

# RTSA NSW CHAPTER NEWSLETTER

MAY 2011 EDITION



NEXT MEETING

## NEW TECHNIQUES IN RAIL GRINDING AND RAIL FLAW DETECTION

MARK WHITE, SPENO RAIL MAINTENANCE



Mark White, Operations Manager- East Coast, Speno Rail Maintenance will provide us with an insight into new developments in rail and switch grinding and ultrasonic rail flaw detection

Rail is a fundamental part of the railway – without it there can be no railway at all. With increasing speeds and axle loads, along with a strong incentive to more cost effective management of what is a high cost, complex, asset, there have been a number of quite significant changes in process and techniques to look after the track in recent times.

The topics that Mark will cover involve looking after the asset by keeping the rail 'in shape', and avoiding breakages and failures (with potential catastrophic outcomes) using techniques that look inside the rail where simple patrol type observations cannot.

A valuable briefing for all track engineers and asset managers.

### TECHNICAL PRESENTATION

VENUE:

BRADFIELD ROOM,  
CENTRAL STATION  
MEETING ROOMS,

Located opposite  
Platform 2, between  
Lost Property and  
Heritage Central.

DATE:

Wednesday 1<sup>st</sup> JUNE 2011

TIME: 11.30 for 12.00

*LIGHT REFRESHMENTS  
WILL BE PROVIDED*

MEMBERS, GUESTS AND  
INTERESTED FRIENDS  
ARE MOST WELCOME TO  
ATTEND.

The Railway Technical Society of Australasia (RTSA) - NSW Chapter

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## APOLOGY TO STEPHEN MUSCAT

Last month the Editor had a brain explosion while compiling the Newsletter so that Stephen Muscat somehow morphed into a Kevin Muscat part way down the front page.

A Kevin was indeed staying at the Editors domicile at the time, and it was simply an unfortunate happenstance that the real Kevin Muscat was a

disgraced footballer (you can't expect the unsporty Editor to know such detail).

We unreservedly apologise to the real Stephen for making such a blunder and assure him that we will not make the same mistake next time.

## POSTCARD FROM JAPAN

*The High Speed Study Tour is now back in Terra Australis, but a week or so ago, while about to board the Beetle for Japan, the following brief report was received from Andrew Honan. There will be a full report from Pascal Sueess on the High Speed STORE at our August meeting.*



The tour started off with the official welcome dinner on Sunday night at Taipei, with delegates flying from all parts of Australia and New Zealand. Very many thanks need to go to Mike Snee and

Tony Bailey of Meridian Travel in getting us all coordinated into Taipei. This was particularly challenging as we all had to change our return flights from Narita to Osaka in Japan.



First on the list was the THSRC, and we were very ably looked after by our hosts from Toshiba. The technical content started with the main rail depot and station at Zouying. This station is at the other end of the HSR line from Taipei, and boasts an impressive state-of-the-art station and

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maintenance depot. The visit at the depot was very comprehensive. Then it was off to the THSR Central Control Centre, where we were very surprised to see Rade Crnjac (an ex-employee of RailCorp) in charge of the operations there. Some delegates know Rade very well! The remaining part of the day was spent looking at operational aspects and features of the different stations

Tuesday night and it was on to Seoul in South Korea. Whilst the morning after, there was slight rain, this didn't slow us up and had stopped by lunchtime. With M-J assisting us, we were off to the KTX depot at Goyang. A massive site and still expanding! South Korea is certainly committed to rail and high speed rail in particular. There is certainly no equivocation on South Korea's part as to how they see rail participating in the economic and social future of their country!

Lunch was a sit down affair (literally) - everyone was on cushions on the floor! The restaurant was an unassuming building located in the middle of a semi-agricultural area and the food was traditional Korean and it was delicious!



