



SINGAPOREAN
SECTION

Institution of Railway Signal Engineers (Singaporean Section)

NEWSLETTER

ISSUE 1 - APRIL 2006

EDITORIAL

Welcome to this first newsletter for the Singaporean Section of the IRSE. 2005 was a busy year for the committee, firstly putting together the paperwork and constitution necessary to gain acceptance from the IRSE Council and the Registry of Societies, to become a society in Singapore on the 20th September 2005. In October a Technical Convention was held in Singapore (see storey on the right hand side of this page) and was very well received. Since then the committee has been meeting to discuss membership, technical presentations, IRSE examinations, all in an effort to provide a range of services to benefit the section members.

However the section can only survive with your input and so the committee is asking for your help in the following areas. Papers are required for technical presentations and the committee is happy to help with the development of any papers. Younger Members are especially encouraged to present papers and copies of signalling books will be given to any who do so. Articles are needed for this newsletter, on projects or technical issues, they don't have to be very long, photos accompanying the article are appreciated as they help to make the newsletter more attractive. Thanks to **Martin White** for being the first to contribute – hopefully this will trigger some more ideas for the next edition.

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SINGAPORE TECHNICAL CONVENTION

In October 2006 a joint technical convention with the Australasian section was held at the Holiday Inn Parkview Hotel, to promote the activities of the IRSE in Singapore. The number of delegates exceeded the organising committee's expectations with nearly 130 attendees.

The convention theme was 'Embracing the Technologies' and consisted of 13 technical papers covering driverless operation, interoperability, re-signalling and standardisation within the Asia – Pacific region. This was followed by a lively debate on the last day entitled 'Driver or Driverless, how far should we automate?' led by representatives from Operating and Supplier organisations. There were also two afternoons of visits, the first to the SBST's North East Line and Sengkang Punggol Light Rapid Transit. The second afternoon was to SMRT's Bukit Panjang Light Rapid Transit system and the North-South/East-West line Operational Control Centre.

A partner program was provided and social events were organised on three evenings of the convention, giving delegates an opportunity to meet and discuss rail issues with delegates from around the region.



A full report on the Convention can be found in the IRSE News December 2005 / January 2006 Issue 110.

IRSE Singaporean Section Committee

Ian Tomlins (Chairman)
Russell Sheild (Vice-Char)
David Quastell (Treasurer)
Julian Danton (Secretary)
Mark Appleyard

Norm Grady
Tom Khella
Toh Kim Toon
Martin White

TYER & CO NO 7 TOKEN INSTRUMENT



By Martin White, Land Transport Authority

This instrument is an example of a single line electric token instrument (photo by Martin White).

It was made in UK by Tyer & Company in approximately 1930. This particular instrument was in use in Junan in Malaysia. It was taken out of service in early 1990s. (i.e. it had been in service for approximately 60 years).

Electric Token instruments were developed in the 19th century in the UK as a means of safely signalling trains on bi-directional single line railways.

It should be remembered that when the Token Instruments were developed, track circuits to detect presence/absence of trains hadn't been invented. Safe signalling of trains was purely dependent on human vigilance, with no protection against simple mistakes or forgetfulness.

Token instruments enable trains to be signalled safely on a single line railway, without the use of track circuits between adjacent stations.

Single line railways in which the traffic can pass on the same line in both directions are particularly hazardous in the event that a mistake is made. In the worst instance and head on collision between trains travelling in opposite directions can occur.

After several such accidents in the UK, electric token instruments were developed.

The main principle of signalling trains by token instruments is simple. For a particular single line section, a token instrument is provided at each end of the section. For a train to enter the section, it must be in possession of a "Token" issued by the signalman (operator) from the token instrument located at the station where the train is to enter the single line.

The token instruments are also equipped with bells and plungers, to enable adjacent signalmen (operators) to communicate with each other when signalling trains between each other. In addition, a three position needle shows the state of the particular single line section. These bells/plungers/needles were based on block instruments used for signalling trains on uni-directional lines.

The two token instruments at each end of the single line are electrically interconnected by direct wire. (Initially this was in the form of a telegraph wire, supported from wooden poles along side the railway).

The two token instruments are electrically interlocked. I.e. once a token has been withdrawn from one token instrument, another token can't be withdrawn from either instrument, until the token was replaced in the token instrument at the other end of the single line section.

Each token was engraved with the name of the single line section to which it applied. The driver of a train was only authorised to enter a single line section, if he was in possession of a token for that section. One important safeguard was that the driver of a train was required to check that he had been given a token for the correct section. (In the UK there were in the 19th century a number of accidents in which a driver was given a token for the wrong single line section and this mistake by the signalman (operator) was then compounded, because the driver didn't check he had the correct token.

Loopholes such as the above were eventually eliminated eg by interlinking the token instruments with the signals controlling entry to a particular single line section. By this means, the signal controlling entry to a single line section could only be cleared to proceed, if the relevant token had been removed from the token instrument. Originally this interlinking between token instrument and signals was purely mechanical. A later development was the introduction of electric locks on signals controlling entry to the single line section. These locks could only be released (unlocked) when a token had been released from the relevant token instrument.

An additional safeguard introduced on later token instruments was that the tokens for each single line section were made unique. In this way, a token could only be inserted into the correct token instrument.

Electric token instruments are still used on many single line railways in the world. KTMB (The Malaysian Railway) uses electric token instruments on the Singapore section of its Singapore to Kuala Lumpur Railway.

Good examples of Tyers Token Instruments can be seen at Bukit Timah on KTMB.

However, with the more wide spread introduction of track circuits in recent years, token instruments have been replaced by systems such as "Tokenless block" single line working. In this system the single line between adjacent stations remains non-track-circuited, but a "virtual" token is created when a train enters a single line section. This can only be "retrieved" to allow another train to enter the single line section, when the train operates track circuits located at the exit station in the correct sequence.

Tokenless block working was developed in UK in late 1960s as a cheaper alternative to use of traditional token instruments on lightly used single lines.

The advent of Solid State Interlockings (SSI) in 1980s enabled the next stage of Token Working to be developed. In the UK Radio Electronic Tokenless Block (RETB) was developed for lightly used single lines eg in Wales and Scotland. With this system, an "Electronic Token" is issued by radio to a particular train.

The SSI performs the equivalent function as the traditional token instrument.

This particular token instrument can be found in the Hampshire office of the Land Transport Authority.

IRSE EXAMINATIONS

Are you interested in taking the IRSE exam, either to gain corporate membership of the IRSE or to further your knowledge of Signals and Telecommunications? If so **Ian Tomlins** (ian.tomlins@lrrail.com) has started a study group to get candidates together so that they can share their knowledge and develop the skills necessary to pass the examinations.

The examinations are held yearly and for the last two years, **Martin White** has invigilated the exams, here in Singapore.

If you would like further information on the exams or the study groups, please contact the editor at the e-mail address on the first page or Ian Tomlins at the address above.

Potential Members

If you are interested in joining the IRSE or are already a member and would like to join the local section (for which there is no extra charge). Please contact **Julian Danton** at the e-mail address on the front of this newsletter for more information and help with filling in application forms.

Newsletter

Please let the editor know if there is anything you want to see in future editions of this newsletter. As previously mentioned, contributions are always welcome and plenty are required to fill the three editions a year that are planned for this newsletter.

