



The Railway Technical Society of Australasia

The First Ten Years

Philip Laird





What may have been. An image from the 1990s of a future Speedrail Sydney - Canberra train at Sydney's Central Station. Photo: Railway Digest/ARHSnsw.



Three Vlocity trains standing at Southern Cross Station. These trains coupled with track upgrades as part of Victoria's Regional Fast Rail program have seen a 30 per cent increase in patronage in their first full year of operation. Photo: Scott Martin

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2008

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Front Cover: An East West freight train at Two Wells, SA
Photo: Mark Carter

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Introduction



As the Executive Chairman of the Railway Technical Society of Australasia (RTSA), it is my great pleasure and privilege to greet you. This book 'The Railway Technical Society of Australasia - The First Ten Years' has been published to mark the 10th anniversary of the formation of the Society.

Arising out of its predecessor the National Committee of Railway Engineering (NCRE), the RTSA was formed in 1998 and, since then, it has built a reputation where it is recognised as one of the important pillars of the railway industry. Over the last 10 years the main focus of the RTSA has been the continuing professional development (CPD) of personnel within the railway industry. Today it is recognised as the peak professional body within the industry and it has more than 1000 ordinary members and 10 corporate members.

The purpose of this book is to outline the development of the railway industry in Australia and New Zealand over the past three decades and to illustrate the associated role of the Railway Technical Society of Australasia. I would like to congratulate the author Dr Philip Laird and the review team for their excellent effort in collating and documenting the material that is specific to RTSA and linking it within the broader aspects of the Australian railway industry.

On behalf of the members of the RTSA Executive Committee, I trust that you, the railway industry professionals and others, will greatly benefit from this historical record and that its contents will be a source of information and provide you with enduring value.

Ravi Ravitharan

RTSA Executive Chairman
June 2008

Acknowledgements



The author with a Queensland tilt train on trial at Nerang February 1998

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Philip Laird

University of Wollongong

Foreword

 BY TIM FISCHER AC

Movement at the Stations: Rail at last on a Roll!

After many false dawns and notwithstanding some bad public policy decisions, rail is at last turning the corner in Australia, at the start of a new century. There is movement at the station as the word has passed around, indeed there is upgrading of many stations and of the tracks in between the stations.

Along with an account of the Railway Technical Society of Australasia, this book plots the key dates of development of rail downunder and provides an excellent platform on which to move forward and contemplate the take up by rail of the ever expanding freight task in a big way. Likewise it charts the start and stop initiatives with passenger rail, especially the failure to proceed with a TGV type very fast train on our biggest or most densely populated corridors.

Sydney Central Station and Southern Cross Station Melbourne are sleek enough, with revamps now complete and even some surplus platform capacity. These two grand stations anchor one of the most traveled city pairs in the world, but the rail route between Sydney Central and Melbourne Southern Cross is crooked to say the least, adding to the inter capital distance.

The current rail distance Sydney Melbourne is 960 km, a VFT Canberra Gippsland route would be just 876 km and an inland route via Canberra North and West Albury would be an even shorter at 859 km. With a TGV at 400 km/h maximum, then a service of less than 3 hours is doable and competitive.

However we rarely think big and ahead of demand with rail infrastructure in this country, the new WA commuter line Perth to Mandurah and the world's newest transcontinental railway Adelaide to Darwin being notable exceptions.

Almost every night of the week, an APT double stacked freight train pulls out of Adelaide for Darwin with over 4000 tonnes of valuable freight on board, equal to about 100 B-Double truck movements. These super freighters versus using road represent on this key north south corridor a big reduction in diesel use and greenhouse gas emissions. For these reasons, not to mention congestion costs, we need rail to roll right along and we need well based information and debate as provided here, to help bring this about.

Tim Fischer

The Author declares as a courtesy he is a Director of APT Freightlink and Host of the ABC's *Great Train Show*, but emphasises he has written the foreword based on his personal views.



Tim Fischer at Albury Station

1 Railways in Australasia

In 1854, Australia's first steam train ran on a broad gauge (1600 mm or 5 ft 3 in) track from Flinders Street to Port Melbourne. A year later, passenger services started between Redfern and Parramatta in NSW using standard gauge (1435 mm or 4 ft 8.5 in) track. With the start of the first rail service in Queensland between Ipswich and Grandchester in 1865, Australia gained narrow gauge (1067 mm or 3 ft 6 in) track. For more on Australia's multiplicity of rail gauges - 22 in total - see Fischer (2004).

By 1881, all six colonies had railways. The first inter-colonial link was at Albury allowing for a Sydney - Melbourne service to start in 1883 - albeit with a change of trains at Albury due to the different gauges. Other intercapital links included Melbourne - Adelaide (1887) followed by Sydney - Brisbane (1889) with a change of gauge at Wallangarra. The linking of Australia's colonies by rail acted as an impetus to Federation with the formation of the Commonwealth of Australia in 1901.

In 1901, railways were the preferred means of travel, and for consigning domestic freight. Until then, their main competition had been horses on land and ships on water. So important were railways at Federation that the new States preferred to retain their railways, rather than transfer them to the Commonwealth as had been the case with defence, postal and telegraph services. The Commonwealth's first major public work was the construction of the Trans-Australian Railway from Port Augusta to Kalgoorlie. This was an ambitious project that was completed during World War I under harsh conditions. Train services were started in 1917 on the new line by the Commonwealth Railways.

Extensive suburban railways, complemented by electric tram networks, served all state capital cities. Melbourne gained its first electric trains in 1919, and Sydney in 1926 - both with 1500 volt DC equipment. The ravages of the Depression, and the emergence of competition for passengers and freight from buses and trucks resulted in all States enacting legislation in the early 1930s to protect their railways from road competition. The

1930s were also notable for the efforts of Victorian Railways in building the *Spirit of Progress* train to run between Melbourne and Albury. When commissioned in 1937, it was the finest and fastest train in the Southern Hemisphere.

Australia's railways worked hard during World War II to support the Allied war effort. The work of the railways was made harder by the various break of gauges, as the only extension of standard gauge outside NSW between the two World Wars had been Kyogle - South Brisbane (1930) and the extension of the standard gauge Trans-Australian Railway from Port Augusta to Port Pirie (1937). These followed a 1921 Royal Commission, that like a major report in 1945 by Sir Harold Clapp, had recommended conversion of all broad gauge to standard gauge. This task is still to be completed. Subsequent extensions of standard gauge have included Port Augusta - Maree (1957), Albury - Melbourne (1962), Kalgoorlie - Perth (1968), Broken Hill - Port Pirie (1969), Port Augusta - Whyalla (1972), Tarcoola - Alice Springs (1980), Adelaide - Crystal Brook (1982), Adelaide - Melbourne (1995), Brisbane's major port of Fisherman Island (1997) and Alice Springs - Darwin (2004).



Alice Springs - Darwin tracklayer. Photo: Mark Carter

At the end of World War II, the railways were moving record numbers of people, both within major cities and for long distance services. From the 1950s cars became the preferred means of moving within cities and urban rail patronage began a slow decline. Trams, which in the mid 1940s were moving over one billion passengers per year, were withdrawn from all cities by 1969, with

the exception of Melbourne and a solitary line in Adelaide. With the rapid growth since World War II in car use and intercity air travel, non-urban passenger rail services have fared even worse and with few notable exceptions have been unable to arrest declining patronage.

The Whitlam Government introduced two rail initiatives that were to last to the 1990s. The first initiative in 1974 provided some Federal funds for urban public transport. The second advance was the formation of the Australian National Railways Commission (AN) in 1975. AN commenced full operations in 1978 and took over the Commonwealth Railways, the non-metro rail freight and passenger operations of the South Australian Railways, and the Tasmanian Railways.

In 1940, the Australian public rail system was at its longest and extended to 44,883 route kilometers. By 1997, when the first sale of Government rail assets (AN) took place, the total length of public rail track was down to about 32,100 route km and the Pilbara region iron ore railways amounted to about 1300 route km, a total of some 33,400 route km. By late 2007, the total Australian rail network including the iron ore railways (but excluding light rail and the Snowy Mountains Skitube) and new lines (such as Alice Springs - Darwin (NT) and Bauhinia (Qld)) extended to over 37,000 route km.