On to the massive central train centre that covers the entire KORAIL system. So important, it is under Korean national security. We were indeed

very fortunate to be able to visit this centre. Just how they were able to integrate the whole country's signalling and control system is still a mystery and one which will have to remain so.

Next morning we were off to meet Ms. Alex at the Korean Railroad Research Institute (KRRRI) at Ulwang. This facility is a showcase for researchers. Researchers come from all over the world to conduct research here. We only had time to see a few of the laboratories (for example the civil engineering and the wheel/rail mechanics laboratories), but these new facilities were inspiring. Much of the civil research goes into the development of earthquake standards. The wheel / rail mechanics laboratory can test adhesion and contact forces, for a number of environmental conditions, up to speeds of 400km/hr. It is the only facility in the world that can replicate conditions for empirical studies as well as test theoretical assumptions at 400 km/hr.

All too soon we were onto the KTX train down to Busan, the bustling port on south east of Korea. We were able to compare the Shinkansen train from THSR on Taiwan system, to that of the TGV in Korea.

With the weather holding up beautifully, we were able to settle ourselves in Busan for the afternoon and later to see some of the night market fair in the streets. Next day was to be an early start on the ferry to Japan, and so it was time to crash! Thankfully KRRRI was able to convince our hotel to put a bus on for us, and so the early Friday morning trip down to the wharf and onto the Beetle ferry was pleasant.

Going through customs and immigration at Busan is a dream, but do not expect to do much duty free shopping, with a total of about 5 shops, one being a newsagent, another a café and only one real store for the typical duty free- goods! Again

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many thanks go to Mike Snee for getting us on this early ferry which will enable us to meet our awaiting hosts at Hakata port in Japan. The Beetle ferry across from Busan in South Korea to Hakata in Japan promises to be a different and

more enjoyable trip to that of air travel.

Anyway as we board the ferry, we must leave this diary until another time - Japan awaits us!

## KALAMAZOO EPIC

Members will have received a flyer early in May about an epic Kalamazoo (hand operated rail trolley) venture from Adelaide to Darwin starting late in July. This 3000 km trip will involve a team of 14 volunteers pumping away to raise funds for the Royal Flying Doctor Service. Sponsors include Parsons Brinckerhoff, ARTC, Genesee & Wyoming, Transfield and Great Southern Rail, and

we know that at least one of our NSW members will be there taking part.

RTSA suggests member go to the Kalamazoo Crossing 2011 web site, at [www.kalamazoo crossing.org](http://www.kalamazoo crossing.org) for more detail, and in particular to consider making a donation to such a worthy cause

## POINT OF VIEW – MAX MICHELL

Back nearly 20 years ago, in January 1992 to be exact, the last loco hauled train was retired from the Newcastle line leaving the comfortable double deck 'V' sets to run the whole through service. Back then the timetable was recognizably similar to today, apart from the absence of the local 'Tinkerbelle' trains between Newcastle and Morisset. However trains in 1992, using identical trains on the same track as exist today, were on average 12 minutes faster than now – that is trains on average have been slowed by nearly 8% over a period when just about everything else in society has gained pace and increased efficiency. The fastest trains (the headline trains) were timed at 2h 21m for the journey compared to 2h 37m down and 2h 30m up today. The regular semi-fast times that apply during much of the between peak periods were as fast as 2h 31m in 1992 but now are typically 2h 42m. What exactly has been going on?

For a start it has to be said that the many of the wearers of the Transport Ministers robes had a passion for micro-managing the rail system in some sort of perverse attempt to win voter plaudits. I well remember one of these Ministers standing up at a learned conference and waffling on about all the good things he was doing for the Railways, how many dollars were being poured in and so on, but at the end of his speech he simply commented "the first thing I want to see on my desk each day when I arrive at work is the trains are all on time". The 'On Time' mantra had a direct influence on the Railway culture such that 'On Time' ahead of Safety was seen to be a significant causal factor in both the Glenbrook and Waterfall disasters. The end reaction by the railways, in response this micro-management from Macquarie St was to do the obvious and slow trains down.

