

SYDNEY NEWSLETTER



Railway Technical Society of Australasia
Sydney Chapter
PO Box 138, (118 Alfred St)
Milsons Point, NSW 1565

JANUARY 2006

NEXT MEETING

Thursday 2nd February

**17.30 for refreshments prior to Presentation at
18.00**

**HARRICKS AUDITORIUM,
ENGINEERS AUST,
118 ALFRED ST, MILSONS POINT
(200 m north from station)**

ARIC – EXPORTING EXCELLENCE

Ian Robb, Executive Director of the Australian Railway industry corporation (ARIC) will talk about the role of that organisation in working with world wide offices of Austrade in sourcing export markets for Australian rail manufacturers. ARIC is a familiar name to most people in the rail industry but how many know much about the real detail that lies behind it. Come along on 2nd February and find out all about exportable excellence

COMING ON 2nd MARCH

Introduction to TETRA radio systems

Presented by Phil Harley, Senior Product Manager,
Rail Communications, Alcatel Australia

TETRA Digital Radio Systems are one of the newest and most common technologies now being deployed in metropolitan rail networks. The presentation will focus on

- Background.
- Key Features of TETRA systems.
- Special features available for TETRA in Rail systems.
- Examples of where and how TETRA is being used in the operation of modern rail networks.

LAST MEETING

NEW GENERATION IRON ORE WAGONS

Tim Kajons, Manager Structural Engineering at EDI Rail, gave a presentation on the new iron ore hoppers for the narrow gauge railway that supplies the OneSteel steel works at Whyalla (South Australia).

Whyalla is a remote arid area town around 70 km south west of Port Augusta near the head of Spencer Gulf. Its claim to fame is that it has one of the two Australian steel works, located there to be adjacent to iron ore deposits that have been worked for over one hundred years. Colourful names such as Iron Knob, Iron Duke, Iron Monarch and Iron Baron are about to be joined by Iron Duchess and Iron Knight as past or present ore sources. These mines are linked to Whyalla by a relatively heavy duty narrow gauge (3ft 6in) railway, worked by a mixed collection of diesel locomotives from former Westrail, Commonwealth Railways Victorian Railways and BHP ownership. The railway has been operated by ARG for some years now, having been worked by BHP for all the early part of its life.

The existing RSK wagons, approximately 100 in number, tare at 17 tonnes and carry 58 tonnes of ore. These wagons are limited to 50 km/h loaded, and have significant 'hang up' problems at unloading as a result of the relatively clayey ore. With expansion of production ARG require new wagons. At the same time it is proposed that the track be brought up to 80 km/h standard and the older RSK wagons be improved to run at the higher speed as well.

EDI has a local presence at Port Augusta in the former Commonwealth Railway workshops there. This facility is a competent heavy manufacturing facility, having manufactured locomotives and rolling stock in recent years as well as undertaking heavy maintenance and rebuild work

EDI has been given a design, build, maintain contract for 56 new AHOF wagons for this railway. These wagons are of a new bow sided design, with a tare of 20 tonnes and capacity for 72 tonnes of

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ore (i.e. they are designed for 23 tonne axle load at 80 km/h on narrow gauge!). A total of 56 wagons will be in permanently coupled pairs (21.09 metres per pair).

The key requirement for these wagons was resolution of the ore hang up problems so that their higher productivity could be fully utilised. This has been achieved by careful attention to a steep sided clean interior design. The design requirement was for a 20 second door open-dump-door closed cycle. A dump time of 5 seconds (for 72 tonnes) has been successfully achieved with prototype testing at Whyalla as compared to 80 seconds with the RSK wagons.



Computer Generated Image of New Wagons (EDI Rail)

Other issues that had to be incorporated were to keep the centre of gravity low, and to have large dump doors to allow rapid unloading, but with seals to retain dry fines that are part of the ore specification.

Trains are loaded by 10 cubic metre front end loaders (three buckets per wagon) so attention had to be given to robust top sills. Hand brakes are located at the inner ends of wagon pairs, providing a predictable location regardless of the orientation of wagons.

A prototype wagon has been produced and has enabled the design to be proved, particularly in relation to the dumping speed. The first production wagon is anticipated in December 2005 and will be used for ride tests and similar dynamic testing.

The remainder of the new fleet will be delivered during the first half of 2006.

It is understood that the new wagons will be operated in a single train (of approximately 5000 tonnes gross) with product from the new Iron Duchess and Iron Knight deposits, while the older wagons will continue to cater for the Iron Monarch and Iron Duke ore.

Although this particular order is not large it was interesting to hear how EDI had approached the issues associated with this particular operation and the way in which they resolved them. Tim was thanked at the end of the presentation with acclamation from the 20 or so attendees.

