface) , wider fare gates , or toilets for passengers with disabilities ; authorities in the past actively discouraged use of their system by the disabled . Now , these facilities are being progressively installed as part of a programme to make all stations accessible to the elderly and to those with disabilities . All stations are now barrier @-@ free , although works are still ongoing to provide stations with additional barrier @-@ free facilities . The installation of lifts at pedestrian overhead bridges next to six MRT stations and additional bicycle racks at 20 stations is slated to be completed by the end of 2013 .

=== Hours of operation ===

MRT lines operate from 5 : 30am to before 1 : 00am daily , with the exception of selected periods such as New Year 's Eve , Chinese New Year , Deepavali , Hari Raya , Christmas , eves of public holidays , and special occasions such as the state funeral of Lee Kuan Yew (2015) , when most of the lines stay open throughout the night or extended till later . MRT serves as an essential purpose of transport owing to the support from various organisations and being a car @-@ lite society . When train services operate 24 hours , operators cannot carry out maintenance and engineering works to be done overnight .

=== Rolling Stock ===

The following table lists the rolling stock of the network :

At present , all Singapore lines run with fixed length trains between three and six cars , with the future Thomson @-@ East Coast Line using four cars . Since the system 's conception in 1987 , all train lines have been powered by the 750 volt DC third rail , with the exception of the North East Line which is powered by 1500 volt DC overhead lines . The North South and East West lines uses an automatic train operation system that is similar to London Underground 's Victoria line .

No rolling stock has been completely scrapped since service began , with the oldest C151 trains operating since the inauguration of the MRT System in 1987 . Older trains have been renewed over the years under refurbishment schemes to enhance their lifespan as well as to adhere to updated safety and usability codes . Refurbished and new trains sport sleeker designs , improved passenger information systems , more grab poles , wider seats , more space near the doors , spaces for wheelchairs and CCTV cameras . As a trial run , luggage racks were installed on the C751B trains to serve travellers on the Changi Airport branch line . However , the scheme was subsequently

withdrawn in June 2002 and the luggage racks removed .

All trains are contracted by open tender , with their contract numbers forming the most recognised name of the stock . Official sources occasionally refer to the trains of the North South and East West lines as numbered generation trains , with the C151 train being the first and the newest C151C train being the Sixth .

= = = Signalling = = =

All Mass Rapid Transit Lines are able to run automatically , and with exception of the North South Line and the East West Line , are fully driverless and automated . The following list documents the systems :

= = = Depots = = =

SMRT Corporation has four train depots : Bishan Depot is the central maintenance depot with train overhaul facilities , while Changi Depot and Ulu Pandan Depot inspect and house trains overnight . In March 2012 , it was announced the new Tuas Depot would be ready in 2016 for the East West Line . The underground Kim Chuan Depot houses trains for the Circle Line and Downtown Line , now jointly managed by the two operators .

SBS Transit has two depots : Sengkang Depot houses trains for the North East Line , the Sengkang LRT and the Punggol LRT . Kim Chuan Depot is currently jointly operated with SMRT for the Downtown Line . Major operations will eventually be shifted to the main Gali Batu Depot by end 2015 although it will continue to operate on a minor capacity .

In August 2014 , plans for the world 's first four @-@ in @-@ one train and bus depot were announced . It will be built at Tanah Merah beside the original Changi Depot site to serve the East West , Downtown , and Thomson @-@ East Coast lines . The new 36ha depot can house about 220 trains and 550 buses and integrating the depot for both buses and trains will help save close to 66 @.@ 12 acres (26 @.@ 76 ha) , or 60 football fields ' worth , of land space .

= = = Architecture and art = = =

Early stages of the MRT 's construction paid relatively scant attention to station design , with an emphasis on functionality over aesthetics . This is particularly evident in the first few stages of the North South and East West lines that opened between 1987 and 1988 from Yio Chu Kang to Clementi . An exception to this was Orchard , chosen by its designers to be a " showpiece " of the system and built initially with a domed roof . Architectural themes became a more important issue only in subsequent stages , and resulted in such designs as the cylindrical station shapes on all stations between Kallang and Pasir Ris except Eunos , and west of Boon Lay , and the perched roofs at Boon Lay , Lakeside , Chinese Garden , Bukit Batok , Bukit Gombak , Choa Chu Kang , Khatib , Yishun and Eunos stations .