Rail freight

The main business of rail in Australia today is the efficient movement of nearly two million tonnes of freight each day (665.6 million tonnes in 2006-07 - ARA, 2008). Freight tasks are best measured in tonne-km or tkm (one tkm results when one tonne of freight is moved one km). On this basis, the 2006 - 07 rail freight task was 198.6 billion tkm (btkm) - an increase of 66 per cent over ten years. In Australia, since 2000, largely due to the growth in iron ore and coal exports, the rail freight task has exceeded the total road freight task. Figure 1 shows the growth in the rail freight task - more than three fold over the 1978-79 rail freight task.

The 2006-07 rail freight task can be divided into three components (ARA, 2008):

- Ancillary at 91.7 btkm - where most of this was the movement of iron ore in the Pilbara region of WA using the most efficient freight trains in the world (see Section 4.1)
- Intra-state hire and reward - 75.4 btkm - mostly bulk (72 btkm) undertaken by various private operators and Queensland Rail, which has a Central Queensland coal freight task moved mostly by electric traction (see Section 4.2)
- Inter-state hire and reward at some 31.5 btkm - mostly (22.7 btkm) non-bulk - works well on the East - West Corridor where rail now wins over 80 per cent of the interstate land freight moving in and out of Perth (see Section 4.4), and the new line to Darwin.

The revenue to the rail systems from freight customers now exceeds \$4 billion per annum. This amount was far exceeded by the value of iron ore exports (some \$16 billion in 2007) and coal exports (\$22.5 billion in 2006-07).

To offer efficient freight services and to effectively compete with an innovative road freight industry, rail needs to constantly improve its performance. This includes:

- Better quality track - including track straightening and strengthening in places
- Improvements to signalling and safeworking
- New locomotives and wagons - to replace the older, less reliable fleets
- Better management and work practices

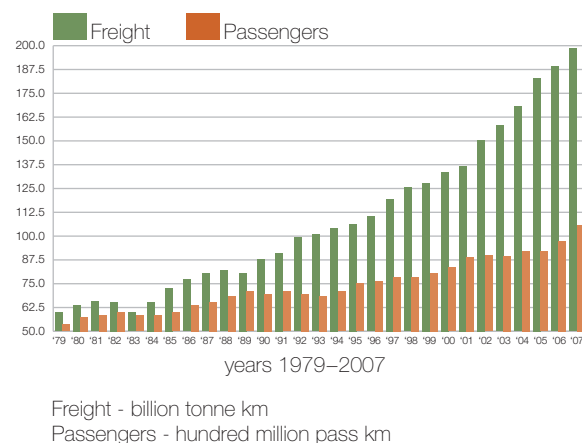
In the fifteen years from 1980-81 to 1995-96, the rail freight task increased by some 70 per cent whilst overall passenger numbers showed little change, and employee numbers in the Government rail systems more than halved from about 110,000 in mid-1981, to about 48,000 in mid-1996. Notable changes were made during the 1980s by AN, Westrail and Queensland Rail with further gains following the formation of the National Rail Corporation in 1991 by an intergovernmental

agreement (with the Commonwealth, NSW and Victoria as shareholders). As a result, aggregate rail freight deficits from over \$500 million per year in the 1980s were reduced to \$200 million by the mid-1990s and then (with some exceptions) turned into operating surpluses. The improved financial performance of all systems occurred at a time rail operations were the subject (from August 1982 to June 2000) of the full imposition of the diesel fuel excise. By 2001, National Rail had met the challenge of turning large losses with interstate freight into a modest profit.

Like other industries, rail in Australia also needed to deal with the National Competition Policy. This led to the fragmentation of some rail systems, with the NSW railway being the first when from 1 July 1996 two track authorities and two above rail operators (State Rail for passengers and FreightCorp for freight) came into being. Only Queensland Rail has retained an integrated structure, albeit with a Network Access division.

Improved rail freight finances set the scene for privatisation of some rail freight operations in Australia. Briefly, these started in 1997 with three parts of AN (Tasmania freight, South Australia freight and long-distance passenger trains) whilst AN's mainline interstate track was taken up on 1 July 1998 by the Australian Rail Track Corporation (ARTC). This break up was followed in 1999 by the franchising of Melbourne's suburban trains and trams and V/Line Passenger business and the sale of V/Line Freight (bundled with a lease of regional Victorian track) followed by the sale of Westrail's freight operations and a track lease in 2000. The sale of National Rail and FreightCorp occurred in 2002. With the subsequent buy back of track leases in Tasmania and Victoria, rail freight privatisation (as with the franchising in 1999 of Victoria's rail and tram passenger operations) can fairly be described as a learning experience for all governments.

Figure 1



Reference: BITRE (2008) and ARA (2008). ARA data used for later years and for passengers scaled to match earlier data.

Passenger rail

Over the last 30 years to 2006-07, urban rail patronage in Australia's five mainland state capital cities has doubled in terms of passenger km and is continuing to grow.

The Sydney based CityRail system is one of the larger urban rail systems in the world. This system extends to over 900 route km, with more than 300 stations, and is electrified to Lithgow, Newcastle, and Kiama (south of Wollongong). Each weekday, CityRail carries over 900,000 passengers in the world's largest double-decker fleet of electric trains. During the Sydney 2000 Olympics, CityRail gave a 'gold medal' performance.

Melbourne gained a new underground electrified line in the 1980s, and is Australia's second largest urban rail service. Over the five years to 2006-07, it has seen an impressive 34 per cent increase in patronage. Victoria's regional rail gained a big boost on completion of its Regional Fast Rail project in 2006 with a 30 per cent increase in travellers to 2007. Melbourne also has the distinction of having an extensive tram service which has seen some extensions and a 16 per cent growth in patronage over the last five years.



An QR National coal train in the Hunter Valley of NSW. Photo: Mark Carter

The Brisbane suburban rail system was progressively electrified from 1979 (see Sections 4.2 and 4.7) and in 1996 trains reached the Gold Coast, with further extensions now under way. In the five years to 2006-07, passenger numbers have grown some 28 per cent.

Perth's successful urban rail revitalisation (outlined in Section 4.6) is a remarkable change from the early 1980s, when the system was destined for closure. A change in government and policy led to the system being upgraded, electrified and significantly extended. As a result, patronage has seen a spectacular four fold growth from 1978 to nearly 36 million passengers in 2006-07.

Adelaide uses diesel electric railcars and has had limited growth in patronage. However, plans to electrify the suburban network were announced in 2008 and the Glenelg tramline was upgraded and extended in 2007. More details of the Glenelg line, Melbourne's trams and Sydney's light rail are given in Section 4.8.

Although the overall numbers for intercity trains in Australia have shown some decline there are some notable exceptions. Australia's world famous intercity passenger trains include the *Indian Pacific* (Sydney - Perth), *The Ghan* (Adelaide - Alice Springs and since 2004 to Darwin) and the *Queenslander* (Brisbane - Cairns). In 1998, a new 160 km/h electric tilt train service linked Brisbane and Rockhampton and was the first regular tilt train service in the Southern Hemisphere. The success

of this service, which gave competition to regional aviation for the first time in decades, was followed in 2003 by the introduction of a Brisbane - Cairns diesel tilt train.

The future for rail

Rail is very energy efficient in moving freight and large numbers of passengers. It has been noted that Australia demonstrates 'world best practice' in the iron ore operations of the Pilbara. Queensland Rail electric traction in moving coal in Central Queensland is also of world class, as is the movement of interstate rail freight in and out of Perth. Reflecting an increase in economic activity as well as the winning back of freight lost to road during the 1970s and 1980s, intermodal rail freight has also increased. With more investment on upgrading mainline track in Australia to remove current speed, height and weight restrictions, this trend will accelerate, as it has already in Canada and the United States. A further factor favouring rail development is that rail is the safest way to travel, and moving freight by rail is much safer - by a factor of 20 - than sending it by road.

Rail will play a critical role in reducing both dependence on imported oil and greenhouse gas emissions in land freight. For moving freight, the preferred unit of energy efficiency is net tonne km (ntk) per megajoule (MJ) where one litre of diesel is equivalent to 38.6 MJ of end use energy.

