

RTSA NSW CHAPTER NEWSLETTER

NOVEMBER 2011 EDITION



NEXT MEETING – will be on Tue 7th February 2012. Details next Newsletter.

SEASONS GREETINGS TO ALL OUR MEMBERS



The railway industry is vastly different from that which existed only 20 years ago. In this work-a-day scene Pacific National, Xstrata, Freightliner, RailCorp, ARTC and a maintenance contractor are all active, highlighting how diverse the business is these days. In the contemporary rail industry there is a requirement for a vast array of skills and expertise – possibly a bigger range of personal and business opportunities than ever before. In one way or another all of you (our valued readers) are part of this and hopefully get as much benefit and enjoyment from it as we do.

THE RTSA NSW CHAPTER COMMITTEE WISHES ALL OUR MEMBERS A VERY HAPPY AND SAFE FESTIVE SEASON AND A PROSPEROUS AND ENJOYABLE 2012

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COMING MEETINGS

The proposed December meeting will not now go ahead. We were unable to get a suitable venue (the last gasp of our venue saga from earlier this year) and were also having difficulty getting a suitable speaker.

At relatively short notice were able to present Don Yuratovac and Omar Jaff, both from Transport Planning Engineering Company URS, who spoke on the topic of light rail and bus rapid transit.

In the circumstances it was decided not to pursue the December meeting but to regard the URS

meeting as the final one for the year – by doing that we avoided the possible situation of having to cancel, change dates or change venue at the last minute with the inevitable confusion to meeting attendees.

The next meeting will now be on the first TUESDAY in February 2012 (Tue 7th Feb, 2012), back in our usual venue of the Bradfield Room at Central Station (or as CityRail now calls the 'steam' station, Centrali).

WORDS FROM THE CHAIR – BILL LAIDLAW

AusRail Plus 2011, last week, was the largest conference yet held with over 300 exhibition stands and estimates of 3,000 speakers, delegates, exhibitors, day visitors and dinner attendees! The whole of the Brisbane Exhibition Centre was filled with some extended walking required between the exhibition space and the venues where papers were presented. During the three day conference there were many opportunities to catch up with friends from other parts of the rail industry and make a few more along the way.

With CORE 2012 to be held in the same venue next September, there was the opportunity to fine tune plans and advertise CORE with a dedicated stand for the duration of AusRail. The most popular item at the RTSA stand was the promotional CORE drink bottles with built in straw!!!

During the AusRail Gala Dinner there was presentation of an individual Achievement award to David Marchant, formerly CEO of ARTC, and a life membership to Ravi Ravithiran for his years of dedication to the RTSA.

For two days prior to AusRail the RTSA National Executive met to plan for the future of the organisation. This is an opportunity for the Chapter Chairs (who make up most of the National executive) to met under one roof to plan and discuss the direction of RTSA and some of our initiatives – technical learning, conferences, study tours and encouragement of young engineers. RTSA awards play a major part of Executive proceedings.

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It has been an eventful year for both the industry and the RTSA. There have been continuing developments in the resource sector which has rather overshadowed the other more traditional rail activities although overall improving the capacity of the network.

High Speed Rail has been the subject of a detailed report for the Federal Department of Transport – a topic which seems to finally be getting a bit of momentum. Locally we are seeing the somewhat delayed Waratah trains starting to enter service at last with four public train sets now rostered. On the other side continuing State indecision surrounds the Federal \$800 million offered for the Northern Sydney Freight Corridor and separately various issues to do with Regional Rail, other than engaging a new Manager for them from next year

Locally the RTSA has had some problems with venues but overall continued to present a varied and interesting set of topics at our regular meetings. In NSW we have finished our meeting program for this year. The program for 2012 is

now being formulated but we will have Simon Wood, National Executive of RTSA who will deliver a topic on his native NZ. Of particular note is the change in 2012 from a Wednesday meeting date to Tuesday. Details can be found elsewhere in this Newsletter.

Like many organisations RTSA is dependent on its members to perform a range of management and administrative tasks on a voluntary basis. Serving on the Chapter Committee is something that I would encourage each of you to consider as a way of returning something back to the industry. On the topic of the Committee Silvia Fedakova has had to withdraw from the committee since she is leaving us and returning to Europe. We thank her for her efforts here and wish her well in whatever new adventures she may find herself in.

