

SYDNEY NEWSLETTER



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

APRIL 2006

NEXT RTSA SYDNEY CHAPTER MEETING

Thursday 4th MAY

Starting at 17.30 for complimentary nibbles (finger picking good!) and networking prior to the presentation at 18.00

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

GRAIN LINES STUDY TOUR –

Andrew Honan, assisted by Bill Laidlaw, will report on our late March Study Tour of western and southern grain areas by a bus load of RTSA members and friends, covering the tour itself, key issues and problems that were identified in relation to remediation and retention of agricultural branch lines and the policy and financial directions that RTSA feels would be appropriate.

This study tour was part of a response by RTSA to the continuing parlous state of a number of lightweight rural branch lines in the grain areas of NSW. These branch lines are an important part of the grain transport network, with several having typical grain tonnages of over 200,000 tonnes per annum, yet their financial position is unsustainable under the current narrow interpretation of relevant costs and benefits

Come along and be informed by the panel, prior to an interactive session with them in a question and answer format.

The topic of valuation and justification of rail lines, including their part in the total rail network, is one of considerable significance at present. Tasmania, Victoria, South Australia and possibly West Australia all have or will have similar issues in the near future, some of which will include secondary main lines as well as branches

Members who attend RTSA meetings and events will qualify for CPD credits in accordance with Engineers Australia criteria.

Before each of our meetings at the Harricks Auditorium a range of finger food and hot drinks is provided by the Association to allow attendees to 'fuel' while networking with others of like interests. The meeting generally finishes by around 19.30 which allows attendees to get home at a sociable hour.

Enquiries in regard to this meeting should be directed to Bill Laidlaw at blaidlaw@bigpond.com (mobile: 0409 602 833) or Andrew Honan at a_honan@pacific.net.au

SYDNEY NEWSLETTER



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

APRIL 2006

NEWSLETTER FORMAT

You will notice that the front page of the newsletter has the 'Next Meeting' notice done in poster style. For the vast majority of members who get the Newsletter by e-mail this allows the front page to be printed off and put up on the office notice board (although it may be a career enhancing move to make sure the company agrees first!). This is part of getting the RTSA exposed to a wider audience in the rail fraternity here. Your assistance in having meeting notices placed on suitable notice boards will be much appreciated

FUTURE MEETINGS AND EVENTS

A tentative meeting program has been determined for the remainder of 2006, although at this stage several of the proposed topics are subject to confirmation, and the dates may need to be swapped around in some cases. However the dates are firm.

MAY 4th: See notice on page 1

JUNE 1st: AGM, George Erdos (National Chair) to be invited as guest speaker. (Venue to be advised but will be at the Central end of town)

JULY 6th: Timetable planning (venue will be the new Engineers Aust location at Chatswood – our new home)

AUGUST 3rd: Joint meeting with PWI at Masonic Centre in Goulburn St. (PWI will determine topic)

SEPTEMBER 7th: Track Machine manufacturer

OCTOBER 5th: Melbourne tram power supply upgrade for Commonwealth Games – how did it go?

NOVEMBER 2nd: Government and Opposition transport spokespersons debate their policies ahead of the 2007 election.

The May meeting will be held at our usual venue at Milsons Point, but soon after that time Engineers Australia are moving home to a new venue adjacent to Chatswood station. The June meeting will be at a 'one off' venue (details next Newsletter). July is planned to be the first of many at the new venue. We will update you in the next newsletter.

CORE 2006 is in Melbourne from 30th April to 2nd May. Places were still available at last report, although it would be wise to book as soon as possible if you haven't yet done so.

AusRAIL will be in Brisbane between 21st and 22nd and November.