The variation of energy efficiency for different rail freight tasks reflects the nature of the freight trains and the track that they operate over. The most energy efficient freight trains in the world are the iron ore trains in the Pilbara now approaching 15 ntk per MJ. This is because of their heavy loads and operations using modern locomotives and wagons with high axle loads running on top quality rail track with easy grades and curves. Overall, Australia's hire and reward railways have an energy efficiency of about 3.2 ntk per MJ, with potential for improvement. This would be facilitated by further track upgrades to allow for longer and heavier trains. Track upgrades also allow rail to more effectively compete with

2 The National Committee on Railway Engineering

road transport. With articulated trucks having an average fuel efficiency of about one third of line haul non-bulk trains, this allows for more fuel savings. Indeed, as an official Bureau of Transport Economics (1996) report stated, shifting interstate capital freight from road to rail is seen as one of five important 'no-regrets' measures to reduce greenhouse gas emissions. In regards to reducing oil imports, Queensland Railways mainline electrification now results in the saving of about 200 megalitres of diesel fuel a year.

Rail is also a very energy efficient means of moving large numbers of passengers - much more so than cars or planes. Where loading factors and track quality can be improved, urban rail has a higher energy efficiency than buses.

Clearly, providing a 'level playing field' for competing modes of transport is very important for the national interest. The problems in Australia mainly result from an imbalance in the way Government capital funding is provided for road and rail track, an imbalance in road pricing and rail track access pricing and regulation.

The imbalance in road and rail track funding is most noticeable at the Federal Government level. For the 30 years from 1974 to 2004, in 2004 terms, Federal funding for roads amounted to some \$58 billion, as against \$4 billion for rail and urban public transport. The AusLink program marginally improved rail's funding from 2004, but to 2008 had given no assistance to urban public transport. Yet, it is our major cities where most oil is used, and which have major problems to address that cannot be solved by just building more motorways.

Recent expansion of rail in Australia is outlined in Section 4.9 whilst Section 5 looks at some proposals for the future.

Rail in New Zealand

Across the Tasman, New Zealand has also seen the rise and fall of its rail system and strong growth in road use during the twentieth century. New Zealand's first steam train ran in 1863 on a broad gauge in Christchurch. Later a standard gauge line was opened near Invercargill but by 1877, a uniform narrow gauge had been adopted. The conversion to a uniform gauge was assisted by the abolition of the Provincial Governments in 1876.

Some differences between Australia and New Zealand are of note. In summary, New Zealand has led Australia in some areas of rail improvements and innovation (and these are outlined in Section 4.10). Before deregulating land freight, New Zealand under the *Road Users Charge Act 1977* had introduced an advanced system of mass-distance charges for all heavy vehicles - something that Australia is still to do. New Zealand Railways was sold in 1993 to the private sector, and in 2004, the Government 'took back the track' - both steps ahead of Australia. In May 2008, the New Zealand Government announced that it brought back, from Toll, the rail and ferry operations.

At about 4 billion tonne km, the New Zealand rail freight task is a small one. New Zealand's long distance trains have contracted over the years to just three services traversing good scenery, Auckland to Wellington in the North Island (*The Overlander*), and two South Island trains - *TranzCoastal* and *TranzAlpine*. Also of note is the poor condition of urban rail over several decades in New Zealand's largest city of Auckland - including its dependence on used diesel multiple units from Perth. Auckland's rail system is now being progressively upgraded with electrification due by 2013.

The official commencement of the Railway Technical Society of Australasia (RTSA) in 1998 was preceded by the National Committee on Railway Engineering (NCRE) of the Institution of Engineers Australia (IE Aust). Although railway engineering had been important to Australia since the 1850s, and IE Aust was formed in 1919, it was not until 1979 that the NCRE was formed by IE Aust. This was within the IE Aust's College of Mechanical Engineering, although it was well recognized that railways required engineers from many disciplines. As noted by NCRE booklets published from time to time, the areas of expertise included:

- civil engineers to provide graded earthworks, bridges, tunnels and drainage plus track structures from ballast to profile-ground rail surface, buildings and interchanges;
- mechanical and electrical engineers to provide locomotives, rolling stock, overhead electrification, workshops and air-conditioning;
- railway signal and telecommunication engineers;
- planning and operations research engineers;
- the engineering manager - some of whom would become chief executives.

The first NCRE chairman was Peter Booth from WA. The full list of chairmen from 1979 to 1998 is given in Appendix C. Throughout its 19 years, the NCRE comprised at any time up to 12 full members as railway engineers from all the major elements of the railway industry. Service was on an unpaid voluntary basis, although basic travel costs to attend the NCRE bi-annual meetings were reimbursed by IE Aust. Each year, three members had to retire from NCRE and many elected to continue to serve as 'corresponding members' with no reimbursement of expenses. As seen by John Adams in his 1998 article (RTSA Newsletter No 2 - from which much of this section is drawn) NCRE over its 19 years "has involved well over some 200 engineers, either as committee members, corresponding members of the committee or on activity organising committees."

An insight to the start up of NCRE by IE Aust is provided by Colin Butcher who was an early committee member and heavily involved in the 1981 railway engineering conference.

Early Railway Engineering Conferences

In September 1978 The Institution of Engineers, Australia was co-sponsor with the Australasian Institute of Mining and Metallurgy of the first International Heavy Haul Railway Conference. This was held in Perth and the conference provided the opportunity for the iron ore railways in the Pilbara to present papers about their research that addressed the challenges associated with high axle load, single product railway operations that had seen a major increase in tonnages since the 1960s.

The response to the conference was huge with a number of papers submitted by overseas organisations and over 400 delegates attending this highly successful and informative event. Clearly railway engineering should be given more attention and the Institution responded by forming the National Committee on Railway Engineering.

One of the first acts of the committee was to organise a railway engineering conference on the subject of 'Track and Vehicle Dynamics' and this was held in Sydney in September 1981. Although this was a rather modest start with only 18 papers accepted for presentation it was well attended and made a profit. From the outset the committee aimed to hold a conference every two years and the success of the first conference made this possible. In September 1983 a railway engineering symposium was held in Melbourne and in September 1985 the Brisbane conference on rail electrification became the first to be titled a Conference on Railway Engineering (CORE).

Colin Butcher

However, NCRE did a lot more than organise railway engineering conferences. These events are listed in Appendix E. Other regular activities within IE Aust and the wider railway engineering community included:

- Arranging the publication and presentation of technical papers;
- Organising Study Tours on Railway Engineering;
- Continuing education of railway engineers;
- Technical surveys;
- Invitation of overseas speakers for lecture tours;
- Honours and awards for prominent railway engineers;
- Co-operation with other Learned Societies;
- Communication with Railway Engineers.

We look at each aspect in turn.

Publications

Along with supporting the publication of numerous technical papers in the proceedings of the conferences on railway engineering, NCRE published independent papers and reports covering major Australian railway projects, research and development further education, engineering competency and the manufacture of railway products by Australian industry. From the beginning, NCRE was active in examining and commenting on such projects as the Bicentennial High Speed Rail Project.



In 1981, the NCRE published a detailed report to improve rail connections to Canberra. Shown here is the front cover of an accompanying brochure.



The front cover of a 1994 brochure produced by the NCRE. Earlier versions were produced in 1983, 1987 and 1989.

The High Speed Rail Project

In 1981 the NCRE published a detailed report *Bicentennial High Speed Rail Proposal* with a brochure to propose a new 'T-Line' railway from Goulburn to Yass with a spur to North Canberra. This followed field investigations and was the work of a NCRE committee with Bruce Sinclair (Chair), Peter Booth (NCRE Chair), Ian Macfarlane, Malcolm Kinnard, Keith Smith OBE (former AN Chair), Laurie Daniels OBE, John Hoyle, Philip Gutteridge, John Hearsch (V/Line) and Lance Horwood.

With ruling gradients of 1 in 75 with a ruling curvature of 1200 metres to allow for 160 km/h train operation at cost of \$127 million, the benefits included faster rail freight services along with a potential 3 hour Sydney - Canberra XPT service and a 6.5 hour Melbourne - Canberra XPT service.

The response from the NSW Government to the proposal was negative (as it had been to Prime Minister Malcolm Fraser's 1980 Sydney - Melbourne electrification offer). Instead, Australia gained a Bicentennial Road Development Program. This led to a new Goulburn - Yass four lane dual carriageway, with town bypasses, being built at a cost exceeding \$500 million.



This artist's impression by the late Phil Belbin showed Australia in 1984 (and in *Railway Digest* June 2004) what a Melbourne - Sydney Very Fast Train could look like between the Snowy Mountains and Canberra. *Image courtesy of ARHS/nsw and Graeme Belbin.*

The NCRE 'T-Line' 1981 option was followed in 1984 by the ambitious Sydney - Canberra - Melbourne Very Fast Train proposal by the CSIRO. The 'T-Line' option was noted in the ARTC 2001 Track Audit and again in a RTSA response to the AusLink Green Paper. Today, the T-Line option would be ideal for tilt trains and give a good rail connection to Canberra - not only from Sydney, but also from Melbourne and southern NSW.