I would like to thank the NSW Committee for their efforts over the past year. **Finally on behalf of the committee as a whole we wish all members and their families a safe and happy festive season and a bountiful new year**

LETTERS TO THE EDITOR

A picture is worth a thousand words. This month we have two real letters (from Len Hibble and Frank Lander) as well as two thousand words in pictures.

Len Hibble writes:

I am one of your “vigilant readers”, a regular. You frequently include subjects related to the October Newsletter topic of ‘Freight Movement on the north-south corridor’ on which I have had some personal experience.

By way of explanation I did have a short 4 year experience in the Road Freight Transport Industry in the 1970’s in the middle of my otherwise basically

Engineering work life. I am conscious that that experience must be so dated as to be irrelevant for today’s and more importantly tomorrow’s operating conditions but your current discourse prompts me ‘to put pen to paper’ on a couple of points.

- Engineers are rarely good Salesmen particularly if they are conscious that the Product/Service they are offering is not as good as they know it can/should be.
- JIT in its original sense is as you say not a real issue today, but I would suggest it is still a ‘real’ requirement of the consignor to know

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the hour of the pickup (by whoever) and equally if not more so the hour and day the consignment will be delivered. The timely performance of all three movements is extremely important.

- And that this will always be the case – Consistent Reliability ALWAYS.

You correctly make the point that 'Rail' is just the bit in the middle of a three part function but I ask are Railway Engineers the best persons to be organising the 'coupling' function at each end of the 'Freight Train' standing in the Freight siding ?

We are all confident that ARTC et al will get this North South Rail Corridor to a standard to make competitive transit time a reality but then what?

It is to be expected that at the first signs of a Rail challenge the Road Operators will react vigorously if not violently to protect their 90% of the market they now enjoy. So while the Rail Operation is being brought up to scratch should there not be some thorough research undertaken now to determine what the Freight Forwarders and other Potential Users expect of a Rail Freight Service – what do they see as lacking in the current situation, what besides price would be needed to encourage them to change. With this information and some data on potential volume the "Railways" would be able to work with potential partners for the other two functions of the overall 3 part Service Operation building to an offering 'too good to refuse'. Maybe some organisation(s) is doing this now but if not should this research and preparation not be undertaken now and if so by whom?

By way of interest my 4 years was with Ansett Freight Express as Regional Manager based in Sydney coordinating the freighting activities between Melbourne, Sydney and Brisbane operation through the 3 State Managers. The Pantechicons, and Prime Movers were Company owned and the Drivers all AFE employees. This was a tightly controlled operation with all trucks departing their depot within 10 minutes of the

scheduled time irrespective of the extent of loading. Reg Ansett required AFE to operate on a time schedule exactly as the Airlines.

Frank Lander writes:

An excellent editorial in the October newsletter.

I think the JIT myth needs to be exploded. There are four arguments:

1. What happens when it gets there? Your point that it often just sits in a warehouse when it gets there is one argument.
2. "Time is Money !" Do some numbers. A 20 tonne consignment of wine (containerised) might have a value of \$100,000. If your cost of capital is 10%, you would pay \$10,000 interest p.a. = \$27.40 per day. That is, if rail took one day longer than road to get there, but was \$27.40 /box cheaper, the customer would be indifferent. (\$1.40 /tonne is not a lot !).
3. The Darwinian Galapagos argument. In this argument, the humans in Sydney are presumed to have evolved differently to the humans in Brisbane. The humans in Brisbane are quite happy to have second morning delivery from Melbourne, but the humans in Sydney have evolved differently and require next morning delivery. I don't subscribe to it.
4. When rapid delivery is really urgent. If you are going to have product sitting around in a warehouse ready to do an urgent 'next day' delivery from Melbourne, then why not have it in a warehouse in Sydney (or Brisbane, etc) so you can do a 'next hour' delivery

Perhaps you should do some research on JIT and do an editorial in RTSA, or Fin Review.