Please remain behind the yellow line until the lizard has come to a complete stand

Understanding Engineers - 3

A pastor, a doctor and an engineer were waiting one morning for a particularly slow group of golfers. The engineer fumed, "What's with these guys? We must have been waiting for 15 minutes!" The doctor chimed in, "I don't know, but I've never seen such ineptitude!" The pastor said, "Hey, here comes the greens keeper. Let's have a word with him." "Hi George! Say, what's with that group ahead of us? They're rather slow, aren't they?" The greens keeper replied, "Oh, yes, that's a group of blind fire-fighters. They lost their sight saving our clubhouse from a fire last year, so we always let them play for free anytime." The group was silent for a moment. The pastor said, "That's so sad. I think I will say a special prayer for them tonight." The doctor said, "Good idea. And I'm going to contact my ophthalmologist buddy and see if there's anything he can do for them." The engineer said, "Why can't these guys play at night?"

SYDNEY NEWSLETTER



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

APRIL 2006

LAST MEETING (a joint IRSE / RTSA meeting)

SAFETY CHANGE MANAGEMENT

Gareth Topham, Safety Change Manager for RailCorp, presented a very interesting overview of the issues surrounding safety management and how these apply to RailCorp.

Gareth began by defining safety - "This is freedom from unacceptable risk of physical injury or of damage to the health of people, either directly or indirectly as a result of damage to property or to the environment.

Functional safety is part of the overall safety that depends on a system or equipment operating correctly in response to its inputs. " (ref: IEC61508).

He then went through a number of formal standards which when 'melted down' can be presented as the seven step risk assessment process as used in the UK 'Yellow Book'. This entails –

- Hazard Identification – e.g. HAZOP, FMECA
- Causal Analysis - e.g. Fault Tree
- Consequence Analysis - e.g. Event Tree
- Loss Analysis
- Options Analysis
- Impact Analysis
- Decision

Managing Safety Change means not only implementing a safe system, but also ensuring the change process will be undertaken in a safe manner. The Change Activities should consider passengers, staff, contractors and members of the public within the neighbourhood. Planning at an early stage for safety assurance means you have the best chance of both identifying and satisfying the necessary safety requirements - and avoid finding yourself in a difficult situation

A quick look at Human Factors discussed the fact that there are many tools for assessing such implications on a project. They may include workload, ergonomics, task analysis, fatigue management, types of errors and their mitigations. Human Factors studies do not have to be done by HF experts, though their advice in choosing the right tools is often valuable.

Gareth then introduced the concept of ALARP – As Low As Reasonably Possible.

It is –

Using Good industry practice

Compliance with standards and legislations

It is not –

Use of Best Practice – this may be too cost prohibitive

Continual Improvement – this may be a good ideal and worthy exercise but it does not relate to ALARP.

The ALARP process provides a framework for making decisions and application of 'Structured Professional Judgement'. Advice is provided to document how the change project and decisions are developed – the conclusion may be do nothing but there is still a need to explain why. The decision as to what is ALARP is always an exercise of professional judgement.

There are some European practices that are interesting alternative approaches. The French practice GAMAB (translates to as safe or better than the system it replaces) considers the whole system so that you can engineer some elements to higher risk than previous if overall the system risk is equal or better than before the previous system.

The Germans practice MEM (Minimum Endogenous Mortality denoted by "Rm") has been determined as: $Rm = 2 * 10^{-4}$ fatalities/person*year. From the above the following rule is applied: "Hazards due to a new system of transport would not significantly augment the figure Rm".

Gareth then shifted along to Hazard logs. A good hazard log effectively forms a Safety Case. It provides tractability between hazards, common causes, safety requirements and mitigation control ownership. It can be used to track safety documents, incidents during the project and a journal of how the hazards have been identified and closed out. Commercial hazard logs can also form qualitative fault trees to analyse the risk. Identified hazards are entered into the log and the causes listed. By understanding the consequences of the hazard we can assess the risk (likelihood and consequence). Hazards are closed by providing sufficient controls to ensure the hazard and causes are controlled so that the risk is "As Low As Reasonably Practicable".

All good change project reports are structured and include the following

- Background
- Purpose
- Consider the Objectives and Scope
- Responsibilities and Stakeholders
- Organisation for Change
- Safety Activities
- Technical Safety Report
- Conclusions and Recommendations
- Constraints on the use of the system

You may design a perfectly good system but you must consider the environment in which it will be used.