Comment later followed from the NCRE on the Very Fast Train (VFT), Urban Passenger Transportation and railway infrastructure needs. Further achievements of NCRE included representations to the House of Representatives Standing Committee (the Neville Committee) inquiry on the role of rail in the national transport network. Both NCRE and IE Aust input was recognized in the Neville Committee's Report *Tracking Australia* (1998).

Study Tours on Railway Engineering (STORE)

The first STORE was held in 1980 and concentrated on Melbourne's electric railways and tramways, with 40 participants. This was followed in 1981 by an inspection of the coal railways of Central Queensland (40 participants), and in 1982 with an extensive tour of Western Europe's mainline and urban railways (56 participants). Following the Pilbara heavy haul STORE in 1984, STORE's were held in the Hunter Valley, South Australia, New Zealand, Tasmania, North America and China.

The emphasis in these tours was on education through a series of pre-briefed, hard-work, no nonsense field visits. They were a low-budget, minimum-frills trip that the individual railway engineer could afford to attend, as well as the engineer whose attendance was sponsored by his organisation.

Technical surveys

An early NCRE technical survey was that of rail research and development within Australia and included an independent survey led by Michael O'Rourke of BHP's Melbourne Research Laboratories (MRL). It was published in 1981 and was followed by an independent technical survey on the manufacture of railway products within Australia. Associated with this project were proposals in 1986 and 1988 for a History of Railway Technology in Australia, and (to complement Dr Max Lay's well regarded *Source Book on Australian Roads*) a *Source Book on Australian Railways*. Despite good profits being generated for IE Aust by the biennial CORE, these proposals did not proceed.

During the 1990s, a major survey was conducted by the education subcommittee of NCRE. At CORE1998, the NCRE released a report *Railway Engineering Competency Profiles* prepared by its Education Subcommittee with extensive input from Chris Venn-Brown and John Scott.

Invited eminent speakers

The first overseas eminent speaker invited by IE Aust to visit all States on the recommendation of NCRE was John German in 1980 who was then Vice President (Engineering) of the Missouri Pacific Railway. Mr German later became the Executive Director of the International Heavy Haul Association or IHHA. Other invited speakers included in 1992 Al Reinschmidt, Director of Track Research at the Association of American Railroads.

A list of RTSA invited overseas eminent speakers can be found in Appendix F.

Co-operation with other societies

From an early stage, NCRE worked closely and cooperatively with other learned societies and groups within the railway industry including the Permanent Way Institution (PWI), the Institution of Railway Signalling Engineers (IRSE), the Australian Railway Industry Corporation (ARIC), the former Railways of Australia (which became the Australasian Railway Association Inc (ARA) in 1994) and the Rail Track Association of Australia (RTAA). The RTAA was formed in 1983 and had evolved from a Rail Sleeper Association that was established after a conference held in 1976.

One early example of cooperation was with the RTAA in the timing of railway technical conferences. In September 1981, the Fourth International Rail Track and Sleeper Conference in Adelaide was timed to follow the NCRE Railway Engineering Conference in Sydney with special arrangements for delegates to travel from Sydney to Adelaide by train. Subsequently, it was decided that the International Rail Track Conferences would be held in even numbered years (starting in 1986 at Melbourne, then New Zealand in 1988) whilst as a rule, the Conferences on Railway Engineering were held on the odd years. This arrangement worked well until the ARA held its first AusRail conference in 1995 at Brisbane followed by 1997 at Melbourne, and was the reason for deferring CORE from 1997 to 1998.

The NCRE and the IHHA

The NCRE had a long association with the IHHA and indeed the 1978 IE Aust conference held in Perth is regarded as the first IHHA conference. As John German (at <ihha.net>) recalls:

"Based upon the work done by the Melbourne Research Laboratories of the Broken Hill Properties Co Ltd (BHP) for the Mt Newman Mining and Hamersley Iron railways in the Pilbara region of Western Australia the idea sprang up in 1975-76 to disseminate the knowledge gained in that research program with other heavy haul railways of the world. After discussions with other countries it was determined that they were not alone in their concerns and problems. Therefore, they sent out invitations world-wide to those railways that were involved in using dedicated unit trains to haul such commodities as coal, grain, iron ore, etc."

The first IHHA Board meeting was held in July 1983 at the AAR Headquarters in Washington, DC, USA, where, inter alia, it was agreed that there would be six directors (albeit with only five votes) where:

"Australia would have two directors, one each for the Railways of Australia (public sector) and the Iron Ore Railways (private sector) respectively. Canada (Railway Association of Canada), China (China Railway Society), South Africa (South African Transport Services) and United States (AAR) would each have one."

In 2008, Australia remained the only country to have two directors (Brian Bock representing ARA and Russell Donnelly of BHP Billiton Iron Ore) with other countries extended to include Brazil (Companhia Vale Do Rio Doce or CVRD), India Railways (Ministry of Railways), Russia (The All Russian Railway Research Institute), and Sweden-Norway (Nordic Heavy Haul Association). A list of major IHHA conferences appears in Appendix G.

Honours and awards

The Railway Engineering Award was instituted in 1984 by the NCRE and was awarded in conjunction with each Railway Engineering Conference for the best project or paper on any aspect of railway engineering by an Australian railway engineer. It recognised the talents of successful innovative railway engineers and the organisation supporting them. The final NCRE award was made at CORE1998 to Robert Jordan of Alstom Australia for his entry *Lightning Protection for Solid State Interlocking for the Bekasi-Gedebage signalling project in Indonesia*.

NCRE also acknowledged major achievements and contributions to Australian railway engineering in two forms: an Institution Award for Excellence for a major achievement in engineering, or a recommendation to the Governor-General for a civil award within the Order of Australia. To 1998, three prominent Australian railway engineers, including one past member of the NCRE, had received the Order of Australia for their specific contributions in the railway field.

Communications

To facilitate communication with railway engineers, IE Aust maintained a list of individual railway engineers and organisations to advise of forthcoming conferences, Study Tours and visiting overseas speakers. NCRE activities were also advertised in the Railways of Australia regular publication *Network*.

CORE1998

CORE1998 was organised by a Committee chaired by Wardina Oghanna of Central Queensland University at Rockhampton and was held 7 – 9 September 1998 at the Capricorn International Resort in Yeppoon.

3 The Railway Technical Society of Australasia

CORE1998 Engineering Innovation for a Competitive Edge

CORE1998 was a challenge from the start to finish and with many firsts! Up to the mid 1990s, there was limited interaction between NCRE and universities whilst CORE conferences were organised by professional rail engineers in major capital cities.

So, when an offer was made by the Centre for Railway Engineering (CRE) of Central Queensland University (CQU), Rockhampton to the NCRE committee to host CORE1998, there were some reservations. Not only that the venue was in a provincial city far from all capital cities, but CORE was to be organised by a university. In addition, due to a poor attendance at a recent conference in Darwin - not rail related - there were reservations within IE Aust.

Approval was at last given when IE Aust reached agreement with CQU to share the burden of any loss, or the profits, from the conference. However, both parties were soon to become at ease when CORE1998 secured \$120,000 in sponsorship from six industry organisations before issuing the first call for papers.

Up to 1995, CORE conferences tended to have a national outlook and with an attendance of around 200 delegates. CORE1998 achieved 396 registered delegates with 65 technical papers, including submissions from 15 overseas countries. This was assisted by IHHA holding their annual directors' meeting at the conference venue. What made the conference even more

remarkable is that registrations closed two months before the conference was held.

The conference ran in three streams. It had an exhibition area with 42 booths in a fully air-conditioned hockerdome and outdoor displays that included an entire articulated Queensland Rail coal wagon. However, there was an unfortunate political problem for the people from the State Rail Authority (SRA) in NSW when NSW government of the day had restricted participation after the opposition labelled CORE as a 'Gravy Train'. This, of course, was far from the truth.

Overall, with net proceeds of more than \$200,000, CORE1998 exceeded all expectations.

Wardina Oghanna
CORE1998 Conference Chair

The political problem noted above arose from a Sydney Sunday tabloid running an editorial in August 1998 that made allegations of railway engineers as 'fat cats' and either sipping cocktails by a resort lagoon or playing golf (on Sunday). Despite the conference program citing no fewer than 10 different papers to be given by NSW rail authority authors, the then NSW Minister of Transport restricted CORE1998 attendance to just one person from each of four rail authorities. One author who was instructed not to participate had actually gone to the trouble of thanking the particular Minister for permission to present his paper.