And now for two thousand words in interesting pictures, neither of which require any explanation

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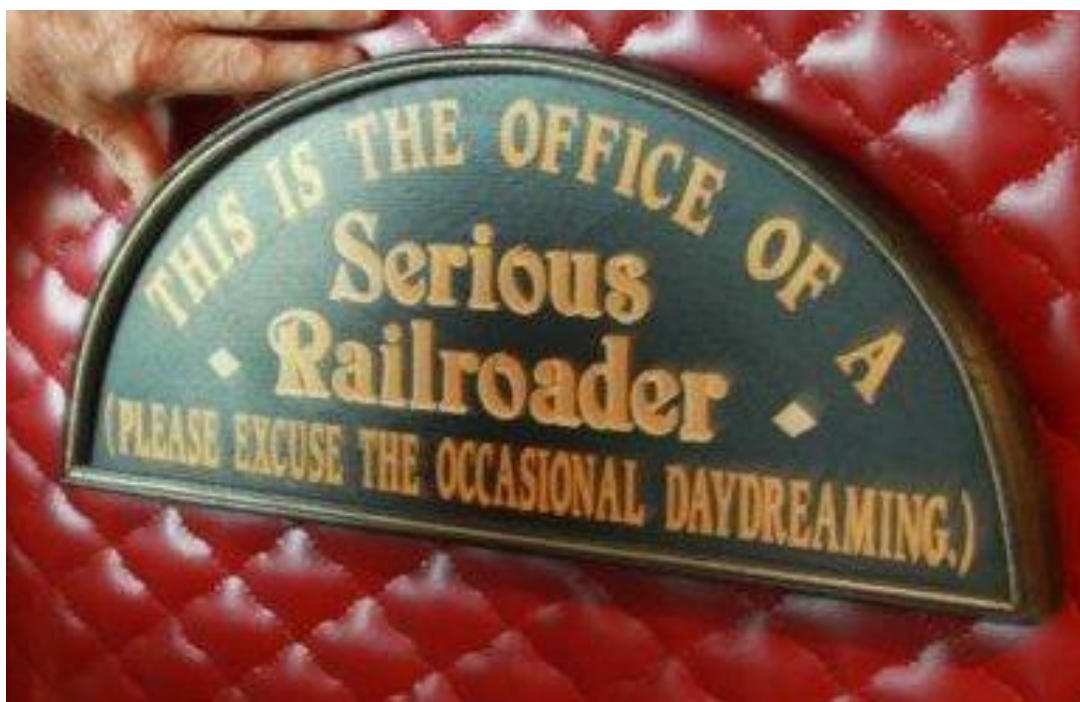


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POINT OF VIEW – MAX MICHELL

North America, USA and Canada in particular, is the home of half a dozen seriously large railroads, a few midsized outfits and a very large number of regional and short lines. These various companies are the current perturbation of a long history of railroads buying and selling each other, starting from the early days when literally hundreds of railroads were created to open up the country.

With a combined populations of something north of 300 million, spread fairly widely across USA and southern Canada, it is inevitable that there is a considerable amount of inter-change between various railroads. Virtually every regional and short line will need to inter-change with an adjoining railroad (major or minor) and quite a volume of major railroad traffic will need inter-change to complete its journey.

From early days it was a requirement that there was standardisation of equipment on rolling stock – not just for couplers, underframe strength and brakes but maximum gross weights and outline dimensions. Currently there are several outline dimensions (the various AAR Plates) reflecting the availability of 'double stacking capabilities and other over-height standards on some routes, but for all practical purposes there is only one maximum weight standard for a four axle wagon (car), 286,000 lb gross, or 130 tonnes in metric. To continue to operate in inter-change service every line has to be able to handle cars of this weight or risk being marginalised out of existence.

The major railroads naturally meet these standards (they no doubt proposed them in the first place) but the short lines are something else. In many cases they have rather tired and sub-standard track but

with some help from regional governments and on line customers they have generally managed to keep themselves up to the mark. One important difference between North America and here is that they take a far less precious attitude to rail (for which read rail weight) than we have ever done. There are a number of stories about short lines which have continued in business with 130 tonne cars on track laid with 80lb/yard (40kg/m) rail or even lighter – albeit at rather low speeds. Their issue is more with underline structures rather than rail per se. It is the structures which are generally the subject of third party support.

In Australia we initially had very little inter-change between rail systems. Queensland was NG, NSW SG, Victoria and S.A. BG, Commonwealth SG and W.A. NG – any interchange was by transshipment rather than passage of foreign wagons across borders. The exception was between S.A and Victoria, but even there the first 60 years or so of their joined existence saw little, other than passenger trains, crossing the border on a regular basis.

