SYDNEY NEWSLETTER

Railway Technical Society of Australasia
Sydney Chapter
Mail: PO Box 6238, Kingston, ACT, 2604

JUNE 2007

NEXT RTSA SYDNEY CHAPTER MEETING

Tuesday 3rd JULY

12.00 for the first presentation to be held at our new venue –

LARGE MEETING ROOM - CENTRAL STATION CONCOURSE,

which is off the North West corner, opposite platform 1, and next to the left luggage place.

Peter Hong Ning, of EDI, and Dr David Brown, consultant to Battery Energy, will give a presentation on

SUPER GEL BATTERY TECHNOLOGY

EDI has been heavily involved in looking at battery technology especially for rolling stock and signalling applications. Last year we started representing an Australian manufacturer Battery Energy targeting the rail industry. The "Super Gel" technology used by Battery Energy was developed in Australia in a joint project between CSIRO and Telstra. It is a really good home grown story. The presentation, which will have a wide appeal those in the rolling stock and signalling disciplines, will deal with -

1. History of Lead acid battery technology
2. Overview of different designs and the respective strength and weaknesses
3. Factors affecting battery life and performance
4. Overview of "RailGel" technology

Dr David Brown from Battery Energy who is a highly qualified battery boffin will be able to answer all those technical questions about batteries that you always wanted to ask but were too afraid to!!

SPECIAL REQUEST TO EXISTING COMMITTEE MEMBERS: Could Committee members please make themselves available at the new venue at 11.30 on the meeting date.

Complimentary nibbles and networking will be available from 12.00, prior to the presentation. The meeting will finish by 13.30

Why not come along to an RTSA meeting (where you will be most welcome) and broaden your horizons in the industry that employs you and/or that you are keen to support. Even better consider joining RTSA (you do not have to be an engineer to be a member) and enjoy the full range of services provided by the association. Contact is at the mail address (above) *or* at www.rtsa.com.au *or* by ringing Bill Laidlaw on 0409 602 833.

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FUTURE MEETINGS

In addition to the presentation outlined on page 1 of this Newsletter the meeting next Tuesday is our **AGM Meeting**. Members have been sent a nomination form, but be aware that nominations for the Committee close this coming Friday (29/6).

The following meetings are planned for the remainder of 2007. We always despatch a newsletter, or in extreme situations a flyer, prior to every meeting. In most cases the next couple of months are firm while those further out are provisional.
Anyone with inspiration or bright ideas for future meetings should contact Bill Laidlaw at billlaid@bigpond.net.au

Tue 7th AUGUST at Central: Bombardier will give a presentation on low floor trams

Thur 23rd AUGUST at city location: joint RTSA / PWI / IRSE meeting, with a speaker arranged by PWI.

Wed 5th SEPTEMBER at Central: tba

Wed 3rd OCTOBER at Central: tba

Wed 7th NOVEMBER at Central: provisionally Downer EDI on the subject of 25kVA electrification as practiced in Queensland and Western Australia.

There will be no meeting in December – the AusRAIL 2007 conference will be held in Sydney in the first week of December, an event which will attract the attention of most of our more active members.

MEETING VENUE – HOW TO GET THERE

The new time and place for our meetings is designed to make these more accessible to members and friends – for the remainder of this year we have the Large Meeting Room at Sydney Central (Sydney Steam Station to our older members!) which can be found in the North West corner of the main concourse. We hope to have an RTSA Banner or other indicator there to help your navigation.

With this new venue will come a change of 'normal' date to the first Wednesday of the month, although the first two such meetings (July and August) will in fact be on the first Tuesday due to prior booking of the meeting room on our desired date.

COMING EVENTS

AusRAIL Plus 2007 will be back at the usual Darling Harbour location in Sydney from Tuesday 4th to Thursday 6th December 2007.