Art pieces , where present , are seldom highlighted ; they primarily consist of a few paintings or sculptures representing the recent past of Singapore , mounted in major stations . The opening of the Woodlands Extension introduced bolder pieces of artwork , such as a 4 @,@ 000 kg sculpture in Woodlands . With the opening of the North East Line , more series of artworks created under a programme called " The Art In Transit " were commissioned by the Land Transport Authority . Created by 19 local artists and integrated into the stations ' interior architecture , these works aim to promote the appreciation of public art in high @-@ traffic environments . The artwork for each station is designed to suit the station 's identity . All stations on the North East , Circle and Downtown Lines come under this programme . An art contest was held by the authorities in preparation for a similar scheme to be implemented for the Circle Line .

The Expo station , located on the Changi Airport branch of the East West Line , is adjacent to the 100 @,@ 000 @-@ square @-@ metre Singapore Expo exhibition facility . Designed by Foster and Partners and completed in January 2001 , the station features a large , pillarless , titanium @-@

clad roof in an elliptical shape that sheathes the length of the station platform . This complements a smaller 40 @-@ metre reflective stainless @-@ steel disc overlapping the titanium ellipse and visually floats over a glass elevator shaft and the main entrance . The other station with similar architecture is Dover .

Changi Airport , the easternmost station on the MRT network , has the widest platform in any underground MRT station in Singapore . It is rated 10 out of 15 most beautiful subway stops in the world in 2011 .

Two Circle Line stations ? Bras Basah and Stadium ? were commissioned through the Marina Line Architectural Design Competition , which was jointly organised by the Land Transport Authority and the Singapore Institute of Architects . The competition did not require any architectural experience from competitors , and is acknowledged by the industry as one of the most impartial competitions held in Singapore to date . The winner of both stations was WOHA . In 2009 , " Best Transport Building " was awarded to the designers at WOHA Architects at the World Architecture Festival .

= = Expansion = =

The MRT system relied on its two main lines , the North South and East West lines , for more than a decade until the opening of the North East Line in 2003 . While plans for these lines as well as those currently under construction were formulated long before , the Land Transport Authority 's publication of a White Paper titled " A World Class Land Transport System " in 1996 galvanised the government 's intentions to greatly expand the system . It called for the expansion of the 67 kilometres of track in 1995 to 360 in 2030 . It was expected that daily ridership in 2030 would grow to 6 @.@ 0 million from the 1 @.@ 4 million passengers at that time

The following table lists Mass Rapid Transit lines and stations that are currently under testing , construction , or that are in the planning stages :

= = = Downtown Line = = =

The 42 @-@ kilometre , 36 station fully underground Downtown Line , will connect the northwestern and eastern regions of Singapore to the new downtown at Marina Bay in the south and to the Central Business District . Similar to the Circle Line , three @-@ car trainsets will run on the Downtown Line with line capacity projected for 500 @,@ 000 commuters daily . The Downtown Line is slated to be completed in three stages . Stage 1 from Bugis to Chinatown began operations on 22 December 2013 . Stage 2 from Bukit Panjang to Rochor began operations on 27 December 2015 . Stage 3 from Fort Canning to Expo will begin operations in 2017 and Stage 3e from Expo to Sungei Bedok in 2024 respectively .

= = = Thomson @-@ East Coast Line = = =

The 43 @-@ kilometre , 31 station fully underground Thomson @-@ East Coast Line will connect the northern region of Singapore to the south , running parallel to the existing North South Line passing through Woodlands , Sin Ming , Upper Thomson and Marina Bay before turning east and running through Tanjong Rhu , Siglap , Marine Parade and Bedok . The line will commence operation in five stages , with the first three stages starting from Woodlands North to Gardens by the Bay commencing operations between 2019 and 2021 respectively , Stage 4 from Tanjong Rhu to Bayshore in 2023 and Stage 5 from Bedok South to Sungei Bedok in 2024 . The northern terminus of Woodlands North is also expected to interchange with the Singapore @-@ Johor rail link to provide access to Johor Bahru and the future Johor Bahru Rapid Transit System .