Somewhere around 1900 the Commissioners had the good sense to set some common standards in regard to couplers and braking and to some degree outline, such that when standardisation and the associated bogie exchange became a fact of life in the 1960's there was minimal obstruction to state based rolling stock now crossing borders at will.

The area where there was little if any accepted normal practice was in permitted wagon weights on various lines. Over time an upper limit of 19 tonnes axle load (tal) became normal on the SG/BG network on main lines, and in some cases



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secondary lines. A number of inter-state routes were OKed for 20 tal back around 1986, but otherwise it was left to the then state railways to determine what could and could not be run. Branch lines were often of 'pioneer' design and constructed in suitably lightweight material. These generally had lower limits than did the adjoining more important tracks.

Victoria took a lead some 30 years ago in this respect raising the condition of all remaining regional lines to a standard able to take 22 tal locomotives (G class) although retaining the 19 tal for wagons. Even the Robinvale line, with suitable additional sleepers and ballast under its 30kg rail, was able to take the heavy locomotives – a move which allowed Victoria to rationalise its locomotive fleet by having virtually universal running rights for all types, regardless of rail weight.

Australian National did something similar allowing heavy locos on 30 kg rail, as well as allowing heavy locos and wagons (up to 23 tal) at 80 km/h on recycled 40 kg rail from the original 1917 Trans line (in fact this section, on the Alice Springs line, still remains in track 30 years later and carrying far more tonnage than ever envisaged when this allowance was agreed).

ARTC has taken up the cudgels for its inter-state network and initially has approved 21 tal at 110 km/h on rail of 47 kg (which is the majority of its track outside NSW) and 23 tal at 80 km/h. It is now re-railing east of Whyalla, where 40 or 47 kg rail is being replaced with 60 kg plant with the objective of lifting track to 100 km/h at 23 tal and 80 km/h at 25 tal as a national standard. The Melbourne – Adelaide line (it is around half 47 kg and half 60 kg rail at present) and the big one – the Trans line between Port Augusta and Kalgoorlie which is predominantly 47 kg rail dating back to the 1960's

will both need to be re-railed before this is a national inter-capital standard

New South Wales on the other hand never saw the commercial side of this issue at all (and probably still doesn't). A considerable number of 'grain lines' are still in 30 kg rail, albeit with a growing proportion of steel sleepers and a reasonable serve of ballast. Some lines, such as Cobar, Coonamble (currently being done), Naradhan, Walgett and North Star have be re-railed using second hand main line rail – with the unfortunate situation that sections such as Nevertire to Nyngan and Temora to Wyalong are in 40 kg rail with mainly 53 kg further out.

Despite this there apparently has been no holistic approach which would remediate the formation, ballast and underline structures at the same time so these lines would then be capable of handling main line type trains at reasonable commercial speed. The current process of running lightweight branch line locos that are now half a century old on grain trains in order to service the outer end of grain branches is pure NSW – nowhere else in the country is such a sub-optimal operation tolerated.

All the NSW grain branches remain under the control of the State (with one exception) and are funded by the State. ARTC has managed these lines for the last 7 years, a task which will be taken over by John Holland in the New Year. However all the financial and operational decisions are made by the State with the Manager in effect doing what the State requires and is willing to pay for. The potential is there to either do a proper job while re-railing, or to be more proactive and accept a minimal standard for modern locomotives (at least) on suitably husbanded existing rail so that the archaic practices of the past can be done away with.



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Retention of a GrainCorp fleet of 48 class locos and older type grain wagons is all about retaining the constraints of the past on lightweight grain lines – allowing GrainCorp to do the branch line bit into sub-terminals where main line trains can reload (double handling) at leisure for the haul to port. A ‘one standard’ approach to these lines would allow considerably more efficient grain operations than are now practiced, with the consequent downstream benefits from more efficient haulage being available to plough back into other complementary improvements to the grain logistics chain.

Victoria did it 30 years ago, Tasmania has done it (although grain is not an issue there), the grain lines in South Australia are more or less of one and Queensland has done it. Western Australia is getting close to a single standard – only NSW stands out as having allowed a completely solvable problem to fester under the weight of bureaucratic indifference to commercial efficiency. No wonder the state economy keeps being reported as cactus!!