Gareth gave a case study of axle counters. These have been generally accepted in Germany and are part of the operating and safety culture. When trying to apply them in the UK there were huge cultural barriers to break down –

Detection of Broken Rails

Use of Track Circuit Shorting Clips in an Emergency

SYDNEY NEWSLETTER



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

APRIL 2006

Reliance on Humans to effect a reset

In the end these were resolved by changing associated practices - reliability of the comms systems - design of the VDU based Control System; increased ultrasonic testing of the rails; reset of a disturbed or failed section. So the Safety Case often demonstrates risk mitigation which has nothing to do with the initial product Gareth also mentioned the concept of cross acceptance - which has been developed in Europe to allow manufacturers to claim cross acceptance once they have achieved approval in one member state. Both Siemens and Alcatel have used this to good effect. It is suggested that Australia should use the concept to allow less onerous safety validation inside the black box. A safety case will still need to be made for the environment in which the cross accepted 'box' is employed in, but the 'box' is not directly part of that process.

Gareth summarised the post implementation review part of the safety change process as involving Short Term and Long Term Review (1 month / 6 month) Formalise the process – you get more consistent data Provide feedback to those who raise issues – empower Undertake analysis of all reports to identify underlying trends

Document review to provide lessons learnt to others. Gareth was thanked with acclamation by approximately the 30 members (of RTSA and IRSE) at the end of his presentation.

Understanding Engineers - 4

What is the difference between Mechanical Engineers, Electrical Engineers and Civil Engineers?

Mechanical and Electrical Engineers build weapons and Civil Engineers build targets.

ILMRS OPEN DAY

Weston Langford, an engineer compatriot from Victoria, came up to Sydney with Reg Topp to inter alia visit ILMRS for their open day. Weston has provided the following interesting commentary on his weekend 'up north'

My visit to the Illawarra Light Railway's open day on March 19th had its origins 44 years ago when, during the course of my second annual leave from the Victorian Railways early in 1962 I missed seeing the 2ft gauge line at Corrimal for the simple reason that I didn't know that it existed. This visit to Albion Park, from Melbourne, involved travel both ways on the day XPT

and a trip on the day prior to Newcastle courtesy 3801 Limited and CityRail. After visiting Albion Park we travelled by the Eastern Suburbs Railway to King's Cross so that my Colleague could visit his relatives.

My attention was drawn to the ILMRS Open Day by a display advertisement in *Railway Digest*. Later we learned about the special arrangements made by RTSA Sydney Chapter. I suffer from significant mobility impairment. As a consequence transport from Albion Park to the Museum had to be arranged. This was personally attended to by RTSA Sydney Chapter Chairman Bill Laidlaw to whom I extend my grateful thanks. (*Bill seems to be the driver of all things mobile – come to the next meeting to find out more – Ed*).

The Illawarra Light Railway and the arrangements made for its open day were entirely creditable with the exception that they ran out of sandwiches rather early in the day and my colleague and I had to make do with ice cream for lunch. The Illawarra Light Railway is comprehensively described in the *Museum Guide* which I would commend to members. My 44-year quest to photograph the locomotive "Burra" in operation found its fulfillment thanks to the endeavours over many years of the Museum Society and its members.

Comparisons are odious but, after traveling over representative parts of the CityRail network I would conclude that, notwithstanding all of its past problems and recent bad press, it is enjoying the benefits of its rigorous and substantial infrastructure renewal over the years and also that the wheel-rail interface is being really well managed. It was also refreshing to note the progress being made by ARTC on the intercapital line but, at the same time, disappointing to note that, due to the four year planning horizon adopted, no re-alignments have been adopted in the works currently under way. Our friends in the *Roads Club* would be incredulous at the thought building one of their major links to alignment standards in vogue in 1910.

My colleague and I look forward to a future visit to the Illawarra Light Railway to see the composite "Shay" locomotive in operation and to ride on the track extension to Albion Park Station as shown on the site plan (Page 9 of the *Museum Guide*).