= = = Jurong Region Line = = =

First proposed as a LRT line when originally announced in 2001 , the Jurong Region Line has since been upgraded to be a medium capacity line after the project was revived in 2013 . The new

configuration will serve West Coast , Tengah and Choa Chu Kang and Jurong . Details will be announced once Tengah New Town development is up , and the completion will be by 2025 .

=== Cross Island Line ===

The 50 @-@ kilometre Cross Island Line will span the island of Singapore , passing through Tuas , Jurong , Sin Ming , Ang Mo Kio , Hougang , Punggol , Pasir Ris and Changi . The addition of the new line brings commuters with another alternative for East @-@ West travel to the current East West Line . It will also connect to all the other major lines to serve as a key transfer line , complementing the role currently fulfilled by the orbital Circle Line . This line will even have a longer timeframe due to the environmental study aspects , with the completion by 2030 .

=== Tuas West extension ===

The Tuas West Extension is an extension of the East West Line from Joo Koon to Tuas Link . The stations ? Gul Circle , Tuas Crescent , Tuas West Road and Tuas Link ? will extend MRT connectivity to the Tuas area and are expected to serve more than 100 @,@ 000 commuters daily . Construction began in 2012 and is planned to be completed in 2016 .

=== Circle Line Stage 6 ===

To be completed by 2025 , the 4 @-@ kilometre extension will run from Marina Bay through Keppel , ending at HarbourFront . On 29 October 2015 , the LTA announced the 3 station locations for the ' Circle Line Stage 6 ' . The stations are Keppel Station , Cantonment Station and Prince Edward Station .

=== Downtown Line 3 extension ===

To be completed by 2024 , the additional 2 @.@ 2 km extension will run from Expo via Xilin and interchange with Sungei Bedok of the Thomson @-@ East Coast Line .

A commuter who lives along the corridor of the Thomson @-@ East Coast Line (TEL) will be able to access key employment nodes along the Downtown Line 3 corridor in a single train ride . The Downtown Line 3 Extension also brings direct connectivity along the corridor it serves .

=== North East Line extension ===

To be completed by 2030 , the 2 @-@ kilometre extension will run from Punggol through Punggol North including the new Punggol Downtown . The extension is for future residents in Punggol North to have train access to the city centre as well as other parts of Singapore .

=== Fares and ticketing ===

Stations are divided into two areas , paid and unpaid , which allow the rail operators to collect fares by restricting entry only through the fare gates , also known as access control gates . These gates , connected to a computer network , can read and update electronic tickets capable of storing data , and can store information such as the initial and destination stations and the duration for each trip . General Ticketing Machines sell tickets for single trips or allow the customer to buy additional value for stored @-@ value tickets . Tickets for single trips , coloured in green , are valid only on the day of purchase , and have a time allowance of 30 minutes beyond the estimated travelling time . Tickets that can be used repeatedly until their expiry date require a minimum amount of stored credit .

As the fare system has been integrated by TransitLink , commuters need to pay only one fare and pass through two fare gates (once on entry , once on exit) for an entire journey , even when

transferring between lines operated by different companies . Commuters can choose to extend a trip mid @-@ journey , and pay the difference when they exit their destination station .

== Fares ==

Because the rail operators are government @-@ assisted , profit @-@ based corporations , fares on the MRT system are pitched to at least break @-@ even level . The operators collect these fares by selling electronic data @-@ storing tickets , the prices of which are calculated based on the distance between the start and destination stations . These prices increase in fixed stages for standard non @-@ discounted travel . Fares are calculated in increments based on approximate distances between stations , in contrast to the use of fare zones in other subway systems , such as the London Underground .

Although operated by private companies , the system 's fare structure is regulated by the Public Transport Council (PTC) , to which the operators submit requests for changes in fares . Fares are kept affordable by pegging them approximately to distance @-@ related bus fares , thus encouraging commuters to use the network and reduce its heavy reliance on the bus system . Fare increases over the past few years have caused public concern , the latest one having taken effect from 1 October 2008 . There were similar expressions of disapproval over the slightly higher fares charged on SBS Transit 's North East Line , a disparity that SBS Transit justified by citing higher costs of operation and maintenance on a completely underground line , as well as lower patronage .