COMING EVENTS OF INTEREST

HUNTER VALLEY STUDY TOUR (STORE)

This event will be a joint two day event with PWI up in Newcastle and intended to run over three days from Fri 23rd March to Sun 25th March next year. The plan is:

Friday 23 March 2012

Following arrival of the morning train from Sydney
Short bus tour in Newcastle area

Lunch at Monte Pio at Telarah
3 - 4 Papers on topics concerning coal and train operations in the Valley
Evening dinner at Monte Pio
Overnight at Monte Pio or other accommodation

Saturday 24 March

All day bus tour to a number of new, exciting and interesting facilities relating to the coal operations
Lunch included
For those wishing to return to Sydney by train, the bus will return to Broadmeadow

Overnight at Monte Pio or other accommodation

Sunday 25 March

Optional Rail Motor tour to Gulgong via Muswellbrook and Ulan giving an opportunity to see the numerous rail and mining activities underway in the Valley.

Lunch will be served at Gulgong

Return to Broadmeadow in time for a train to Sydney

As a number of attendees will be locals, the various activities will be optional and able to be booked separately.

An attractive all-up price will be available for those who have the time to enjoy the full weekend. Partners will be most welcome.

It is anticipated that booking will be open early in 2012.

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NOVEMBER MEMBERS MEETING – REPORTER: MALCOLM CLUETT

Waratah Train – Signal Interference Testing

Dave Nolan, RailCorp

Dave commenced work for the then PTC in 1980 as a signal electrician. He moved to the Technical Support section in 1986. He became a Licensed Signal Engineer, and has taken a lead role in testing various items of rolling stock.

Background

Prior to the first chopper-controlled trains being introduced, it was known that unmodulated audio-frequency track circuits would be susceptible to the fixed-frequency Chopper-controlled trains. This issue was raised in 1983, and the Liverpool – Campbelltown section was resignalled.

At the same time, the decision was taken to eliminate all double-rail 50Hz track circuits. (At present there are a few still outside the electrified area in ARTC territory.)

The Waratahs are the latest generation of double-deck EMU trains for the RailCorp system, centred on Sydney NSW. The line voltage is 1.5kV DC.

The Tangaras have DC traction motors and chopper control (apart from the last set). Subsequent trains have all had AC traction motors with variable-frequency drives. Problems were experienced with the introduction of the Millennium trains affecting the reliable operation of the signalling system. The current generation of signal interference testing within RailCorp dates from this time.

In the period between the Millennium train and the Waratah train, RailCorp has made progress in expediting the testing and approval process for new rolling stock and its effect on the signalling system. This is the subject of today's presentation.

Assessment Criteria

- Train can be reliably detected
- Wheel to wheel resistance meets specification
- Train acceleration and braking meet specification and therefore comply with signal designs
- Train cannot cause a wrong or right side failure of the signalling systems
- Static Inverter unit does not generate harmonics that can impact on the signalling
- 50Hz impedance of the train meets specification

The main sources of signal interference are:

- Conducted currents
- Close Up effects (large magnetic field effects and low impedance)
- Inrush currents (ringing of the train input filter, as described below)

Dave then described the normal path of traction circuit currents, and the operation of Jointed and Jointless track circuits. All track circuits involve the injection and detection of small electric currents, while still handling the large DC traction currents.

Jointless track circuits are tuned to a certain frequency, which is affected by the passage of a train.

100mA is a problematic amount of current for a signal engineer, which is a different viewpoint from

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a rolling stock engineer. (On-board circuits of EMUs or Diesel-electric locomotives can carry hundreds of amps.)

Dave gave a description of **Right-side failures** (stop indication when it is safe) or **wrong side failures** (clear indication when it is unsafe). The Millennium trains did cause some right-side failures during the early trials.

Designers want a train to avoid emulating non-train behaviour as it operates the signalling systems. An important secondary benefit of track circuits is the detection of broken rails. A broken rail can cause a wrong-side failure of the signalling system.

Inrush Currents.

When the 1500V DC is applied to the Traction Inverter, there are a few items to protect it from the sudden rush of current. This includes a large 6mF Capacitor connected in parallel to the inverter. Between it and the pantograph are an inductor, a current limiting resistor (with a switch in parallel), and an in-line switch. The intention is to avoid sudden voltage changes to the Traction Inverter. However, there is a resonant effect when the circuit is first energised, and a second effect when the switch in parallel with the resistor closes (after the capacitor is charged). Ringing of this on-board circuit for both of the above events has the potential to affect signalling systems.