CORE 2008 will be held in Perth between 7th and 10th September 2008. Themes will be around high volume bulk freight and the integration of rail as part of the export supply chain, and rail in an urban environment and the issues of integrated planning of land use and transport as the core of successful public transport. Register your interest by going to www.CORE2008.org

LAST MEETING

The speakers were Mr Richard Bull & Mr Melvyn Bolus, of **Air International Transit** on the topic of **Air Conditioning of High Speed Trains**

Air International Transit is a wholly-owned subsidiary of Futuris. The company claims that they can air-condition anything that moves. (ie, no involvement on air-con installations in buildings). The company does install air-con equipment on mining vehicles such as drill rigs, face-shovels, trucks, etc, and also mobile defence equipment. These applications have similar vibration and other issues to those in railway applications, and not faced by static air-con units.

The company's involvement in the rail industry commenced when it was found that imported air-con units on early diesel locomotives in the Pilbara weren't rugged enough for the conditions (where temperatures are often in the mid 40s.

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The performance specifications for air-con units are often very precise, and the performance is occasionally tested using large number of people boarding and alighting from trains simulating peak-hour conditions.

The Transit Division of the company is based in Huntingwood (Western Sydney). They have climate testing rooms there. In Melbourne there are also climate test rooms and a wind tunnel. Mock-ups of carriages (40% size) are inserted in the wind tunnels to obtain information about air-flow and the best locations for air intakes and outlets.

Models are made from poly-styrene foam with a polyurethane skin. The results from mock-ups are more accurate than those obtained from Computational Fluid Dynamics.

Duct design and balancing of flow are important design activities. Durability testing and Electro-Magnetic interference testing are also undertaken by the company. ADI/Vipac are used for shock and vibration testing (utilising test rigs). Noise emission testing is also undertaken.

All mechanical designs are prepared using 3D CAD modelling. The digital model is also used for Finite Element Analysis and Computational Fluid Dynamics. FEA is used to determine highly stressed areas and to determine deflections.

High Speed rail has the usual challenges of rolling-stock air-conditioning equipment but is even more demanding. Problems become more severe at speeds above approx 170 km/h. This includes the Queensland Rail Tilt Trains. (The pressure pulse when entering / leaving tunnels can be severe, and cause discomfort to passengers.)

A major current contract is the rolling stock that will be used on the Folkestone – St Pancras link. This is the most significant rail project in the UK for decades, and the high-speed line has lots of tunnels. With expected speeds of 225 km/h, a cabin pressure pulse of 4000 Pa for four seconds is anticipated, unless remedial measures are put in place, such as isolation solenoid valves on the inlet and outlet sides.

Minimum fresh air quantities are specified to maintain driver/passenger comfort. Suitable air-conditioning is also important for the driver's alertness. Too much fresh air can cause draughts and waste energy, however.

Intake air scoops will give a variable air flow with speed. The vents have to be properly positioned at areas of suitable pressure, and pressure-distribution diagrams are one of the things investigated in the mock-ups. The scoops also have to be within the structure gauge.

To cope with varying speeds, the pressure measured and control devices operate variable speed fans. Constant Flow Fans are used in Japanese installations. (These give constant flow characteristics regardless of the back pressure.)

Pressure Pulse Solutions

- Passive Pressure Protection
- Active Pressure Protection
- Combined Pressure Protection

Railway Air Con Units can be a either a single rooftop module, or a split unit with some items under-floor. It is more difficult to service the split unit, as the refrigerant needs to be captured and replaced with an inert gas if the two halves are separated, and then recharged with gas again.

Rooftop units can be very compact. For the recent case at the KCRC railway in Hong Kong, the 5kW Drivers Cab Unit is only 400mm tall and occupies a space of just 0.4 cu. M.

There are established international engineering standards for all aspects of Air Conditioner design.

A surprisingly small amount of loss of cool air results from opening of the train's doors.

Question from the floor – why isn't reverse-cycle air conditioning used for railway cabin heating ?

Answer – problems in icing-up of the external evaporator. May be used in future, with some development. Usually electrical heating elements are used instead for heating of the intake air. In terms of the traction energy requirement, this is a small heat loading.

Question – why aren't Negative Ion Generators used ?

Answer – no real demand at present, but might be developed in the future.