== Ticketing ==

The ticketing system uses the EZ @-@ Link and NETS FlashPay contactless smart cards based upon the Symphony for e @-@ Payment (SeP) system for public transit built on the Singapore Standard for Contactless ePurse Application (CEPAS) system . This system allows for up to 4 card issuers in the market . The EZ @-@ Link card was introduced on 13 April 2002 as a replacement for the original TransitLink farecard , while its competitor the NETS FlashPay card entered the smartcard market on 9 October 2009 .

A stored value adult EZ @-@ Link or NETS FlashPay branded CEPAS card may be purchased at any TransitLink Ticket Office or Passenger Service Centre . The CEPAS card may be used for the payment of MRT , LRT and bus fares . The CEPAS card may also be used for payment for goods and services at selected merchants , Electronic Road Pricing tolls , and Electronic Parking System carparks . Additional credit may be purchased via cash or NETS at any General Ticketing Machine (GTM) , Add Value Machine , TransitLink Ticket Office , Passenger Service Centre , AXS Station , DBS / POSB / OCBC / UOB Automatic Teller Machines , online via a card reader purchased separately , or selected merchants . Additional credit of a predetermined value may also be automatically credited into the card when the card value runs low via an automatic recharge service provided by Interbank GIRO or credit card . An Adult Monthly Travel Card for unlimited travel on MRT , LRT and buses may also be purchased and is non @-@ transferable .

A Standard Ticket contactless smart card for single or return journeys may also be purchased at the GTM for the payment of MRT and / or LRT fares . A S \$ 0 @. @ 10 deposit will be levied on top of the fare to be paid . The deposit will be automatically refunded through an offset of the fare to be paid for the third journey on the same ticket while an additional discount of S \$ 0 @. @ 10 will be given for the sixth journey on the same ticket . No refund of the deposit is provided if the card is used for fewer than 3 journeys . The ticket can be used for the purchase of single or return journeys to and from pre @-@ selected stations up to a maximum of six journeys over 30 days . Fares for the Standard Ticket are always higher than those charged for the stored @-@ valued CEPAS (EZ @-@ Link and NETS FlashPay) cards for the same distance traveled . The ticket is retained by the user after each journey and does not need to be returned to any GTM or Passenger Service Centre . Identical to the usage of CEPAS cards , the ticket is tapped onto the faregate reader upon entry and exit .

For tourists , a Singapore Tourist Pass contactless smartcard may be purchased . The card may be bought at selected TransitLink Ticket Offices and Singapore Visitors Centres . The tourists may retrieved their deposit by returning the card to the ticket offices or visitors centres within 5 days from the date of issue .

= = Safety and security = =

= = = Safety = = =

Operators and authorities state that numerous measures had been taken to ensure the safety of passengers , and SBS Transit publicised the safety precautions on the driverless North East Line before and after its opening . Safety campaign posters are highly visible in trains and stations , and the operators frequently broadcast safety announcements to passengers and to commuters waiting for trains . Fire safety standards are consistent with the strict guidelines of the US National Fire Protection Association .

There were calls for platform screen doors to be installed at above @-@ ground stations after several incidents in which passengers were killed by oncoming trains when they fell onto the railway tracks at above @-@ ground stations . Underground stations already featured platform screen doors since 1987 . The authorities initially rejected the proposal by casting doubts over functionality and concerns about the high installation costs , but made an about @-@ turn when the government announced plans to install half @-@ height platform screen doors on the above @-@ ground stations in January 2008 , citing lower costs due to it becoming a more common feature worldwide . They were first installed at Jurong East , Pasir Ris and Yishun stations in 2009 under trials to test their feasibility .

By 14 March 2012 , all elevated stations have been retrofitted with the doors and are operational . These doors prevent suicides and unauthorised access to restricted areas . Under the Rapid Transit Systems Act , acts such as smoking , eating or drinking in stations and trains , the misuse of emergency equipment and trespassing on the railway tracks are illegal , with penalties ranging from fines to imprisonment .

There were a few major accidents in the history of the MRT that raised safety concerns among the public . On 5 August 1993 , two trains collided at Clementi station because of an oil spillage on the track , which resulted in 132 injuries . During the construction of the Circle Line on 20 April 2004 , a tunnel being constructed under Nicoll Highway collapsed and led to the deaths of four people . The overall reliability of the ageing North South and East West lines were questioned by the public after multiple major train disruptions in December 2011 led to a Committee of Inquiry , which uncovered serious shortcomings in SMRT Corporation 's maintenance regime . Since then , every MRT line had been plagued with disruptions of various degrees of severity .