A 50Hz waveform can exist in the traction power supply (due to a failure in a sub station). The 50Hz resistance of a train must meet the specification.

There was a three stage approach to the testing of the Waratah train sets.

Stage 1 - Factory Tests in Japan at the Hitachi works.

This was an interesting concept for testing. Typical RailCorp signalling components were taken to the train (or rather, a factory simulation of a train) with the objective of getting an early warning of any problems.

Signal equipment from Sydney was shipped to Japan for testing. This amounted to some tonnes of equipment, including heavy items such as resistance bonds. The test work included the following:

- Recording of harmonics generated by the traction equipment while under test (the traction motors for ¼ train were mechanically coupled to dynamometers)
- Replaying of these recordings and injecting them into a track circuit set up on a real section of track within the works
- Recording of the effects on the test track circuit for subsequent analysis

Laptops and test equipment from National Instruments were used to record and analyse the data. Dave showed pictures of the laboratory set up and the actual track circuit on a little-used section of railway within the facility. The Hitachi plant in Mito, Japan, was a large one covering 20 Ha and with 16,000 employees.

All aspects of train performance were tested, ie low & high line voltages, different grades etc. It was found that the 50Hz impedance of the train did not meet specification, and inrush currents were likely to be a problem.

Stage 2 Pre Production Test Vehicle (PPTV)

This was an initiative of Reliance Rail, in the form of a four-car pre-production train. All subsequent trains were of eight car configuration, and not

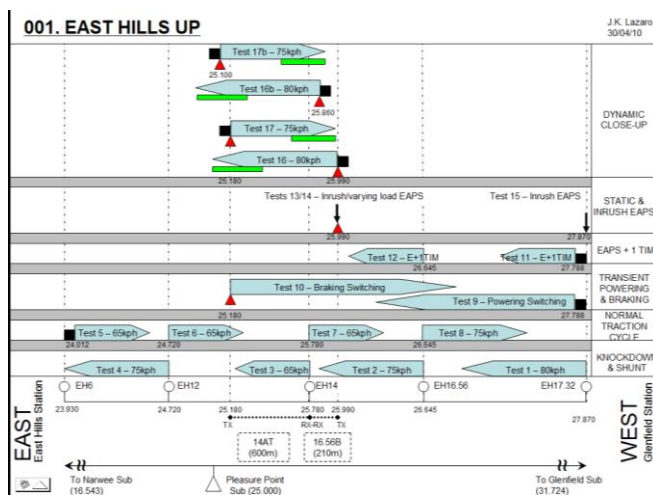
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divisible. The PPTV allowed the conventional test approach of taking the train to the signal hardware. Sub-systems of the train were type-tested, and experience was gained as to what to expect from an 8-car set.

Graphical Test Plans of the forthcoming tests were prepared. This is a new way of summarising a lot of test run information, in conjunction with substation locations, signal locations, direction, and the actual operational tests to be undertaken. An example is presented below:



Pre Production Test Vehicle findings:

- Conducted currents were of such a nature that they could be accepted.
- Close Up effects needed to be better understood. Required retesting to allow further analysis
- Inrush currents were going to be a problem. Renewed an initiative to replace the last remaining double-rail 50Hz track circuits in the Sydney Metropolitan area.

Conventional testing of new trains on the rail network during possessions at night.

For previous generations of train testing on the wider network, there was only three hours of productive test work per night, if the usual approach was taken of testing trains in the small hours when regular passenger services are not operating. This is a poor use of labour (typically four persons lineside and ten on board).

Stage 3 - Intensive Testing of Set 1 at Clarendon

Again, this was a case of taking the track circuit to the train, but not as far as Japan. Two nearby signalling sections were set up on the outer end of the Richmond branch, at each side of Clarendon station. Both sites had a team on site, to allow one circuit to be reconfigured while the other one was under test.

Buses were substituted for regular trains beyond Windsor.

Different items of hardware were set up to test 50 types of signalling systems – over five nights of weekend track possessions. Working two shifts permitted 18 productive hours per day. Some of the testing was in very cold weather conditions.

Alstom Coils were used to monitor current harmonics. Processing of the test results had to keep pace with the project. Recorded raw data was backed up to memory sticks and delivered to the office at the conclusion of each shift.