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Trains times selectively adjusted to allow better on time running would be one response but the alternative of simply slowing all run times (and therefore train times) across the board was adopted. Given that On Time running seems to be only measured in the peaks and at the end of journey even this sloppy approach could have been a bit more focused.

As a long time observer of train timetables and timing I have to say that there are a number of deep rooted downsides to the practice of slowing train timetables. For a start it reduces the capacity of the track by having trains in any section for a longer time – an example today was an up Wyong local waiting time at Woy Woy (for the timetable to catch up), blocking a following Brisbane – Melbourne Superfreighter which in turn stopped a following regional container train. In a section where headways would normally be around 4 minutes (allowing for stops) the timetabled delay to the Wyong train actually used up a whole additional path by the time all these trains cleared. Maybe it doesn't matter when the line is running well below capacity but it should matter when the State is putting its hand out for \$7.9 billion to increase capacity on the line.

A second issue is the de-skilling of drivers. On the Short North (or Southern line to Novocastrians) there are some very good drivers who can precisely keep time and easily make up time when needed. However the flip side is that there are frequent cases where there are no obstructions or impediments to quality running and the train still manages to lose time. I don't know whether it is inexperience, boredom or what but the ability to run late on the slowed down timetable would seem to be a classic case of a downward spiral.

A third issue seems to be the proliferation of permanent slow speeds on a main line, presumably

driven by the knowledge that impositions on train running are quite capable of being absorbed in the torpid timetables. An example is on the journey north from Sydney. Once clear of Wells St there are a number of significant impediments to good running – some difficult to avoid and some simply due to parsimony or indifference - Strathfield slow 25 km/h junction, West Ryde 50 km/h turnout, Epping 60 km/h track speed half way to Cheltenham, Hornsby relief 60 km/h turnouts half way along, Berowra 50 km/h turnouts through loop (de facto main line), 60 km/h for a kilometer entering Gosford yard, various 90/95/100 km/h speeds between Tuggerah and Wyong north on near tangent track – all of these things have an impact on the ability to run efficiently on a track that is otherwise reasonably good. The point about all these impediments to good train running is that they seem to have been created with little or no reference to train running or to the end game of customer satisfaction. For instance the Berowra Loop, as part of the local Clearway project, could well have been given marginal re-alignment to make the loop the through track with the centre road on an alignment suited to a terminating track. Is it no thought, no money or no imagination that drives these fractional projects?

For a suburban line with impediments have a look at the Bankstown 'loop'. It appears that Bankstown has the slowest suburban trains in the country, apart from a couple of minor branch lines, hardly a good recommendation for a system trying to get into the 21<sup>st</sup> century.

There is a valid argument that capacity expansion expenditure cannot be justified until the actual and latent capacity of the existing system has reached its zenith. Projects, such as some of the Clearway projects, never seem to deal with the issue of 'low hanging fruit' but move straight to big money solutions that often turn out to provide marginal

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benefits. In many cases there would seem to be a number of smaller scale projects which would provide incremental gains at far lower cost, which would satisfy immediate and short term future needs.

Let's start with a proposition that things should always improve, however little, as the years roll by. Why then can't we better what our forbears (who must have been made of much sterner stuff than we are) achieved in 1929 between Sydney and Newcastle, using 1891 steam locomotives and being limited to 60 mph (95 km/h) maximum track speeds?

It would be great to see the CityRail system making an effort to selectively improve train timings toward something equal to or better than those of the past, while at the same time taking active steps to pay much more attention to alignment and track speeds as part of the solution.

With the devolution of power to the Transport Department there has to be qualms about achieving the latter, but at least the new service delivery orientation of RailCorp might just get something done toward the former.

## LETTERS TO THE EDITOR

*Basil Hancock has responded to last month's letter from Tony Bailey in regard to platform doors*

I refer to the letter from Tony Bailey in the April newsletter referring to platform doors at Sydney stations.