On 7 July 2015 , train services on the North South MRT Line and East West MRT Line in Singapore were suspended in both directions following a major power trip . The disruption lasted for more than 3 hours , affecting 250 @,@ 000 commuters . This was considered the worst disruption to the MRT network since it first began operations in 1987 . Independent experts from Sweden and Japan were hired to conduct investigation into the cause of the disruption . The cause was identified as damage to a third rail insulator due to a water leak at Tanjong Pagar station . Consequently , a program was implemented to replace insulators liable to similar failure .

= = = Security = = =

Security concerns related to crime and terrorism were not high on the agenda of the system 's planners at its inception . However , after the Madrid train bombings in 2004 and the foiled plot to bomb the Yishun MRT Station in 2001 , the operators deployed private , unarmed guards to patrol station platforms and conduct checks on the belongings of commuters , especially those carrying bulky items .

Recorded announcements are frequently made to remind passengers to report suspicious activity and not to leave their belongings unattended . Digital closed @-@ circuit cameras (CCTVs) have been upgraded with recording @-@ capability at all stations and trains operated by SMRT Corporation . Trash bins and mail boxes have been removed from station platforms and concourse levels to station entrances , to eliminate the risk of bombs planted in them . Photography without permission was also banned in all MRT stations since the Madrid bombings , but it was not in the official statement in any public transport security reviews .

On 14 April 2005 the Singapore Police Force announced plans to step up rail security by establishing a specialised security unit for public transport , the unit today is known as the Public Transport Security Command or more commonly known as TRANSCOM . These armed officers began overt patrols on the MRT and LRT systems on 15 August 2005 , conducting random patrols in pairs in and around rail stations and within trains . They are trained and authorised to use their firearms at their discretion , including deadly force if deemed necessary . On 8 January 2006 , a major civil exercise involving over 2 @,@ 000 personnel from 22 government agencies , codenamed Exercise Northstar V , simulating bombing and chemical attacks at Dhoby Ghaut , Toa Payoh , Raffles Place and Marina Bay MRT stations was conducted . Thirteen stations were closed and about 3 @,@ 400 commuters were affected during the three @-@ hour exercise .

Security concerns were brought up by the public when two incidents of vandalism at train depots occurred within two years . In both incidents , graffiti on the affected trains were discovered after they entered revenue service . The first incident , on 17 May 2010 , involved a breach in the perimeter fence of Changi Depot and resulted in the imprisonment and caning of a Swiss citizen , and an Interpol arrest warrant for his accomplice . The train involved was a C151 train . SMRT Corporation received a S \$ 50 @,@ 000 fine by the Land Transport Authority for the first security breach . Measures were put in place by the Public Transport Security Committee to enhance depot security in light of the first incident , but works were yet to be completed by SMRT Corporation when the second incident , on 17 August 2011 , occurred at Bishan Depot .

On 22 November 2012 , the Land Transport Authority carried out a ground deployment exercise with SMRT to test their incident management plans in the event of a train service disruption . In total , about 135 personnel including representatives from the Singapore Police Force 's Transport Command (TransCom) and SBS Transit participated in the exercise . Train service continued as per normal and commuters were not affected by the exercise . Codenamed ' Exercise Greyhound ' , the exercise went through the scenario of a broken rail on the East West Line at Buona Vista . SMRT had also activated their Rail Incident Management Plan .

On 22 August 2013 , ? Exercise Greyhound 2013 ? was carried out by the Land Transport Authority with SBS Transit to validate the procedures of SBST ? s Operations Control Centre (OCC) and the workability of its contingency plans for bus bridging , free bus service and deployment of Goodwill Ambassadors (GAs) during a simulated prolonged train service disruption . About 300 personnel including representatives from LTA , SBST , SMRT , the Singapore Police Force ? s Transport Command (TransCom) , Traffic Police and Singapore Civil Defence Force (SCDF) participated in the exercise . Train service continued as per normal and commuters were not affected by the exercise .

= = = General = = =

= = = Academic publications = = =

= = = Corporate and governmental sources = = =