Each night's test data was processed the next day using tailored MatLab scripts, which had been verified prior to the beginning of the project. Sufficient staff were rostered to keep up with

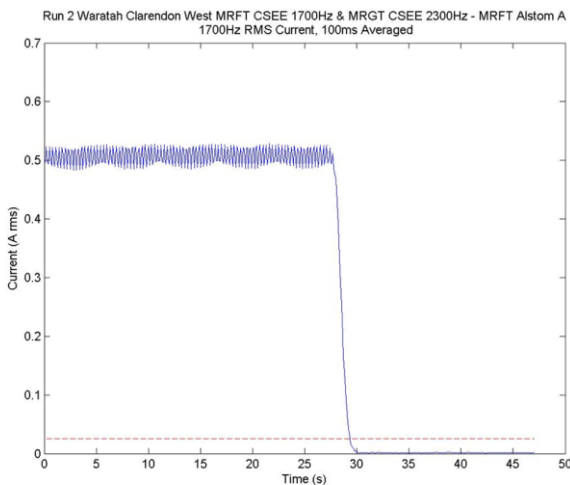
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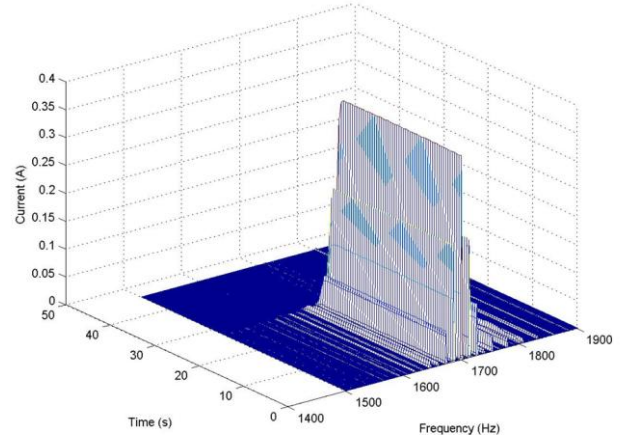
recording. 100,000 pages of test results were produced.

Typical Results were presented in 2D plots (current versus time) with a go/no go criterion. Critical frequencies were evaluated. The plot below shows a track circuit being activated at t=28 seconds.



3D plots (current versus time versus frequency) allows extra interpretation. Additional harmonics and noise are visible.

Run 2 Waratah Clarendon West MRFT CSEE 1700Hz & MRGT CSEE 2300Hz - MRFT Alstom A
Max = 388.6492mA



Dave presented examples of 2D and 3D plots, showing the response when a track circuit was activated by the test train.

Other Testing

Some mid week possessions were used elsewhere on the wider rail network to test interaction of Set 1 with signalling systems whose hardware was not readily transportable to Clarendon.

Set 1 findings.

- Conducted Currents were acceptable
- Close up effects while above the standard did not contain any persistent or modulated components and are therefore ignored by the track circuit receiver.
- Inrush currents were an issue but this was resolved by the replacement of the remaining double-rail track circuits
- 50Hz train impedance met specification

Interim approval was granted to allow the Waratah trains to operate over certain parts of the network. No need for locomotive haulage.

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Approvals

A presentation was given to the Chief Engineer Signals & Control Systems outlining the processes undertaken, the findings and the resolutions of the issues that had been detected. The final report was signed off by the Chief Engineer Signals & Control Systems

Timing of the Approval process

Approval was gained only two months after testing of the 8-car set began in August 2011. This reflected a tremendous effort on the part of the signals test team.

There are obvious advantages in completing the testing process as soon as possible. For example, minimising inconvenience to members of the public through needless track possessions, and commercial arrangements with the supplier.

Dave acknowledged the RailCorp rolling stock team who assisted with the project.

Q&A

Q Diesel electric locomotives with AC traction motors – do they also cause problems for signalling ?

A Potentially yes – if they have AC traction motors. Some units now have 3MW of power onboard.

The signalling system is DC immune so DC locos are not a problem. Wheel profiles are important for correct operation of track circuits.

Q Please expand on wheel profile

A Tread profile is important. Loss of shunt incidents can occur with poor wheel treads. The basis of the signalling system is that trains should reliably short out one rail from the other.