Many thanks to Malcolm Cluett who took notes of this meeting.

THE OBSERVATION POST

The Editor has been enjoying life in other parts of the planet which, inter alia, involved 30,000 km of air travel and 6100 km of rail travel. There were many interesting and even exciting rail things to report on (a few of which are noted in the June Rail Horizons) but there is one little line of no more than 53 km that deserves special mention.

The railway is a Ferrovia Electrica Internazionale (an International Electric Railway) which seems to be known as the SSIF – Societa Subalpina di Imprese Ferroviare – but whose trains are proudly emblazoned in large chrome letters with the initials FART – Ferrovie Autonimee Regionale Ticino (?). The trains are narrow gauge, electric tram like vehicles that cross from Domodossola, in Italy not far south of the Simplon tunnel, to Locarno (not to be confused with the nearby Lugarno) in Switzerland at the head of Lake Maggiore (for the geographically embarrassed all this lies between Milan in north central Italy and the Swiss border).

A regular summer time tourist circuit is to take the lake boat from Italy (Stresa or Arona) the length of Lake Maggiore to Locarno in Switzerland, returning by FART to Domodossola and then Trenitalia on the international main line back to the starting point. We were there at a time when this round trip was only possible on four days of the week and we were there for the other three – so we went from Stresa to Locarno and back by rail.

The day was one that could charitably be described as wet – in fact the rain persisted down all day and since the journey was through the southern outliers of the European Alps there were spectacular waterfalls in some of the most unlikely places to enhance our day. The train from Stresa to Domodossola was a six car double deck commuter set from Milan being pushed by a high powered electric loco, as is the habit in Italy.

The Driver and his charge at Domodossola

At Domodossola the SSIF can be found in a tunnel underneath the main line and at right angles to it. Two coupled cars arrived as we did to form the 11.40 limited express. The cars are quite tram like – an articulated pair but with one section having two bogies and the other with a single bogie being articulated off the back end of it. Each set has high class seating in two classes, while the limited expresses also have a refreshment trolley for the Italian part of the journey. The whole thing is powered by properly constructed catenary overhead. Other older vehicles were articulated three section 'Panoramico' vehicles which hauled rather old fashioned trailer cars, and sturdy little passenger car 'locomotives' which seem to now be dedicated to works trains and snow clearing. The cars have a toy tin whistle as a warning device, which is probably why all the level crossings

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(mostly in the high elevation part of the line) have active protection.

Right on the advertised we set off, past the main depot and workshop, and across the river flats to Masera where we met an opposing single car train. The line is single throughout, with powered (automatic??) crossing loops at frequent intervals. From that point for the next 13 km to Druogno the line twisted and curved across the face of the mountainside, making several very sharp (less than 100 m radius) horseshoe turns, until it started contouring upward through forests, across grand stone arch bridges over raging torrents and occasionally through tiny settlements. Later information indicated that the line ascends 600 meters in those 13 km, at an average of 1 in 22. I assume that these trains have track brakes (tram style) as an added insurance on such grades.

From Druogno through the high point at Santa Maria Maggiore (830 m elevation) to Re the line runs through quite delightful (although very wet) alpine meadows in a gap between soaring peaks. However from Re the line enters serious gorge country (and shortly afterwards Switzerland) where it hangs way above a quite large and very energetic river. The Swiss describe this area as Centovalli – the Hundred Valleys – but we would probably describe it as the Hundred Gorges. Tunnels and bridges (like real bridges, not just overgrown culverts) abound cutting through outlying rocks and ridges and leaping over gushing side streams. Pretty little villages here are larger than earlier but less frequent, no doubt due to the absence of any sensible place to locate them. In places rock shelters cover the line and in one case a waterfall was likewise diverted over the top. Despite being warned to take our passports (Switzerland is not part of the European Union) no one at the border or in Locarno showed any more interest in such matters than we would find between Albury and Wodonga.