SYDNEY NEWSLETTER



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

APRIL 2006

GUEST BOOK

As the opportunity arises points of view from members and other interested observers will be reproduced in this Newsletter.

Our commentary this month is from Don Phillips – an experienced and acute observer of the transport industry who generally maintains a low profile but has become so incensed by the complete dereliction of duty to the nation by policy makers and politicians that he has felt the need to speak out:-

Twice the Task – Twice the trucks?

In February this year the National Transport Commission (NTC) released its report 'Twice the Task - A review of Australia's freight transport task.' The report is supposedly an objective analysis of policies required to cope with Australia's increasing freight transport task, but readers of it could be forgiven for thinking that it is an excuse to justify bigger and heavier trucks.

Twice the Task advocates working towards consistent higher mass limits for trucks throughout Australia particularly on interstate highways, major urban freeways and arterial roads with connections to freight hubs and distribution terminal areas. To support bigger and heavier trucks, the report recommends increasing the construction standard of the road system and recovering these increased costs through pricing. However, allowing bigger and heavier trucks is one thing – getting them to pay for the extra road damage they cause is quite another as was seen recently with transport ministers' rejection of increased road user charges for heavy vehicles.

The report comments that rail's market share will fall to 6% between Melbourne and Sydney by 2020 and to 7% between Sydney and Brisbane. However, it then says that these projections don't account for potential increases in rail market share from investments and other improvements currently under way. Obviously not, otherwise the Australian Rail Track Corporation wouldn't be undertaking substantial investments in those two rail corridors to increase rail's market share to at least 20% and 30% respectively with higher growth possible from further investment.

Twice the Task comments that programs to shift freight from road to rail simply reflect the idea that 'rail is good, trucks are bad' and that the benefits of any mode shift 'will be marginal except in particular local situations'. Really? This completely ignores the well researched and publicised benefits of mode shift to rail in terms of reduced road construction and maintenance costs,

reduced crash risk to motorists from large trucks, less fuel use and fewer greenhouse gas emissions. Given that the benefits of mode shift to rail are apparently negligible, we might as well get on with introducing 36.5 metre, 90 tonne gross B-triple trucks.

The report then makes the astounding claim that rail investment is 'very expensive'. Compared with what? The \$500 million freeway through the middle of Albury; the \$350 million, Yelgun to Chindera Pacific Highway Bypass of Murwillumbah in northern NSW; the \$300 million, 15 kilometre Craigieburn Bypass in Melbourne's north; the \$2,400 million, 40 kilometre Eastlink project in Melbourne's south-east; the \$278 million, 1.3 kilometre addition to Brisbane's inner northern busway; the \$170 million, 4 kilometre Mitchell Freeway extension in Perth etc, etc. What was that about road money falling from the sky? Rail investment could also 'reduce funds available for other, more beneficial projects'. Like what? Stronger and wider roads to accommodate the bigger and heavier trucks that are so critical to the nation's transport task? What is worse is that rail projects 'could require additional land which would increase disruption during construction'. Now, how many houses have been demolished over the years for urban freeways...?

In fairness, the NTC is working on rail regulatory reform to simplify the costly, time consuming and complicated existing state based regulatory processes and significant investment in the interstate rail network is about to occur. Unfortunately, rail regulatory reform and infrastructure investment will be undermined by continual increases in truck size and weight especially without any commensurate increase in road user charges for heavy vehicles. Yet another fine example of Australia's transport policy vacuum.

To quote from the January 2006 edition of International Railway Journal, the railway industry has to stop burying its head in the sand and become more assertive. Or, as SCT Logistics Director Peter Mason was reported to have said recently at a rail conference in Sydney, the rail industry needs to 'lob hand grenades' and increase its visibility.

If it doesn't then it will get flattened by B-triples.

