

Singapore Technical Convention

With the support and encouragement of the IRSE Council and the Australasian section, the membership in Singapore started the process of forming a local section at the end of 2004. In September 2005 the efforts came to fruition when approval was granted for a local Singaporean Section of the Institution.

In an ambitious attempt to promote the activities of the Institution and the new section it was decided to organise a joint Technical Convention with the Australasian Section. So, between the 24th and 26th October delegates congregated at the Holiday Inn Parkview Hotel in Singapore for the joint Australasian and Singaporean Section's Technical Convention entitled "Embracing the Technologies".

Singapore has a relatively short history of just less than 20 years of rapid transit operation, but in that time has built up a system that comprises of 65 Mass Rapid Transit stations and 43 Light Rapid Transit stations. Technology has played a pivotal role in the development of the signalling and telecommunication systems for the network in Singapore and therefore provided a perfect backdrop for the theme of the convention, 'Embracing the Technologies'.

A much larger than expected turnout of nearly 130 delegates were welcomed to Singapore by Philippe Hartheiser, Chairman of the Singaporean Section, who along with Trevor Moore, Chairman of the Australasian Section would co-chair the convention. Jacque Pore, IRSE president was unable to attend due to prior commitments but was more than adequately represented by John Francis, Senior Vice President and Wim Coenraad, Junior Vice President. John Francis gave the opening address to the convention, setting the scene for the papers and site visits to follow. He noted the forward-looking development vision for the rail transit systems in Singapore and the remarkable achievement of implementing the vision within a relatively short period of time. He went on to the question of technology and whether, as an industry, we are environmentally conscious and doing enough to try to reduce the amount of power utilised by the railways, including equipment running costs and optimising the power consumption by trains. John concluded by congratulating the local section on its successful creation and thanked the Australasian Section for playing an active role in supporting and encouraging the new section to start activities. Recognising a growing interest in the Institution, evident by the exceptional turnout, he highlighted some of the benefits that he hoped the local section would be able to bring to Singapore.



John Francis' opening address to the convention. Picture Lim CK

An informative collection of papers had been put together exploring the convention theme. The first morning got off to a good start with a paper by Trevor Moore on the Signalling Code of Practice, An Australian Perspective. Two interesting telecommunications papers followed, reaffirming to the audience that Telecommunications are an important element of the Institutions activities, firstly, “Public Carrier Communications Technologies and Strategies for Low Traffic Lines” by John Aitken and then “Tetra for Driverless Rapid Transit Systems” by Edwin Lee. Following a short break for refreshments, Howard Revell and Raphael Salson gave their paper on “Innovative System Application and Integration Engineering for Asia Pacific”. The morning was wrapped up by Yoshikazu Saito’s paper on the Technical Trend of Signalling System and Latest LRT Signalling System”, this presentation led nicely into the afternoon’s technical visit where this system is in operation.

Delegates gathered in the afternoon for a technical visit to SBS Transit, one of the two Operators of rapid transit systems in Singapore. After a short walk to Dhoby Ghaut MRT Station near to the convention venue, delegates were given a ride on the North-East Line (NEL), the first fully automatic heavy mass transit system in the world. Comments were made about the smooth ride given by the system and the overall cleanliness of the transit Systems. From the NEL, delegates were transferred to the Sengkang Punggol Light Rapid Transit (SPLRT) System, for a short trip to the co-located depots of the NEL and SPLRT. It was noted that the SPLRT depot is built on top of the covered NEL depot to reduce land usage, which is very important in a country that has an area of only 700 square kilometres.



Delegates on the North East Line. Picture Lim CK

Split into groups, delegates were expertly escorted around the NEL and SPLRT facilities by SBS Transit staff. In the control centre of the NEL, the Operational Control Centre and Depot Control Centre were seen and the different operating positions and roles explained. The operation of the NEL Depot is also fully automated, requiring similar protection systems to the main line. A brief explanation of the increased complexity of the systems when the driver is removed was given, leading to questions on degraded operations, where it was explained that the majority of trains were manned with roving staff, who could address faults in the systems or drive the trains should the need arise. Our visit to NEL was concluded with an inspection of the NEL Depot Equipment Room to see the moving block signalling equipment for the depot.

Moving on to the SPLRT, delegates boarded a specially provided LRT vehicle to get to the opposite end of the complex. Again SBS transit staff were on hand to guide delegates around the LRT system. The LRT control systems are less integrated than

those of the NEL and the different operator positions for train control, communications, power and other systems were explained by our host. The visit then moved onto the depot area, to see vehicles under maintenance. The vehicles have rubber tyres, which provide the advantage of reduced noise in a built up environment, but the disadvantage of increased maintenance costs. No IRSE Convention would be complete without inspecting a set of points, so delegates were shown a set of points in the depot and the interesting way in which vehicles are ‘pulled’ through the switch by a guide wheel taking the open rail rather than by the conventional way of guiding a train over the closed rail.