CORE1998 was opened by Barry Grear, Immediate Past National President of IE Aust, and the keynote speakers included: Vince O'Rourke, CEO of Queensland Rail (*Renaissance of Rail*),

Braam le Roux, CEO Spoornet, South Africa (*Back to the future for rail transportation*) and Roy Allen, President AAR (*North American experiences in an ever-changing Railway World*).

Three Conference Tours were offered: a visit to the Centre for Railway Engineering at CQU, Queensland Railways facilities at Rockhampton, and Austrak. A post conference tour gave participants their first ride on QR's new Tilt Train at speeds of up to 160 km/h plus a tour of the port and a coal mine at Gladstone.

The NCRE held its last meeting on September 1998 in association with CORE1998 when its role and activities were taken over by the Railway Technical Society of Australasia. Both NCRE and CORE1998 helped to give the new Society a good start.

3.1 The formation and early years

From the late 1980s, along with its main activities including conferences, the National Committee on Railway Engineering (NCRE) was exploring the option of forming a Technical Society.

At its May 1988 meeting, NCRE Chair Michael O'Rourke asked members to respond to the concept of Technical Societies. These had been proposed by the Institution of Engineers Australia (IE Aust). The reaction within NCRE was mixed, and at the next meeting in November 1988, after "wide ranging discussion", it was agreed to seek "better formal co-ordination with other organizations." The NCRE instead drew up a five year plan, and in 1992 a view was noted regarding railway engineering that it was "...doubtful if there are the numbers to make a technical society work."

By 1995, there were no fewer than 15 Technical Societies within IE Aust, and NCRE started to address the many questions as to forming a technical society. Would it have its own finances? Would it be incorporated? Would it be possible for persons who were not members of IE Aust to be a member of a technical society?

At its meeting of March 1996, the NCRE established an 'exploratory' subcommittee to examine the technical society concept. In time, an understanding was reached with IE Aust that incorporation was not needed and non-members of IE Aust, including overseas persons, could join the new society. In addition, the appreciable proceeds from former railway engineering conferences would be available to a new society on the condition that a special Technical Initiatives Fund be formed. However, IE Aust was to retain final say on individual proposals for funding.

In October 1996, the NCRE took the decision in principle to form a technical society and formed an Interim Committee. The office bearers were George Erdos as President, John Adams as Deputy President, Ian Nibloe as Honorary Secretary and

David Ferris as Honorary Treasurer. The initial Mission Statement (which served to 2006) was "To provide learned society and communal functions for individuals and groups in the railway industry and to provide practice based opinion and advice for The Institution of Engineers Australia."

The inclusion of the name Australasia in the new society was as a result of the former Railways of Australia (ROA) having recently changed its name to the Australasian Railway Association (ARA). The NCRE then settled on the name 'Railway Technical Society of Australasia'.

By March 1997 a comprehensive business plan for a new railway technical society had been prepared. At 19 pages, it was complete with a three year budget projection that included the allocation of \$48,000 held in a Technical Initiatives Fund. The business plan met with the approval of IE Aust and towards the end of 1997, IE Aust was inviting its members with an interest in railway engineering to consider joining a new RTSA when renewing their annual subscriptions.

This invitation was repeated in a letter dated 5 March 1998 from George Erdos as Interim RTSA Chairman advising of the formation of a new RTSA to provide "extension and enhancement" of the NCRE, to be achieved in part "by the fostering of Regional Chapters and encouraging membership 'by all people' interested in the advancement of the Australian railway industry." This letter concluded with the invitation to "... take the opportunity to become a founding member of what will be an energetic and enthusiastic Society."

An integral part of any IE Aust technical society was the formation of chapters based on divisions of IE Aust mainly located in state capital cities. So, concurrently whilst negotiating with IE Aust, the Committee was also setting in motion the formation of new chapters. It was decided that these would be located in each mainland state capital along with one in New Zealand.

In May 1998 the first National Newsletter for the RTSA was sent to members, and was able to note that "The RTSA has now been formed" and

that "Formation of local Chapters in some states has proceeded well." The Newsletter reported that the Sydney Division Chapter (which was to cover all of NSW until such time as a Newcastle and/or ACT Chapter were formed) had been elected (with Chairman Les McNaughton) and would be holding its first meeting to hear a speaker on NSW rail safety at the IE Aust Sydney Division Auditorium at Milsons Point; also a site visit to MainTrain at Auburn would follow later that year.

It was also necessary for the NCRE to draft a constitution. A template suitable for use for all potential new technical societies had been provided by IE Aust and reflected rules such as a requirement for the National Chairman to step down after two years of office. In 1998, a draft constitution was circulated, and subsequently adopted. However, in part due to the template having a small number of problems and inconsistencies that were not apparent at the time, the new RTSA constitution soon required amendment. This required each Chapter having to consult its members regarding the proposed changes.

In July 1998 nominations were called for National Chairman, Secretary and Treasurer of the new RTSA and elections were held for two positions. The scene was then set for the final meeting of the NCRE and the first meeting of the RTSA National Council. The combined meeting took place on 6 September 1998 at Yeppoon, Queensland, in association with CORE1998. The inaugural Annual General Meeting of the RTSA then took place and the National Council was announced as follows.

National Chairman:	Philip Laird
Immediate Past Chair:	George Erdos
Deputy National Chairman and South Australia Chapter Chair:	John Adams
National Secretary:	Ian Nibloe
National Treasurer:	Robert Schweiger
Sydney Chapter Chair:	Les McNaughton
Queensland Chapter Chair:	Luis Ferreira
Victoria Interim Chapter Chair:	David Ferris
Western Australia Chapter Chair:	Shane Hinchcliffe

Both the NCRE and the new National Council were ably assisted by Julie Armstrong of IE Aust's Canberra office. Along with collecting RTSA subscriptions (usually with IE Aust payments), IE Aust provided secretarial assistance and in the early years, printed and posted the national newsletters to members.

An early challenge for the RTSA National Council was the hosting of the next Conference on Railway Engineering or CORE. For some 15-years, CORE under NCRE had been held every two years, alternating with a biennial conference held by the Rail Track Association of Australia. However, the ARA, which first held its AusRail conference in 1995 at Brisbane, also wished to hold its conference every two years. The suggestion made to the RTSA at CORE1998 by the then ARA Director was that AusRail should be held every two years, with the RTAA and RTSA to work out something for the other year. This was in opposition to each of the three groups holding their own conference every three years. The initial response was for RTAA to proceed with a 1999 conference in Sydney followed by the ARA with AusRAIL in November 1999 and for the RTSA to host a 'Mini-conference on Railway Engineering' in 2000. This soon became CORE2000.

During 1999, the RTSA membership steadily grew. The Annual General Meeting was held in Melbourne on 9 May in conjunction with the RTAA International Rail Track Conference. The RTSA National Council was strengthened by the election at the AGM of Ravi Ravitharan as National Treasurer, whilst Robert Schweiger became Deputy National Chair, and John Adams continued as Chair of the South Australian Chapter, CORE2000 and Awards Committees.

This challenge to host CORE2000 had been accepted by the South Australian Chapter who engaged Mark Carter of GRMS Media to assist. Mark had gained much experience in running a number of rail industry conferences under the auspices of the lobby group Rail 2000, and went on to assist in the organisation of CORE2002 and CORE2004. His account of CORE2000 follows.

CORE2000 Railway technology for the 21st century

CORE2000 originally started out as an idea for a relatively low profile technical conference to follow on from CORE1998. It was held from May 21 to 23 at the Ramada Grand Hotel in Glenelg.

While the original focus was to concentrate simply on two days of technical presentations, with generous sponsorship from the Australian Rail Track Corporation (ARTC) and Rail Services Australia, CORE2000 rapidly took on a life of its own. Final delegate numbers fell just short of 300 and with the help of interest generated by the high-profile negotiations at the time for construction of Alice Springs to Darwin railway, a total of 22 trade exhibitors took part. The conference was opened by then Premier John Olsen and formal proceedings concluded with a gala dinner in the Adelaide Town Hall.