Recent CityRail trains (Millennium, Oscar and Waratah) all have doors in almost exactly the same locations, and I think that the issue of standardisation of door positions is currently well understood. Hopefully the understanding of the need for consistent locations will not be lost should responsibility for such decisions be moved elsewhere within the new NSW transport organisations.

However as Tony states, there is currently a wide variety of door positions in the older suburban trains (Tangara and stainless steel stocks), which makes the platform door issue much more complicated. The worst offenders are the non-air conditioned stock, with many permutations within

eight-car S-sets, depending on whether the trailer cars are genuine trailers, former driving trailers (to two different basic layouts) or demotored power cars, and also in which direction they are facing (the cab makes the door arrangement off-centre). This is further complicated by the presence of six-car R-sets in 4+2 or 3+3 formations. The saving grace is that by the time platform doors could be installed (if they ever are), the R-sets and probably most of the S-sets should be off the system.

Just to complicate matters further, if the Western Express, with its ten coach trains, were to proceed, that would of course raise other issues and would presumably require these trains either to be banned from the existing CBD lines (i.e. be restricted to new tunnels and stations only) or to have some car doors isolated at existing tunnel stations.

There is one other aspect of platform doors which needs to be considered. They are only effective if

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the train stops in the right place. This is easy to achieve with automatic driving, but in a manually driven system such as CityRail, the need to stop accurately has the potential to slow the system down due to drivers making more cautious approaches to stops to avoid overshoot or undershoot. The degree of stopping accuracy required will be affected by the platform door widths and the ratio of doors to fixed screens along the platform.

Platform doors have the potential to make crowded stations safer, but I am not so sure about claims that they will speed up boarding and alighting times. Is there any evidence of this? It should also be remembered that the reason for platform doors

being provided in places such as Singapore is probably as much to do with keeping air conditioned air in the stations and not in the tunnels as it is about passenger safety.

[Editors comment: I have had a passing interest in platform gates (open air platform doors) recently and it seems that the major applications are for automated systems, where there is no one to watch the track ahead, and in climates where underground stations need some form of air-conditioning. The problem at Town Hall and Wynyard is one of passenger flow and inadequate platform space, which would only be exacerbated if platform doors were installed there (using up a slice of available platform space.)

## COMING EVENTS

### HUNTER VALLEY STUDY TOUR

One of the charming aspects of trying to organise this event is that it is something like trying to herd cats – as fast as one date is fixed one of the multitude of players in the game comes up with a prior booking, possession, lack of accommodation, competing event or whatever. The planets may have aligned in May but sure as sure the many players in the game seem determined not to be aligned anytime later this year.

So now the plan is to try for March next year – in the fervent hope that we can get alignment then before anyone or anything jumps in to confound things again. The only good thing about the perennial postponement of this STORE is that the Hunter Valley becomes more interesting and busier as time goes by.

Stay tuned.

### ANNUAL DINNER – 2011

An excellent sponsorship opportunity exists to support our Annual Dinner to be held on 11<sup>th</sup> August 2011. With rapidly expanding opportunities in the NSW rail industry, and some new exiting rail projects about to proceed, the dinner will allow attendees to socialize, network and gain insight

into wider aspects of the rail sector as presented by a guest speaker. This high profile event gives companies an opportunity to raise their profile in the Rail Industry.

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This year's Dinner will be held on Thursday, 11<sup>th</sup> August 2011 at Doltone House, Jones Bay Wharf, Pyrmont. The format is intended to remain the same with pre-dinner drinks and a guest speaker on the night. The cost will be held at a similar low level to previous dinners. Numbers for this event will be limited to 150.

All bookings for this event will be via online services and phone bookings. A notification will be emailed to all members with specifics within the next month.