Delegates in the SPLRT maintenance workshop. Picture J.Danton

The SPLRT provides a feeder service from the Sengkang and Punggol new towns onto the Mass Rapid Transit System into central Singapore. The system was constructed concurrently with the new towns to ensure that transport infrastructure was in place before the area is fully populated. This advanced planning was visible on the trip back from the SPLRT, which was nicknamed the ‘Jungle ride’ by our hosts, given that it passes thorough areas of Sengkang New Town which have yet to be developed.

The evening was spent at Brewerks, which is an excellent restaurant and microbrewery overlooking the Singapore River. A very enjoyable and relaxed evening was enjoyed by all, giving the delegates ample time to reflect with colleagues on the day’s activities whilst soaking in the atmosphere and enjoying the excellent food, local beer and Australian Wine.

The papers on the second morning were focussed on interoperability and asset replacement, highlighting some of the current issues associated with addressing the transportation needs of modern cities. Starting with ‘Interoperability of ATC Systems Hong Kong MRTRC Experiences’ by L.Y.Lam, which detailed some of the challenges faced whilst trying to ensure interoperability between systems whilst upgrading existing lines. Resignalling and Interoperability’ by Dr. Gerald Yelloz focused on the growing trend of operating companies towards driverless interoperable systems and the challenges therein. The next two papers, ‘Strategies for Resignalling Metro Lines compared to Signalling New Lines’ by Mike Harris and ‘Challenges on Implementing CBTC on an Existing Railway’ presented by P.L.Chiu gave insights into how contractors and operators are working together to implement some of these complex systems. The final paper of the morning, ‘Getting the Right Balance in Delivering an Enhanced Automatic Train Supervision Capability for the SMRT Rail

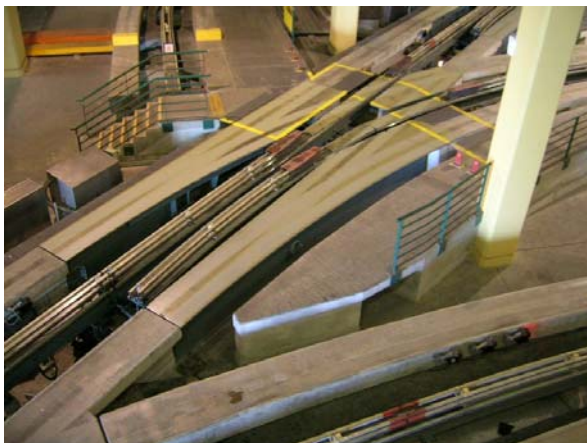
Network' by Choo Siew Aun and Mike Harris, gave the delegates a flavour of what to expect in the afternoons visit.

So, following another good lunch the delegates boarded SMRT buses and headed off to the West of Singapore to the Bukit Panjang Light Rapid Transit (BPLRT) System. This was the first fully automated driverless system to be constructed in Singapore and was the first system in Singapore to use a computer based interlocking. Its construction differs from the SPLRT in that it was constructed through an already thriving town, resulting in a much more complex guideway alignment undulating around the limited space between buildings. Again, a rubber tyre vehicle system was chosen to reduce noise pollution whilst maintaining ride quality. Delegates also witnessed the ability of the car windows to turn opaque when the vehicle moved close to residential buildings in order to maintain residents privacy. This feature was achieved using LCD technology embedded in the glass, turned on and off depending on the vehicle position.

A short trip on the BPLRT took delegates into the station located within the depot. To maximise the limited space available in Singapore, the depot was built on top of a shopping centre, so for a depot station it is surprisingly well used. SMRT staff expertly shepherded the delegates around the depot facilities and control centre. The BPLRT system employs an "I-Beam" located in the centre of the guideway to guide the vehicles around the system and delegates were able to witness one of the depot switches being exercised, illustrating how vehicles make the transition from one track to another.



BPLRT Control Centre. Picture J.Danton



BPLRT "I Beam" Switch. Picture Lor KY

From BPLRT delegates boarded buses to travel back into the centre of Singapore to visit the North-South / East West (NS/EW) line Operational Control Centre (OCC), arriving just as a tropical rainstorm engulfed Singapore. Our quick thinking SMRT guides quickly rearranged the stopping location for the busses and formed a chain of umbrellas against the torrential rain to allow delegates to stay dry.