The descent to Locarno averages around 1 in 50, which is probably more a matter of the terrain rather than any requirement for easier grades. Despite this there were sections where things looked seriously steep, particularly where we were trying to catch up with the ever descending river. At Intragna there is a grand steel arch bridge which leaps over a river maybe 80 – 100 metres below in the gap between two tunnels.

Maybe 80 – 100 metres ….

The last few kilometres into Locarno (which is 70 metres lower elevation than Domodossola) is through semi urban slopes until the line dives into a tunnel well over one kilometre long which eventually arrives at a sizable underground station beneath the Swiss Railways surface station a block or two from the Lake.

The Swiss, being a tri-lingual nation, have a railway that is variously known as the SBB (German), CFF (French) and FFS (Italian) but since we were in an Italian speaking part of the country I guess it was the FFS that was on the surface!!! (In fact Swiss carriages carry all three sets of initials). Locarno in the rain was not the most inspiring place and yet again the Swiss proved that they are no chefs.

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Locarno SSIF station is a quite elaborate underground affair

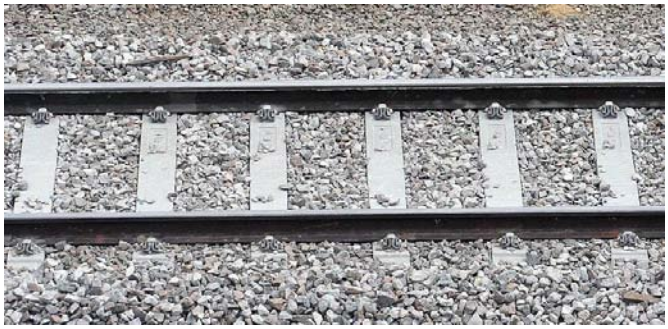
We returned on the 16.12 limited express (a very full single set this time) in which one of the seats was occupied by a little fluffy white dog which had dutifully paid a child's fare for such privilege. We gathered that the dog and its owners were actually heading for Lyon in central France; from Switzerland via Italy and Switzerland (again) to France in an afternoon, starting on a train that averages 30 km/h, such is the nature of trains and people in Europe.

Return through the high country was accompanied by rising cloud that revealed that snow had fallen almost as low as the railway, adding quite a bit of interest to the journey. On this occasion we were flagged down by the refreshment trolley from the wayside (not a station), apparently so it could change over between trains that were slightly out of course. When you think about it, being flagged down by a refreshment trolley would be a much better excuse for late running than some of the stuff we are used to here.

If Europe is on your agenda, and particularly Switzerland or northern Italy, then the SSIF / FART should be on your radar. It is truly one of the scenic railways on this planet.

BEFORE AND AFTER

We offer, without comment, the following two pictures of sections of the Main Southern line. The first is 'as is' existing hybrid timber and steel sleepered track, while the second is of newly concrete sleepered track (not at the same location).



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Andrew Honan	Committee	John Watsford	Committee

CONTRIBUTIONS TO THE SYDNEY NEWSLETTER

Part of the function of RTSA is to keep members in touch with what is going on in the industry and with each other and to that end we are only too happy to publish items of interest. Articles or editorial comment for Newsletter are very welcome. We have several hundred members locally some of whom have stories, events or developments of interest that could make an interesting item for Sydney Newsletter.

Contact details are –
The Editor, Max Michell, e-mail to samrom@bigpond.com, phone 02 9331 5662 or post to P.O.Box 279, Potts Point, NSW, 1335. (but just hold back between early May and mid June while I absent myself from my appointed place of duty)

For all other matters relating to RTSA Sydney Chapter contact Malcolm Cluett (Secretary) or Bill Laidlaw (Chairman) as above.

CPD CREDITS

Engineers Aust members who attend RTSA meetings and events will qualify for CPD credits as per the Engineers Australia criteria. Members are responsible for recording their own CPD for audit.

NOTICE TO MEMBERS RECEIVING RTSA NEWSLETTER BY EMAIL

If you should receive this Newsletter by post but would prefer to get it by e-mail (quicker and more reliable) then please let the Canberra know (address in the page header). E-mail saves time for you and costs for RTSA, which in the end can only mean better service to our members

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