If you would like to discuss sponsorship opportunities or have any queries regarding the Annual Dinner please contact Katharina

Gerstmann on 0400 133 234 or [nsw-chair@rtsa.com.au](mailto:nsw-chair@rtsa.com.au).



## INTERNATIONAL CONFERENCE FOR WOMEN ENGINEERS AND SCIENTISTS

The 15<sup>th</sup> International Conference for Women Engineers and Scientists is to be held in Adelaide from 18-22 July 2011. This is the first time an international conference for women engineers and scientists is being held in Australia.

The conference is a rare opportunity to meet leading women in science and engineering, hear their views on leadership, innovation and sustainability.

The link to the latest newsletter showcases some of the leading women who will be speaking: <http://eventcampaign.com.au/enews/ICWES2011/icwes2011-enews6.html>

Registration costs have been kept to a minimum as the conference has been supported by the generosity of Australia's leading companies in science and engineering.

**AusRAILPLUS 2011**  
CONFERENCE & EXHIBITION

2011 Theme:  
**Innovation and Customer Relations**

**22nd – 24th November 2011**  
Brisbane Convention & Exhibition Centre

Australian Railway Association Inc, NSW Traffic, ARIC, IRSE, ENGINEERS AUSTRALIA RTSA

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## MAY MEETING – REPORTER: MALCOLM CLUETT

### PROLONGING THE SERVICE LIFE OF AGEING FREIGHT ROLLING STOCK.

**Stephen Muscat, Consultant, Interfleet**

Generally, rolling stock lasts a long time in the railway environment. A lot longer than road vehicles, for example. Freight wagons are usually designed for a 25 year life, though some wagons operating in NSW would now be about double that.

The life of a wagon could be lengthened by increasing its capacity, or modifying it to suit a different type of loading. Like most structures, wagons will deteriorate over time. This deterioration will commence from day one of operation. Wagons are also subject to fatigue loading, which is related to fluctuating stress levels and time. The result of fatigue is cracking of areas subject to fluctuating stresses. The fatigue phenomenon was first noticed in railway axles in the 1840s.

The implication of a wagon subject to deterioration are:

- Wagons set aside for repairs
- Wagons scrapped prematurely
- Could block a railway corridor after a breakdown
- Could inflict damage to other infrastructure
- inability to meet haulage contracts
- payment of damages to other parties in the event of failure

The incidence of failures versus time for a wagon follows a typical bathtub-shaped curve, with the initial warranty period, stable operation over its design life, and then an increasing incidence of

failures to the point where it is more economic to purchase new wagons.

Railway operators often need to transport new and different products. This can drive the need to modify wagons. An example is the shipping container, which arrived in Australia around 1968. Long distance rail transport is now dominated by the haulage of containers. Many types of wagons were modified to carry shipping containers (even 4-wheelers in the early containerisation years).

The following can affect the service life of a freight wagon;

- Load distribution
- Fatigue characteristics (material properties, design to avoid stress concentrations, manufacturing methods)
- Maintenance and frequency of inspections
- Load spectrum
- Method of loading and unloading
- Track conditions and speed
- Environment (ie, industrial emissions, saltspray)

The speaker described three tools which a designer can utilise to increase the life of a wagon:

- Finite Element Analysis for stress analysis. (FEA)
- Instrumentation to determine actual stresses
- Fatigue Life simulation

This is allied with computer drafting. The structure is divided up into small (but not microscopic) triangular elements. The stresses in response to applied loads is then calculated by means of a digital computer. This technique was not possible before the development of digital computers, as the number of calculations is too high for manual processing.

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Results can be displayed as a coloured spectrum. Design to avoid high-stress areas allows for an optimised design in terms of minimum mass and maximum load-carrying capacity.

Example – steel coil wagon – was originally an open wagon without a centre sill. Each coil of steel weighs 30 tonnes, and the wagon can carry either one (in the middle) or two (one at each end). The owner had suitable steel members on hand to add side sills, without purchasing new steel elements. The structure was analysed and verified before it was allowed onto the rail network. The speaker showed pictures of this wagon before and after.