There is a programme to remove field side relief on railheads, so that tread hollowing on wheels is not likely to cause a problem (ie, rolling contact on rusty and non-conductive outer treads of wheel).

Worn rails and foreign rolling stock can cause problems. (example of foreign rolling stock - diesel locomotive on a line which normally carries only EMUs)

Block working is instituted when reliance cannot be placed on track circuits.

The problem of wheel and rail profiles is managed partly by administrative and partly by a Standards approach, in cooperation with the rolling stock engineers. There is wheel monitoring equipment on the network.

Q Are there insulated joints on high frequency track circuits ?

A Yes there are some (over points). Detection current varies from 250 mA (double rail) to 6A (single rail).

Q How to specify signal system compatibility requirements to rolling stock manufacturer ?

A Curves are specified from the client to the manufacturer, in terms of what track circuits can tolerate. Values in the curve take into account the failure mode. (Broken rail, broken wire, 50% margin, etc)

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Q Richmond Line –were there problems with the Level Crossing at Clarendon during the intensive testing.

A An objective was to avoid excessive blocking of road traffic.

With hindsight, it would have been better and less confusing for motorists to have booked the level crossing out of use, and had it manually activated by flagmen. There were problems with the battery going flat at the crossing.

Q Would certain trains cause interference for predictor level crossings ?

A RailCorp have no predictor crossings yet. Some will be introduced in the Kiama – Bomaderry section shortly. None in electrified territory.

Q What is a Digital Track Circuit ?

A There are some new systems in use, viz EBI 200 and EBI 400 (coded)

Signals are digitally processed. Otherwise, track circuits on the RailCorp network process an analog signal.

Q Please expand on the track circuits which were replaced in 1983.

A These were unmodulated audio-frequency track circuits in the Liverpool-Campbelltown section of line. It was known that there would be a problem with chopper-controlled trains and this section was resignalled before chopper rolling stock was introduced.

The speaker was thanked for an interesting presentation, which was accompanied by photos of the test installations in Japan and Australia, circuit diagrams of the various types of track circuits and the test set-ups at Clarendon.

The URS special meeting on November 14th will be reported in the next issue, which will be dated February to align with the month of the meeting it advertises but will in fact be distributed during the second half of January

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WHERE AND/OR WHAT IS IT?

We have a rather peculiar puzzle this month, submitted by Malcolm Cluett. The pictures show a portion of Bondi Road at the corner of Penkivil St (half way between Bondi Junction and the beach) along with a close up of the survey marker visible in the roadway (bottom centre) which is clearly identified as NSW



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The question is when was the marker placed in this location and why?

Last months picture was taken approaching Gap crossover, north west of Werris Ck. At this point the lines from Narrabri and Binnaway come together through a gap in the ridge before running through to enter Werris Ck from the north. During WW2 a second line (the left hand track) was provided which approached Werris Ck from the south, allowing cross country war supply trains to arrive at the latter facing toward their ultimate destination of Queensland – or at least that was the intention.



Like a lot of war time rail capacity enhancements it probably arrived too late to be of much use in the war effort, but in this case (as is evident in the picture) it did remain in use until the reduction in Binnaway line trains (from withdrawal of passenger trains and de-classification of the line to 'grain only' status for local traffic) resulted in closure of the war time leg into Werris Ck.

Malcolm Cluett, John Hoyle, Stephen Townsend, David Langley and John Nestor all identified the location.

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FUTURE MEETINGS AND EVENTS FOR 2012

Date and time	Activity	Location
TUESDAY 7 th February	TBA	Bradfield Room Main Concourse, Central Station
TUESDAY 6 th March	Simon Wood, National Chair, RTSA on a New Zealand topic	Bradfield Room Main Concourse, Central Station
Friday 23 rd to Sunday 25 th March	Hunter Valley Study Tour (joint program with PWI)	Newcastle and Hunter Valley
TUESDAY 3 rd April	TBA	Bradfield Room Main Concourse, Central Station
TUESDAY 1 st May	TBA	Bradfield Room Main Concourse, Central Station
TUESDAY 5 th June	TBA	Bradfield Room Main Concourse, Central Station

The Bradfield Room at Central is located next to the Lost Property Office opposite the inner end of Platform 2

Note: From February 2012 regular members meetings will be on the first TUESDAY of each month.

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The best way to submit contributions is by e-mail to the Editor at 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.