Following a short presentation about SMRT's operations and general activities, some light refreshments were taken before delegates again split off into groups to visit the Control Centre. The NS/EW line was the first line to be constructed in Singapore and opened in 1987. The OCC is dominated by two large mimic panels, one for the signalling system and one for the power and tunnel ventilation systems, providing the operators with a more traditional overview of the system. Whilst up in the viewing gallery, a standby system for the Automatic Train Supervision System (ATS) consisting of a 4x4 matrix of back projection screens provides a more compact display of the information shown down below on the signalling mimic panel. Our host explained that although this was used to facilitate the ATS upgrading work it is now available as part of a stand-by OCC and for use by the controller during incident management.

The Gala Dinner was held on the second evening at the Sentosa Resort, which is located on the resort island of Sentosa, just to the south of Singapore. Set back in secluded grounds it provided a very exclusive and enjoyable retreat from the hustle and bustle of modern Singapore. Delegates, partners and guests were able to relax on the terraces overlooking the sea before enjoying an excellent meal in the main ballroom. Tom Khella, the master of ceremonies for the evening welcomed our guest of honour, Brigadier-General Yam Ah Mee, the Chief Executive of the Singapore Land Transport Authority and the sponsors, delegates and partners before calling upon Wim Coenraad, Junior Vice President to give a short speech to the assembled audience. Wim then presented tokens of appreciation to the Sponsors of the convention, without whose support the convention would not have been possible. Finally, Mrs Marguerite Bell proposed a vote of thanks and presented a small token of appreciation to the hosts of the partner program.



Wim Coenraad addressing the Gala Dinner guests. Picture Lim CK

The final morning started promptly with a paper from Rajendra Jadhav, 'Bombardier CBTC Solutions'. The next paper detailed the systems currently being installed on the latest line under construction in Singapore, 'Circle Line, The longest Automatic Metro Line in the World' by Xavier Champaud. The last paper was presented by Mark Appleyard, 'Driverless Systems, The challenge for the Operator and the Maintainer' which gave the operators perspective of fully automated driverless systems, and led nicely into the Debate on 'Driver or Driverless? How Far Should We Automate'.

John Francis chaired the debate, introducing the panel of debaters, consisting of Simon Lane and Paul Khalifat presenting the operators perspective and Philippe Prevot and Dr Gerard Yelloz presenting the system suppliers viewpoint. Initially, each panellist gave their point of view and discussed the perceived benefits of removing the driver to relieve staff constraints or to free up staff for other duties such as security, all weighted against the overall ability to react to degraded situations. Following this discussion, the floor was opened to questions and provoked some lively exchanges. One important point made was that removing the driver removes driver error, which was forcefully countered by the fact that this can be achieved with semi-automatic systems employing high levels of technical defences, without removing the driver. Other points raised were the ability of a driverless system to continue to function even when a driver is not available and the savings gained by the reduction of wear and tear to the railway if an automatic system were used, although this can also be addressed by the introduction of a driver initiated Automatic Train Operation system. What turned out to be a very stimulating session, concluded with a discussion on automation and interoperability, issues that affect both driver and driverless systems. The debate could have continued for a considerably longer time, but unfortunately the convention was drawing to a close.



John Francis leads the panel in the debate. Picture Lim CK



K.W. Pang adds to the debate. Picture Lim CK

The first closing speech for the convention was given by Ong Boon Leong, the Executive Director of SBS Transit, who gave the operators view of the use of technologies and challenged us all to try to curb our enthusiasm for embracing technology, but to combine the use of historical and new technologies appropriately to build a better transportation system. Finally Brigadier-General Yam Ah Mee, the Chief Executive of the Land Transport Authority, gave an insight into how technologies have been successfully employed in Singapore and the place that technology and indeed, the IRSE have to play in the future of Singapore rail systems. Finally it fell to the co-chairmen of the convention to conclude the proceedings, with short speeches, a vote of thanks and an invitation to the closing lunch.



The Co-chairmen, Trevor Moore and Philippe Hartheiser. Picture Lim CK

This convention proved to be an excellent starting point for the Singaporean Section, giving an opportunity to introduce the IRSE and the new section to individuals and organisations in Singapore and the region. A very enjoyable and enlightening few days were had by all and everyone attending left with a positive image of both Singapore and the IRSE. The organising committee would like to express it's gratitude for the help and overwhelming support that Australasian Section gave in the organisation of this event, to the sponsors for their generosity and finally to the Operators for their hospitality and efficiency in the organisation of the visits.

Finally the Singaporean Section committee would like to invite any IRSE Members who are passing through Singapore to make contact with the Section, as papers and views of members from outside of Singapore will always be warmly welcomed.

Julian Danton and Ian Tomlins