Keynote presentations were made by ARTC CEO, David Marchant (*Adapting to Change - How competition in the Australian market will drive industry forward*) and Mike Franke, former Chief Engineer of the US-based Burlington Northern Santa Fe railroad (*The role of technology in the success of freight railroads in North America*). In addition, a total of 46 technical papers were presented and a post-conference tour organised to view the ARTC control centre at Mile End.

Mark Carter

At CORE2000, it was announced that the Sydney Chapter had accepted the responsibility of hosting CORE2002 and that this would be held in Wollongong. Other challenges accepted by the RTSA National Council in its early years were to address awards, standards, education and training (skills shortages) and government relations and these are outlined below. In addition, an important part of RTSA growth was each chapter holding meetings featuring a speaker in each mainland state capital. Where ever possible, eminent overseas speakers visited each Chapter.

Some local field trips were also organised. From time to time the enthusiasm has been such that it appeared that some Chapters were holding an informal competition to see who could offer the most events.

Awards

The RTSA expanded the NCRE awards program in stages. The first step was to confirm an annual individual award 'to a person who has made an outstanding contribution to the railway industry.' This was to be accompanied by a biennial Industry Award, in the year in which a CORE conference is held, to reward an engineering achievement in the railway industry that is considered worthy of public recognition. The first individual award was made in 1999 to Ross Hunter, Group General Manager, Technical Services, Queensland Rail (for his work including Main Line Upgrade) and the first industry award was made at CORE2000 to Kinhill / Connell Wagner Joint Venture and Leightons for the Jolimont Rationalisation Project (near Flinders Street Station).

The next step was to present an award for an undergraduate project thesis in railway engineering. These and subsequent awards are outlined in Section 3.2. A full list of RTSA award recipients can be found in Appendix I.

Standards

The RTSA continued the NCRE's interests in standards, and was well represented on various Standards Australia Committees that developed Railway Safety Management Standards, Codes of Practice, and Railway Hardware Standards. These standards had to accommodate the significant changes that had occurred in the rail industry during the 1990s, and also sought to improve national consistency to overcome impediments to the efficient operations of interstate rail services.

The skills challenge

At CORE1998, the NCRE released a definitive report *Railway Engineering Competency Profiles* prepared by its Education Subcommittee with major input from Chris Venn-Brown and John Scott. This was at a time when there was in some areas, a serious shortage of qualified railway engineers. In part, this was due to the rail industry having been extensively downsized and the shortages were expected to become increasingly apparent as many of the industry's older workforce retired. A further factor was the increasingly fragmented nature of the industry. To compound the problem, some rail organisations were not undertaking skills training to mitigate the anticipated skills shortages, particularly for tradespeople and professional engineers.

Concurrently with the preparation of the NCRE report, the IE Aust with the support of the Australasian Railway Association (ARA) and the Institution of Railway Signal Engineers (IRSE) conducted a detailed Railway Engineering Employment Survey. A total of 479 completed surveys were received. This led in 1999 to the production of a detailed 102 page report *Engineering for Rail Sector Growth*, by Athol Yates of IE Aust highlighting the factors that had led to a shortage of rail engineers. These included an aging workforce, fewer engineering graduates entering the rail sector, and increased overseas demand for Australian Railway engineers. The report made three main recommendations:

- that individual rail engineers consider the future skills needs of the Australian rail sector and gain the necessary skills required to work with the new, rapidly changing rail technology,
- that each rail organisation examines the implications of the skills shortages and introduces initiatives to mitigate them, and
- that a rail sector-wide strategy be developed to eliminate future skills shortages.

The report also noted that *"the current shortages are likely to get significantly worse."* Comments by spokesmen for each of the four groups funding the study follow.

The report *Engineering for Rail Sector Growth* was launched in September 1999 at the IE Aust Brisbane office by then Queensland Minister for Transport, the Hon Steve Bredhauer MP. One aspect of the report was to note rail infrastructure construction activity of \$1.3 billion in 1996-97 (the highest in 20 years or more) and then current and potential Australian rail projects amounting to about \$14 billion (\$4.3 billion most likely), and \$9.7 billion other potential projects including Alice Springs - Darwin (now completed) and others not started such as the Sydney - Canberra Speedrail proposal (at \$3.5 billion). Also noted, with thanks to ARIC, were current and proposed South East Asian projects amounting to \$A117 billion.

Both the 1998 NCRE competency profiles report and the 1999 skills report were summarised in a further 1999 publication *Keeping Australia on Track*. The new booklet again warned of the growing shortage of railway engineers and gave 'shortage elimination initiatives' for individual rail engineers, rail organizations and the entire rail sector.

Government Relations

From early days, the NCRE had been aware that despite the benefits of railways and their ongoing potential for the safe and high - speed movement of people and haulage of freight *"State and Federal politicians express constant concern over the level of railway deficits, and the continuing cost of essential improvements."*

Engineering for rail sector growth

The renaissance of rail is gathering pace in Australia and around the world. To facilitate that process we must plan for the availability of experienced engineers, engineering technologists and engineering officers. While individual companies are taking initiatives to mitigate against immediate shortages, it is in our own best interests as an industry to develop a longer term strategy to properly resource our continued growth.

Ray McCutcheon, President, ARA.

The rail study categorically confirms the anecdotal evidence that the existing shortage of signal engineers and other railway engineering specialists is getting more acute. While this global shortage will reflect in short-term benefits to the individual via higher wages, it will undermine the sustained growth of the industry. By the professional associations, industry and education providers working together, we can build on our excellent rail engineering resources and develop an Australian rail sector which will be internationally cost competitive and export orientated.

Malcolm Menadue, Chairman ISRE (Australasian Section)

Rail is emerging as the transport mode of the early 21st century and the engineering team can book their tickets on the industry's expansion by having skills needed by employers. New rail technology demands that we will develop new approaches to career advancements for rail engineers. We must explore all options, such as group training schemes, post graduate distance education courses and rotational placement, and implement the best.

Joe Abercrombie, President IE Aust

Rail in Australia is set to perform much more of the nation's transport task. To realise its potential, rail infrastructure will need to be upgraded, which requires a significant number of skilled rail engineers and technically competent managers. Underpinning the renaissance of rail will be a renewed emphasis by all sectors of the railway industry on education, training and research.

Philip Laird, National Chairman RTSA

As we have seen, NCRE was not just concerned with engineering, but also bringing to the attention of Government some of the benefits of rail development. The first RTSA National Council meeting in September 1998 established a Government Relations Committee and agreed to arrange for the printing and wide distribution of a brochure. This was to support the *Tracking Australia* report that had been released in August 1998 by a House of Representatives Committee (called the Neville Committee, after its chairman Paul Neville MHR). The brochure was enclosed with the third newsletter for RTSA members in March 1999, and inserted in the next issue of the quarterly magazine *Track and Signal* and subsequently received favourable comment in the former ARA magazine *Network*.

The RTSA National Council then approved further brochures, all using Technical Initiative Funds, in a series called *Fix the Rails* that looked in turn at various States and major corridors. All brochures were drafted by the Committee and produced by GRMS Media in Adelaide. Along with colour photographs, each brochure included facts and quotes supporting improvement to rail infrastructure in line with the Neville Committee recommendations along with brief information about the RTSA and CORE. In 1999, brochures were produced for Victoria, the East - West corridor (SA and WA), and NSW. The NSW brochure called for realignment of the track in the Cullerin Ranges (as had the former NCRE Goulburn- Yass T- Line Option) and led to an interesting proposal from former Westrail Chief Civil Engineer John Hoare. This proposal was for a major NSW Main South rail deviation from Bowning (near Yass) to Cootamundra and was further investigated and noted in the 2001 ARTC Track Audit.

By early 2000, there was increasing concern that the Federal government was unduly delaying its response to the *Tracking Australia* report. By then, responses were also overdue to the Productivity Commission's report on progress in rail reform, and a Prime Ministerial Task Force on revitalising rail. Accordingly, in preparing a brochure on the

NSW and Queensland North Coast lines (*Fix the Rails V*), it was decided to include a 'Post Card to the Prime Minister'. The postcard included the simple request to the government to respond favourably to the three rail reports, and had space for the sender's name and address. With wider distribution of the brochure with postcard, some 600 signed postcards were sent to Canberra. They did make a difference, although the main Government response was to commission yet another report - a major Track Audit from ARTC.