In recent years, the availability of durable computing and mobile phone devices has allowed this technique to become more widespread.

However, there is always the need to interpret the data, and to remove outlying points which may skew the results. (These could be caused by electrical noise or interference.) There is also the need to store and analyse the large amounts of data that can be generated. The final result is to arrive at the load spectrum, which can then be fed into FEA.

This can predict the life of a structure for a given load spectrum. It indicates regions that might be a site of an early failure.

It can be difficult to quantify the remaining life of a wagon if its previous load history is unknown. A probabilistic approach is required, and should be compared with real results across a whole fleet.

Factors which can shorten the life of a wagon include poor or non-homogenous materials, flame-cut edges which haven't been ground, corrosion, sharp corners which cause stress concentration,

etc. For castings, surface finish is also a factor which is associated with longer life. Design to eliminate vibration is also important, across the range of excitation frequencies.

While a wagon is being inspected, it is not out on the tracks earning money. This is one example of many compromises between operational and maintenance requirements in the railway field. Minimising downtime will increase profits. A suitable maintenance plan should be developed for all rolling stock.

Wheel flats are one example of a wagon fault that can snowball into other problems (fatigue loading to wagon and track, damage to load, complaints from lineside residents, getting a please-explain from the track authority, etc). The speaker showed a picture of a huge wheel flat. One side of the wheel was still glowing red-hot when it was photographed. Another perennial problem is the overheated bearing, which usually results in the end of the axle breaking off and the bogie sideframes dragging along the sleepers. On a long train, it can be difficult for the driver to detect such a fault.

Poor track is a major factor in wagon life. If a wagon is not rolling smoothly (ie, hunting) it will have a shorter life. In turn, good track conditions depends on smooth-running rolling stock.

Another unusual picture was that of a small excavator INSIDE a gondola wagon, being used to clean out the bottom, but probably causing a few impacts too. These notches or dents could be future stress-raisers.

The three tools and engineering consideration for stress analysis can increase the reliability of a wagon fleet, and lengthen its life. Control of stresses will limit sudden failures and prevent untimely early retirement. The cost of these



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practices are less than purchasing new wagons at shorter intervals.

**Q** Difference in service life between Bottom Dump wagons and Rotary Dump wagons ?

**A** Rotary dumps can have problems if the loader is located on the top of a hill, or the trains are very long. Severe longitudinal forces are generated due to stop-start action from positioner. Drawgear should be designed for these loads. There are other considerations as to which wagon type is best for a particular product (such as the self-cleaning ability of the material).

**Q** Inspection of springs ?

**A** Taken into account at manufacture – springs are shot peened. This reduces surface tensile forces and improves fatigue life. Otherwise, to fully inspect the springs, the bogie should be stripped down.

**Q** What type of vehicle was in the illustration with the huge Wheel Flat ?

**A** Not sure – obtained from the Internet (writer's note – probably an Amfleet car in USA, due to the inside bearings)

**Q** Are bogies with primary and secondary suspension superior ?

**A** Not the speaker's field of expertise.

**Q** Wheel sets – are they a major component of vehicle costs ?

**A** Yes. They are the interface with 3<sup>rd</sup> party assets (like tyres on a motor car).

**Q** Stress peaks – interpretation of strain gauge output signals and determination as to which are real peak loads and which are outlying stray data ?

**A** Cutting off peaks in the data – depends on judgement and experience. Anomalies could be due to electrical noise, irregular track, etc. As always, outlying data should be neglected. Test results can yield huge amounts of data which must be stored and managed properly.

**Q** How does trackside instrumentation help with wagon life (hotbox detectors, vibration sensors, etc) ?

**A** Could assist in preventing imminent catastrophic failure (say of a wheel bearing) or detecting a worn wheel profile. Not a help in determining if fatigue cracks in the wagon body are approaching the critical length, however.