FUTURE MEETINGS AND EVENTS

RTSA Sydney Chapter meetings are normally held on the first Thursday of each month except December and January, generally at the Harricks Auditorium (lofE at Milsons Point) but from time to time at alternative locations. Some meetings may be joint events with kindred organisations, such as PWI or IRSE, in which case the venue (and date) will depend on the hosting organisation.

Some time in the latter part of 2006 the lofE will be moving to new premises in Chatswood (adjacent to the station) and our meeting location will move with it. The facilities will be more amenable to a variety of presentations and activities than at the current location. Plenty of prior advice will be given when the date for change of venue is set.

It is proposed to have a family day at the **Illawarra Light Railway Museum** at Albion Park on **Sunday 19th March**. This is a special family day event for the ILRMS with four steam locos plus a wide range of other railway equipment running. Come and see NSW's most comprehensive collection of narrow gauge industrial railway equipment in action. The day will include rides, demonstration trains and unique photo opportunities. An area of the picnic area will be reserved for RTSA visitors. Kiosk and souvenir shop available. Timber BBQs available subject to any fire bans.

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Entry Fees will be as follows, payable on arrival :-

Adult \$20

Pensioner & Conc \$15

Child \$10 (to 16)

Family \$40

By public transport, take the train to Albion Park and then a 15 minute walk down Station Road and into Tongarra Road. Trains run every hour from Sydney (the track shutdown that weekend is on the Western line☺) so rail access is reasonably easy if you don't want to drive.

A number of other visits and inspections are being considered for later in the year.

Regular meetings during 2006 are planned for the first Thursday of February, March, May, June, July, September, October and November while joint meetings with kindred organisations are planned for dates in April, July and August.

Key rail conferences during 2006 are CORE in Melbourne from 30th April to 2nd May, and AusRAIL in Brisbane between 21st and 22nd and November (note altered date for AusRAIL)

Annual General Meeting.

The Chapter AGM would traditionally have been in February, but this date has a number of disadvantages. It is too early in the year for most people, and more importantly it is out of synch with our parent body IofE. Accordingly from this year it is proposed that the AGM be pushed back to around July in conjunction with a normal members meeting. We will provide all the details and required prior advice closer to the date

EPPING – CHATSWOOD TUNNEL.

An Engineers Australia inspection of the Epping end of the Epping – Chatswood rail tunnel project was held on Tuesday 25th October. A very limited number of RTSA members were invited.

This project will be entirely underground from the entry ramps north of Chatswood to the exit ramps just north of the high level Epping station. The underground distance is approximately 13 km, and since each track is in a separate bore there are now 26 km of tunnels between the two places. This will make these the longest public rail tunnels in Australia, exceeding the Sydney Airport railway by a significant margin.



Please remain behind the yellow line until the Engineers have come to a complete stand

There will be three underground stations plus a low level Epping station beneath the existing ground level station. Work is progressing on the latter station, although it is at a relatively early stage of construction right now.

The running tunnels are complete and track slabs are being constructed. Crossover tunnels are being formed, as are the cross connection walkways between tunnels.

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Floating slab successfully passes the Engineer Loading Test

Track will be fixed directly to continuous 450 mm high concrete slabs supported on the invert at the bottom of the circular tunnel. Most will be fixed slab, but in some places where transmitted vibration could be a problem there is a floating slab structure. This latter involves 20 metre sections of slab being cast 'on the ground' then raised onto hard rubber pads, with 'positioning posts' (suitably isolated with pads) along the centre line to hold the horizontal alignment.



Walking wrong-road up the Epping Up Ramp

Cant and curvature are formed in the slabs so that no post construction track alignment should be required (other than possibly some rail grinding).

Stub tunnels have been provided at Epping for the future Parramatta connection. Rails have been brought into the tunnels at the Epping end and flash-butt welded into long lengths ready for use. The new tracks will ramp down between the up and down existing tracks at Chatswood, but will surface either side of the existing tracks at Epping. Preservation of the existing centre 'terminating' track at the latter may have influenced this choice.

Even the small amount inspected at the Epping end (approximately 1 km underground from the ramp) was most impressive



The inside of a tabby cat? No, the completed tunnel looking toward Chatswood.

MENANGLE BRIDGE

This news and briefing item was received a week or so after the last Newsletter had been despatched. However, given the debacle over the month long bridge closure 30 months ago, it is felt that the item is worth reproducing exactly as it was received

ARTC LIFTS MENANGLE BRIDGE SPEED RESTRICTION

Australian Rail Track Corporation Ltd CEO David Marchant, announced today that ARTC will lift the current speed restriction on the Menangle Rail Bridge following ARTC's finalisation of a safety

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assessment by engineering consultants URS Australia Pty Ltd.