In addition, RTSA worked with IE Aust to prepare a submission to a Senate Committee examining the impact of the then proposed GST. This submission was also influenced by a 1999 report prepared by an IE Aust Task Force on Sustainable Transport chaired by Ted Butcher AM, and urged attention to encouraging rail as an energy efficient means of transport. The Senate Inquiry was part of a process that led to a long awaited rebate of excise imposed on the use of diesel fuel in rail operations. Since its imposition in the August 1982 budget, to its effective removal on 1 July 2000, the railways had paid in total, and in 2000 terms, some \$2 billion. The ARA was particularly pleased to see the new arrangements.

In response to questions made by the Senate Committee during hearings, and again using Technical Initiative Funds, the Society commissioned a report *Comparative Transport Investment Multiplier Effects: Road/Rail* by an economist Margaret Starrs. A major finding was "...that intercity rail and road investments are likely to have similar economic returns at about two to one". This led the National Council of the RTSA to call for the publication of an Australia-wide Benefit Cost Manual for rail and/or urban public transport projects that would include full consideration of external benefits in a manner similar to the 1996 Austroads Benefit Cost Manual. Although this request proved to be somewhat ahead of rail industry and government thinking at the time (like the warnings on the looming skills shortage) the report did give support to the view that it was worthwhile investing in rail.

3.2 A new Century - the RTSA (2000–2004)

By the conclusion of a successful CORE in May 2000 at Adelaide, the RTSA was firmly established. By then, the RTSA membership had grown to about 550, with a further 50 joining over the next two months. At the Annual General Meeting held on 9 May at CORE2000, the incoming National Chairman, Robert Schweiger announced that the RTSA would continue to support government relations along with awards, education and training whilst chapters would be encouraged to grow.

To meet the growing membership, production of the National Newsletter was delegated in 2001 to Mark Carter of GRMS Media, with distribution from Adelaide. In addition, the RTSA gained its own dedicated website <www.rtsa.com.au> that year.

Following CORE2000 at Adelaide, the National Council formed a Rail Forward Vision Task Force and asked it to prepare a report for CORE2002. The RTSA Task Force was chaired by Ted Butcher AM (Chair) and comprised Vince O'Rourke, John Hearsch, John Watsford, Max Michell and Philip Laird. The report *Rail in the next decade: where to and how?* was presented to CORE2002 and included two scenarios 'Steady as we go' and 'Leadership and vision', the latter envisaging a move of the ARA from Melbourne to Canberra. This actually happened during the first half of 2003 - much quicker than some thought it would at the time. More information is given in Section 5.

In 2001 RTSA received a boost when an Adelaide based group Rail 2000 was wound up and transferred its members and assets to the RTSA. Rail 2000 had members from across Australia, issued regular newsletters and occasional media releases and had hosted no fewer than four conferences from 1990 to 2000 (three in Adelaide and one in Melbourne). The scope of Rail 2000 was well covered in the 1997 RTSA Business Plan as follows:

"Rail 2000 was set up in 1989 as a community based non-political lobby group to campaign solely on rail related issues. The organisation is an incorporated body dedicated to promoting rail as an effective, environmentally preferred method of moving people and freight and as the preferred transport mode into the 21st century. Rail 2000 aims to make political leaders and decision makers more aware of the need to invest in the re-capitalisation and revitalisation of Australia's rail transport network. Rail 2000 holds regular meetings, with occasional eminent speakers and national Conferences."

Despite the value of a public interest group supporting railways, Rail 2000 ceased in 2001 (ironically 2001 was the year of volunteer). Amongst the many gains to RTSA was the Rail 2000 Chairman, Max Michell becoming a regular contributor to the RTSA National Newsletter; also the South Australian Chapter gained more and active members.

In 2001 the Rail Track Association of Australia (RTAA) also considered folding and transferring its members and assets to the RTSA. This proposal, which was formally put to the Annual General Meeting of the RTAA in November 2001 lapsed, but did help to reinvigorate the RTAA. Both organisations have since continued to work well together, including rail conferences and joint production in 2002 of a brochure on the Sydney Rail System.

Research

One area of interest to the RTSA National Council during 2000 was the proposal within Queensland Rail and other railway systems along with Central Queensland University (at Rockhampton) and other Universities to form a co-operative research centre (CRC) in Railway Engineering technologies. At its November 2000 meeting in Sydney (following AusRail), the National Council agreed to support applications for a new Rail CRC and to commit a payment of \$2000 a year for seven years. Through its modest contribution the RTSA registered its support for the proposed research initiative, which was more than many other small (or not so small) railway organisations were prepared to do.

The application was successful and on the first of July 2001, the new Rail CRC was open for business. In its first year, the rail industry partners were Queensland Railway, the Rail Infrastructure Corporation of NSW, ARTC, TMG International, and FreightCorp. There were six universities involved, being Central Queensland University, Queensland University of Technology, the University of Queensland, University of Wollongong, Monash University, and the University of South Australia. The Rail CRC advanced railway research with full industry involvement with five main themes; whilst Theme 6 dealt with Education and Training and maintained a close link with the RTSA and other professional bodies. Some of the outputs from one project (Rail transport energy efficiency and sustainability) found their way over the years into RTSA submissions and in 2007 were used in an ARA flyer *Rail - Safer, Cleaner, Greener*.

In 2007, the first Rail CRC was replaced by a new CRC for Railway Innovation and a company Rail Innovation Australia Pty Ltd.

CORE2002 Cost efficient railways through engineering

Wollongong was selected as an alternative to Sydney for this conference held November 10 to 13. It attracted over 500 delegates, with some being day visitors from Sydney. The Hon. Tim Fischer AO gave the opening speech with an enthusiastic view on railways over the ages whilst recognising the need for more advances in Australia. The Keynote speaker was Mysore Nagaraja from the MTA - New York City Transit Authority and he was able to not only outline an impressive capital works program but also how the MTA handled the crisis with stations and track ruined by the 2001 terrorist attack.

The conference included panel sessions and presentations of more than 50 technical papers split into 3 streams. A day two plenary session chaired by Ron Christie, the report of the RTSA Forward Vision Task Force was discussed along with presentations by Phil Potterton of the Bureau of Transport and Regional Economics with transport projections to 2020 and Peter Thornton of TMG International on Very Fast Trains.

In the evening the Gala Dinner was held at the Wollongong Entertainment Centre, the guest speaker being broadcaster George Negus. At this dinner, John Adams, Ian Nibloe and Les McNaughton were made life members of the RTSA.

Day Three was mainly devoted to RTAA sessions on track aspects but also included an address on the Rail CRC by Dudley Roach. The conference, which had been assisted by event manager Caryn Morgan and technical secretary Mark Carter, ended with some technical visits to local companies.

In formally closing the conference, Mysore Nagaraja considered CORE2002 a significant and enjoyable conference.

Les McNaughton
CORE2002 Conference Chair

At the Annual General Meeting held with CORE2002 that had been organised by the Sydney Chapter, John Watsford became National Chairman.

Also at CORE2002 it was announced that the next CORE would be held in June 2004 in Darwin. The choice of Darwin was an initiative of the SA Chapter, who had made initial inquiries of the IE Aust office in Darwin. Assurances were given by the Chief Minister of the NT Government, the Hon Clare Martin, that if the RTSA was to choose Darwin as the conference venue, it would receive a warm welcome.

This, coupled with the fact that the Alice Springs to Darwin Railway was due to open in 2004 was enough for the National Council of the RTSA to take the risk of holding CORE2004 in Darwin. It proved to be a good choice.



Seen at CORE 2002 are John Watsford, Keynote speaker Mysore Nagaraja and Philip Laird
Photo: Mark Carter



Life Members Ian Nibloe, Les McNaughton and John Adams
Photo: Mark Carter



Janette Aitken receives the first thesis award from Philip Laird at CORE2002. Photo: Mark Carter

CORE2004 New horizons for rail

Darwin provided an excellent venue for the 2004 Conference on Railway Engineering. It was a fitting celebration of the completion of the long awaited Alice Springs to Darwin Railway, as well as an opportunity for the rail industry to showcase the technical expertise that is found within the world-class Australian railways. Many delegates also took time off either before or after the conference to explore the outback in this tropical paradise and to travel on the newly opened track on the world famous 'Ghan train service.

The conference continued the CORE tradition whereby plenary sessions and excellent peer reviewed Technical Papers were presented in three streams over two days along with a comprehensive trade exhibition wherein suppliers were able to display their capabilities. The opportunity was also taken to showcase the engineering feats that challenged the constructors of the ADRail Project with a number of Technical Tours after the completion of the conference.