SYDNEY NEWSLETTER



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

APRIL 2006

THE OBSERVATION POST

Last month I wrote about some aspects of *capacity* citing the Melbourne Connex situation, the north south coastal route in relation to 1500 metre trains and rail capacity in relation to coal exports. This month I want to follow through on a particular capacity issue that is quite relevant to the first of these.

I recently traveled to Campbelltown on a weekday at around midday. Not surprisingly there were a number of stabled emu trains in the yard there – not surprising since it was the off peak (between peak) period. What was rather surprising was that all three were Millenium trains (the newest and very good trains), while the train I was in was one of those tawdry six car non air-conditioned R sets, with reduced capacity due to every car having a real or former driving cab taking up otherwise useful passenger space. There at Campbelltown alone was \$75 million worth of new train that could, by definition, only be required for peak hour services. The between peak period is the busiest of the non peaks yet these new trains are not required at that time – ipso facto they are not required at night or on weekends either. Factor the 'peak only' train premium across the whole network and there is probably somewhere between 40% and 50% of the suburban fleet that is in reality a peak period train required only for a few trips per day. At the same time most of the Rail Clearway program (but not all) is associated with provision of infrastructure capacity for peak periods. It would be hard to argue, for instance, that \$70 something million would have been needed at Bondi Junction to lift capacity from 14 to 20 trains per hour when the weekday between peak service is typically 6 trains per hour. That expenditure is entirely associated with peak hour needs, as is much of the metro area expenditure of the past and present. Whenever the word 'capacity' is used in the context of metro railways, have a quick check and work out just how many improvement projects, if any, are to do with overall capacity rather than the narrow time band capacity driven by conventional working hours.

There are two mitigations to the issue of peaking on metro railways – flatten the peak demand and increase the off peak demand. The former is primarily an issue of city planning, social policy, work location and working hour conventions, all of which are outside the railways ability to change (but not beyond the range of some well designed 'hand grenades').

Increasing the demand at off peak times, particularly between peaks, is quite another issue. Marginal costs

are very low - the trains are free, train running and crew time is simply straight time worked and power (fuel) is linear with use - while the demand is highly price elastic. The conventional response is to run relatively low frequency services with some reduction in fares. In Sydney the standard off peak frequency is 30 minutes but with 15 minutes or better where routes have combined services, while the normal off peak fare is around 61% of the normal day return fare.

It has been reported that of all the submissions to IPART on the issue of rail fare pricing only two argued for an increase - RailCorp and our redoubtable Philip Laird. RailCorp are reported to have argued that off peak fares should be lifted to around 75% of the day return fare – a somewhat mechanistic response to a price elastic market, but one that is possibly institutionalised by the cumbersome fare setting process. The trouble with this logic is that relatively few peak hour fares would actually be bought as 'day returns' – most would be weekly (7 day) or longer period fares. Comparing off peak fares with 7 day fares (5 return trips) shows that if the former are lifted to 75% of the day return fare they will actually be very close to the periodical peak hour fares – a bit cheaper out to 45 km but more costly beyond. Comparison with longer period fares (out to 12 months) shows that the proposed off peak fares would be more costly than any day fare equivalent bought as a periodical current for longer than a month or two.

The response of RailCorp to IPART is really quite disappointing. While most other metro rail systems in this country are reported to be achieving handy passenger number increases, significantly assisted by continuing high petrol prices, reports from Sydney (from such authoritative publications as MX it must be admitted) are of marginal growth at best. In part this is a consequence of Sydney having a higher than average market share of urban travelers, and in part a legacy of past poor performance amplified by a heavy overdose of politicization and tabloid drum beating. Looking rationally at the existing situation there is not much that can be gained from trying to increase already high peak numbers (other than achieving even more belly-aching letters in MX), but there is a considerable potential at other times of the day, particularly during the between peak period. Attracting this market is neither easy nor quick.

One aspect that is singularly lacking is Sydney is a flexible and accessible fare system. The range of fares and their peculiar and pedantic application is real steam age stuff among the plethora of more customer friendly fare systems in Australia let alone the rest of the world.