This detailed review of the Menangle Bridge structure has determined that the speed restriction on the bridge can be lifted from the present 40 km/h to 80 km/h. ARTC has adopted the Report's recommendation and will lift the speed from 31 October 2005.

The URS report commissioned by ARTC confirms the safe workings of the bridge and the lifting of the temporary speed restriction as previously recommended in the Grundy Report of August 2003.

Since taking over the Lease of the NSW interstate network last September, ARTC has implemented the recommendations of the Grundy Report in its technical management on the bridge including condition monitoring and general maintenance.

The Grundy Report in 2003 recommended that the line speed be resumed immediately and that the bridge could remain in service for more than 50 years without the need to be replaced in 2006.

The Menangle Bridge since its four week closure in 2003 has operated at the maximum axle load of 25 tonne but has continued to operate with a speed restriction of 40 km/hr.

The Menangle Bridge is a crucial part of the Main South Line between Melbourne and Sydney and impacts on the efficiency of the line for freight and passenger services.

The lifting of the temporary speed restriction will benefit transit times between Sydney and Melbourne for freight operators and inter city passenger trains, as well as local passenger trains for southern highlands commuters.

ARTC in lifting the speed restriction is confident that the recommendations of URS and the previous Grundy Report confirm the structural integrity and safety of the Menangle Bridge.

Two years after the temporary speed restriction

was lifted to 40 km/ph, the latest Investigation Report has found that no immediate work is required and no further deterioration of the infrastructure has occurred.

ARTC has implemented a tailored Maintenance Plan specifically for Menangle Bridge to ensure ongoing safe and reliable passenger and freight services. ARTC plans to invest \$2 million over the next five years for further ongoing maintenance and enhancement of safety and reliability of the bridge

ARTC manages the NSW interstate line under a 60 year lease from the New South Wales government and has recently announced a \$1.3 billion investment program for the upgrade of the main North South Corridor between Melbourne and Brisbane.

The URS Report is available on the ARTC website at www.artc.com.au
12 October 2005

Contact: David Marchant 0419 733 201
Prue Regan 02 8259 0716 0419 297 004

BACKGROUND PAPER

Menangle Bridge crosses the Nepean river between Campbelltown and Picton on the Main South Line that links Sydney with Melbourne.

Constructed in 1863, the bridge originally had 3 spans of 48.8 metres and in 1907 intermediate piers were constructed, resulting in 6 spans of 24.4 metres.

The bridge is a twin track transom top structure. The bridge superstructure is a through girder structure with wrought iron girders and a transverse wrought iron and steel girder deck system. In 2003 following an inspection by Professor West, Menangle Bridge was closed to traffic for 4 weeks. This was due mainly to perceived problems relating to fatigue cracking of the secondary cross girder cleats and potential fatigue failure of the primary cross girder suspension bolts.

Following inspections, analysis and testing by Professor Paul Grundy and URS, the cracking

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was found not to be fatigue related and that the bolts had sufficient capacity.

In April 2003 the bridge was reopened to traffic at a speed of 20km/hr. Following further analysis, in service strain gauge testing, and replacement of the suspension bolts, the speed was uplifted to 40 km/hr in August 2003. Since the reopening the following reports on the bridge have been prepared:

April 2003 Inspections and Report by Prof. Grundy of Monash University

April 2003 Stage 1 (preliminary analysis) URS Report

June 2003 URS Stage 2 (detail analysis) Report

August 2003 URS Stage 2A (detail analysis and inst) Report

February 2004 URS Stage 2A Addendum 1 - Bolt Saddle Analysis and Box Girder Bottom Cell Web Plates

June 2004 Professor Grundy Final Report

July 2005 URS - Uplifting Speed Restriction across Bridge

ARTC will follow the URS recommendations as detailed in their latest report of June 2005 to immediately lift train speed from 40km/hr to 80 km/hr on both tracks. Following inspections over the first 6 months of operations at 80km/hr ARTC will, subject to an independent assessment that there is no indication of deterioration of the functional safety of the structure, then uplift the track speed to normal track speeds over the bridge.

The heaviest trains will not exceed current loadings of 3 x 81 class locomotives and 100 tonne CHS/NHFF wagons - a maximum axle load of 25 tonnes.

A tailored Maintenance Plan has been implemented and ARTC will invest \$2 million over the next 5 years to ensure the continued reliability of the structure over the next 25 years.