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## WHERE AND/OR WHAT IS IT?

This month the picture is actually on the front cover, and in miniature below. The question is what is the location and more particularly how many turnouts are there within view of the photographer (not all being in the photograph).

Last month's 'Where Is It' (a picture of a bunch of lineside signs) drew only one response - from Mark Wolff, who being a local driver has close encounters with this area on a regular basis.

The boards are at Wirragulla (near Dungog) and are alignment marks for cab window alignment to stop at these miniature platforms. Harder than it sounds; the platforms here are very short (one door plus margin) and missing the alignment by a small amount at the cab window mark can result in a very big gap at the platform, not helped by wheel slide in the early morning mist and all the other mystical aspects of driving trains. The blue markers are the newish eco designed / OH&S looking / corporate committee approved boards: E for Endeavour and H for Hunter cars, with 2 being the number of cars. The white boards are older versions for 2 and 4 car 620 sets (the latter more in hope than need) and an original Endeavour board. Of course, these early boards would have been constructed by the local section hairy-leg (fettler) with whatever was scrap lying around his compound, as was done in the days before the railway became a whole lot of fragments of railway.

If any reader has an idea or a pictorial entry for this segment of the Newsletter then please contact the Editor. Entries from outside the Newcastle area would be most welcome. Given that we are the NSW Chapter of RTSA we should keep to things NSW (although at times it is very tempting ....).

Responses or entries to [max412@gmail.com](mailto:max412@gmail.com) please.



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## FUTURE MEETINGS AND EVENTS FOR 2011

Date and time	Activity	Location
Thursday 26 May 2011 4.30 to 6.00	Joint PWI, IRSE and RTSA meeting - Tony Howker – Signalling Principles in Plain English along with Nicolas Jaramillo and Shane O'Neill on the North Coast Curve Easing Project	Sydney Masonic Centre 66 Goulburn St. Sydney
Wednesday 1 June 2011 11.30 for 12.00	Rail Grinding and Ultrasonic Rail Testing Mark White - Speno	Meeting Room Central Station Concourse Sydney
Wednesday 6 July 2011 11.30 for 12.00	RailCorp Digital Train Radio Project RailCorp - TBC	Meeting Room Central Station Concourse Sydney
Wednesday 3 August 2011 11.30 for 12.00	AGM High Speed Study Tour Report – Pascal Sueess	Meeting Room Central Station Concourse Sydney
11 <sup>th</sup> August 2011	Dinner Meeting with guest speaker	Doltone House Jones Bay Wharf - Pyrmont
Wednesday 7 September 2011 11.30 for 12.00	Port Botany and Freight Line Resignalling – TBC Tomas Magyla – Eddie Hawes	Meeting Room Central Station Concourse Sydney
Wednesday 5 October 2011 11.30 for 12.00	The Alternative Railway – What happens when there are possessions and shutdowns Nigel Parker - RailCorp	Meeting Room Central Station Concourse Sydney
Wednesday 2 November 2011 11.30 for 12.00	Waratah Train Signal Compatibility Dave Nolan - RailCorp	Meeting Room Central Station Concourse Sydney
Wednesday 7 December 2011 11.30 for 12.00	Heritage Topic Speaker from TrainWorks Thirlmere	Meeting Room Central Station Concourse Sydney

Members with ideas for meeting topics should contact the Secretary, John Watsford, in the first instance – contact details on the back page of this Newsletter



# RTSA NSW CHAPTER NEWSLETTER

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The best way to submit contributions is by e-mail to the Editor at [max412@gmail.com](mailto:max412@gmail.com) or alternatively to the address shown in the footer.

Engineers Australia members are reminded that attendance at RTSA technical meetings and events contributes towards CPD requirements. Each RTSA technical meeting generally has a value of 1 CPD point.