SYDNEY NEWSLETTER



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

APRIL 2006

It is not that Sydney doesn't have the technology – the magnetic card readers common to buses, ferries and trains are capable of reading dates, times and locations across all modes so presumably could handle an appropriately friendly fare structure. The principal advantage of the Seniors and Pensioner fare is not the give away price but the flexibility of the ticket – all modes within the defined boundaries for the day. An off peak ticket that gave similar all modes capability within more tightly defined boundaries for a set time period would be a far simpler and more customer friendly transaction and travelling experience than the present system, even if the fare was then closer to the normal adult fare (i.e. ticketing access to travel was improved as a quid pro quo for a reduced off peak discount).

A second aspect is the facility of the network. This is primarily a function of frequency and connectivity. The latter issue is all about not having to wait a long time at junction stations for connecting trains (or other modes of public transport). In a system like Sydney's this is difficult to control directly, however if frequencies are improved then connectivity is automatically improved.

One of the features of existing off peak trains is the vast number of empty seats being whirled around the network, coupled with the unfriendly design of Sydney double deck cars for low volume use. Perhaps the solution is to make use of the 'part time' Millennium trains, and their Tangara antecedents and split these into four car trains during off peak and after peak and use the increased number of trains (but same number of cars, and consequently same amount of electricity) to give a higher frequency service. A more radical step would be to have one man operation of these short trains, using peak hour guards as off peak drivers. All other networks in Australia (apart from Brisbane) have gone to one man operation with relatively little disruption. Peak hour trains (or in fact full length trains at any time) would continue to be two person worked – this proposal is all about trying to improve the off peak service quality without adding to the cost impost on the system, not just as a traditional cost reduction exercise. Increasing frequencies and simplification of the off peak fare structure may allow rationalization of station staffing to allow a greater on train presence – providing an element of safety, security and income protection which would be seen as a positive gain by most travelers.

The issue of off peak should be all about maximizing passenger useage during such times. It is not about pretending that revenue gains can be made, along with the politically acceptable increased passenger numbers, by jacking up off peak fares with no offsetting service

quality gains that are appropriate to the discretionary off peak market.

Submissions to the IPART review have closed with apparently an unfortunately high list of 'no change' submissions. Holding revenue down (or even limiting it to the politically acceptable CPI level) is not a way to enable the network to grow and properly fulfill its function as part of the total public transport of the city. Intelligently structuring the fares and service levels to maximize use of the system would be. It would seem that few if any submissions to IPART have taken this approach. Maybe next time there will be many more submissions from people (such as your good self) who have more than a passing interest in rail transport.

SYDNEY NEWSLETTER



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

APRIL 2006

NOTICEBOARD

KEY RTSA SYDNEY CHAPTER COMMITTEE CONTACTS

Bill Laidlaw	Chairman	0409 602 833	blaidlaw@bigpond.com
Basil Hancock	Secretary	0408 295 131	basil.hancock@railcorp.nsw.gov.au
Max Michell	Newsletter Editor	02 9241 2675	samrom@bigpond.com
John Aitken	Committee	Bob McCotter	Committee
Arnold Aranjo	Committee	Trevor Moore	Committee
David Jehan	Committee	Chris Venn-Brown	Committee
Andrew Honan	Committee	John Watsford	Committee

CONTRIBUTIONS TO THE SYDNEY NEWSLETTER

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

NOTICE TO MEMBERS RECEIVING RTSA NEWSLETTER BY EMAIL

Members receiving this Newsletter by email should note that all Sydney Newsletters will be sent in a PDF format prepared using Adobe Acrobat Version 6.

Version 7 of Adobe Acrobat Reader may be downloaded free of charge from the internet at www.adobe.com. Version 6 still seems to read pdf's written in v.7 so maybe there is no urgency about upgrading.

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

DISCLAIMER

This Newsletter is published by the NSW Chapter of RTSA. Opinions do not necessarily reflect those of the Institution, Society, Chapter or Editor.

Items from this Newsletter may be reproduced provided they are appropriately acknowledged to the RTSA Sydney Chapter Newsletter