THE OBSERVATION POST

Rather than the usual commentary on some aspect of our industry I thought that this month I might offer a couple of small items which have been

adapted from items originally penned as part of e-mail responses on topics that will be quite self apparent. So read on -

Learn to Love Your Congestion

As our man in Bogota (actually the Mayor, now running for National President next year) says - we must learn to love our congestion, not for what it is but what it can do. In other words let's bring on the congestion and use that as the lever, not just for good public transport, but for a whole different way of thinking about city planning and management. Unfortunately we are a (nominal) first world country, albeit with public policy, beliefs and behaviours that are reminiscent of the dark ages, so we are not in the position of having nowhere to go but up (unlike Bogota). However other first world countries, notably in civilized Europe, have evolved a compact yet entirely functional way of living in cities that aids rather than detracts from public transport (better thought of as mass transport).

Ian Manning many years ago wrote 'The Journey to Work' in which he proposed that the size of cities was a reflection of the point to point speed of transport. Since WW II and the emergence of affordable mass produced motor cars we have increasingly expanded cities to reflect their faster door to door potential. However as anyone who is even half numerically literate will know, every annular ring added to the outside of a circle (in this case city) will add an exponential quantum to the population. So every say 5 km of annular growth will engender maybe twice the population growth that came with the previous 5 km - hence an exponential growth in congestion at the core. Instead of trying to make the access to the city easier from far out we need to concentrate population in central nodes, focus services and transport lanes into these centres then create the linking web of serious capacity, speed and access in a substantial core public transport network. A refined version of what has been attempted in Canberra.

So if my proposition is generally in the right direction, we need to use road congestion as a positive to change the way we build and grow our

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cities, including the provision of sensible public transport.

Learn to love congestion. Now, if you will pardon me, I must go and watch the second of the twice daily traffic jams approaching the harbour bridge so I can be inspired about the future.

Flying and the High Cost of Fuel

The demand for flying has not dampened noticeably since the cost of fuel took off again a year or so ago. In fact the cost of flying is still extraordinarily cheap if you shop around. A typical car will use something like 80 litres of fuel between Melbourne and Sydney say \$100 order of magnitude - and it will take all day. Air fares can still be got well below this figure and it will take only a few hours, inclusive of terminal time. We have been to-ing and fro-ing to Coffs harbour a lot recently and fares of \$89 or \$99 are quite easy to get - in fact the actual fare is less than half that amount, taxes taking the rest. This is on a regional route that now has better services than ever in the past. Fuel surcharges may in time have an impact, but the most likely outcome of high fuel prices is that the smaller marginal air routes will slowly fall off the agenda (have you tried to fly to Inverell or Grafton lately - no longer flown by mainstream flying?) and smaller aircraft will slowly disappear. Look at Qantas Eastern, now part of Airlink, - 10 years ago they had a mixed fleet of J31's and small Dash 8's. Now the 'Eastern' fleet is all Dash 8's with the aircraft size now exceeding that of the Fokker Friendships in the higher capacity versions. On the mainstream regional routes the average aircraft capacity is probably twice what it was 10 years ago. The same applies with mainstream Qantas - the 737-300's are almost all gone so the 737-400's are the lowest capacity aircraft, yet 10 years ago when they were being delivered they represented the high end of domestic capacity apart from the four A300's and a few 767's in domestic use between Melbourne and Sydney.

The principal benefit for flying, and in a different way urban private car, is the perceived lower point to point time. In Europe where air congestion and weather contribute to unpredictable results the rail

system is very good. When we departed Paris in 2004 we passed through Gare du Nord on our way to Charles de Gaulle airport to fly to London. I later estimated that when the plane was over the channel (unsighted beneath the clouds), the train that left Gare du Nord 40 minutes after we were there would have been pulling into Waterloo.

In the case of urban car I suspect that the change will be slow - some people will find the family fortune eroding, some will change lifestyles and some will change work locations, all of which will change the pattern (and maybe quantum) of car use. However I would suggest that road congestion (such as successfully practiced in Victoria on the Monash Freeway) would have a more noticeable impact on usage patterns than fuel price - provided that the alternatives (public transport off public roads) have capacity and convenience. I would suggest that the Glen Waverley and Dandenong group rail lines are not the best served in Melbourne and are therefore not well placed to pick up much from the elongated Monash parking lot.

The people who are likely to be most vocal about fuel costs are those in the hire and reward game (taxis, buses, trucks) where the opportunity to make a living is eroded as the fuel costs go up. Watch them if you want to see and feel the 'hurt' from higher fuel costs. In the mean time the single driver cars continue to overfill roads on a daily basis.

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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 must have stories, events or developments of interest that could make an interesting item for Sydney Newsletter.

Send copy to the Editor, Max Michell, by e-mail to samrom@bigpond.com, phone 02 9241 2675 or post to 806/129 Harrington St., The Rocks, NSW, 2000. For all other matters relating to RTSA Sydney Chapter contact Basil Hancock (Secretary) or Bill Laidlaw (Chairman) as above.

CPD CREDITS

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.

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