The conference culminated under the stars and looking out over the lawns of the Darwin MGM Grand, with some 450 delegates, sponsors, exhibitors and other guests gathered for the gala dinner and the announcement of the annual RTSA Railway Engineering Award winners. The Railway Engineering Student Theses Award, the inaugural Young Railway Engineers Award, the Annual Individual Award and the Biennial Industry Award recipients received their awards in front of this appreciative audience.

And who can then forget the after dinner speech of the effervescent railway enthusiast Tim Fischer followed by the excellent performance of Pot Pourri presented by Music Theatre Australia. Truly a conference that will be remembered favourably!

Robert Schweiger
CORE2004 Conference Chair

Awards

The Awards Committee, chaired by John Adams to 2003 and then John Dring, continue to administer the individual, corporate, and undergraduate thesis awards.

The first railway thesis award was made in 2002 to Janette Aitken. After a trial period in 2002, that gave Chapters the scope to make a modest payment to a suitable thesis in progress, it was decided to make awards of increased value for completed theses. These were a First Prize including a cheque of \$2000 and up to three Honourable Mentions or Runner Up prizes that included a cheque of \$1000. In 2003 the Committee received no fewer than nine thesis submissions. Such was their quality that two joint First Prizes were awarded along with three Honourable Mentions.

The next innovation was when the National Council decided to introduce a new award for Young Railway Engineer. This was to reward, and encourage, professional engineers, technologists or associates in Australia and New Zealand who were under the age of 30 (now increased to 35).. The prize included expenses to attend CORE and the inaugural award was made in 2004 to Jacob Latter.

Education

The RTSA with the active involvement of Chris Venn-Brown and John Scott went on to extend the 1998 report *Railway Engineering Competency Profiles* with a new report *Railway Engineering Professional Formation and Development*. This report was published by IE Aust in the year 2000.

Efforts were also made about this time to introduce to Australia a 'Passport' scheme from the United Kingdom (as noted in the January 2000 RTSA National Newsletter). This is where young railway engineers could gain recognition, by the Institution of Mechanical Engineers, of experience with more than one employer. Although there was insufficient support at the time within IE Aust, the proposal has recently been revived.

Standards

The RTSA through its representation on the CE2 standards committee, chaired by John Broadley and subsequently Richard Brown, and John Scott continued to support the revision of standards, with particular attention to Railway Track Materials. RTSA support allowed presentations by the CE2 Committee of Standards Australia in the mainland state capitals to reach a wider audience. Given a move to performance based standards and the development of new standards for screw spikes, resilient fastenings and welding of rails, this support was timely.

Government Relations

In 2000 the *Fix the Rails* series of brochures was concluded with one highlighting the interstate network throughout Australia. This was followed in 2001 by another brochure on high speed passenger rail pointing out that as the Federal government was not prepared to support the Sydney Canberra Speedrail concept, then tracks straightened out for faster and heavier freight trains could also support tilt trains - in short, a 'Queensland' option.

The appearance of the ARTC Track Audit in May 2001 was coupled with the Neville Committee releasing a further report *Back on Track* questioning the somewhat slow response by government to its 1998 report. As a result, the RTSA produced a larger-sized brochure supporting the findings of the Track Audit. Basically, these findings were that a modest investment in the interstate track network (mostly in NSW) would pay good dividends.

However, the Federal government had made it quite clear that it was not prepared to invest in NSW mainline interstate track until the NSW Government had leased this track to the ARTC. Although this was agreed to in principle in 2001, thus facilitating the sale of National Rail and Freight Corp in 2002, the actual agreement was not signed until June 2004. This was assisted by the May 2004 Federal budget making a special allocation of \$450 million to the ARTC for work such as "to straighten out the track" – both of which had previously been supported by the RTSA.

In 2002, the Federal government proposed a new AusLink integrated transport program whose Green Paper received wide support, including the RTSA and IE Aust.

Two further brochures produced by the RTSA supported improvements in urban rail. The first in 2002 was jointly produced with the RTAA and focused on the need to upgrade and extend the Sydney rail system. The second brochure addressed urban transport in Australia's five mainland state capitals, and noted the threefold growth in patronage in Perth's rail system during the 1990s after electrification and extension.

The brochures were often accompanied by detailed submissions. These were mainly to the Federal government, with some to the NSW government and the occasional one to other states. This included a response to a draft Queensland Rail Network Strategy with the final report being launched by Premier Beattie at the 2001 Heavy Haul Conference.

3.3 More recent developments (2004–2008)

The holding of CORE in June 2004 was a major success for the RTSA. Notwithstanding Darwin's remote location, the participation of 450 delegates was an excellent result. The event helped the RTSA in more ways than financial benefits to move forward with confidence at a time a reinvigorated ARA was gaining momentum.

From 2004 to 2008, there were two new National Chairmen. The first was George Erdos (2004-2006) who had been the interim RTSA Chairman (1996-1998) and had, like Robert Schweiger, the distinction of now being on the RTSA National Council in one capacity or another, for (at least) 10 years. The second was Ravi Ravitharan (2006-08) who was active in the Victorian Chapter from 1998 onwards, National Treasurer from 1999 to 2003 and is due to continue to serve on the National Council until at least 2010.



Former National Chairmen Robert Schweiger, George Erdos, John Watsford and Philip Laird with former National Rail and Railcorp CEO Vince Graham at AusRail Plus 2005
Photo: Mark Carter

The National Council also saw the retirement of three long standing members in 2005-06. These were David Ferris (interim RTSA Treasurer and then Victorian Chapter Chair), Philip Laird (inaugural national Chairman and Chair Government Relations Committee 1998-2005) and Chris Venn-Brown (Chair Education Committee and National Secretary 2001-06). The respective replacements were Martin Baggott, Andrew Honan and John Dring.

In many ways, 2004 was a significant year for both the rail industry and the RTSA. It started with the ability to travel to Darwin by rail. This was something that many people had long thought would never be possible. The number of people and companies who choose to fully participate in CORE2004 (including exhibitors, sponsors, speakers and partners) was a further indication of the growing confidence within the rail industry and for the RTSA.

On 5 September 2004, the ARTC took up a 60 year lease of the NSW interstate mainlines and Hunter Valley coal lines. This was to lead to the start of major and long over due investment on the North - South Rail Corridor.

However, some hidden challenges were about to emerge for the Australasian rail sector. Some unintended consequences of rail privatisation resulted in the New Zealand government taking back from the private sector the nation's rail

tracks (forming OnTrack). This was followed by the Tasmanian rail track and then the Victorian track reverting to government ownership. Next, branch lines in NSW had deteriorated and needed rehabilitation, whilst gauge conversion of broad gauge freight lines in Victoria and South Australia was stalled. Other challenges emerged with the accelerating demand from China for Australian iron ore and coal. This had the combined impact of increasing demand for rail operation and expansion and strong competition from the mining sector for both skilled personnel and construction capability. Skills shortages within the rail industry had been addressed by the RTSA and other rail organisations as early as 1998.

In 2006, the RTSA Constitution was amended. There were many reasons for the first major change since 1999. One was that the trading name of The Institution of Engineers, Australia (IE Aust) had been changed to Engineers Australia (EA). The RTSA constitution had numerous references to IE Aust and they all needed updating. One change was amending the Mission Statement to read: *"To provide learned society functions for all who have an interest in railway technology and management and to provide practice-based opinion and advice to Engineers Australia."*

A further significant change was to allow for corporate membership of the RTSA. The first corporate membership of the RTSA was taken up by Austrak and by June 2008, there were 10 corporate members. In addition, the National Council became the Executive Committee and the National Chairman became the Executive Chairman. In addition, the various Committees including Awards, Education, Government Relations became Sub-Committees and a decision was taken to form a Technical and Investigations Sub-Committee.

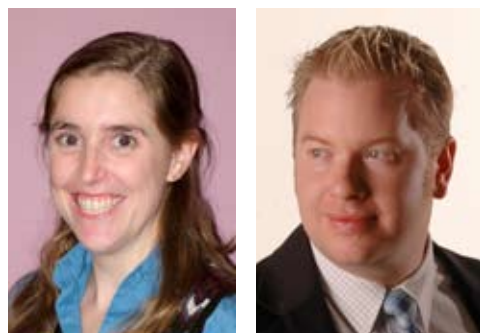
Yet another change in the new Constitution was the provision for all Chapter Committees and the Executive Committee to allow for the representation of special interest groups such as young members or female members. At a meeting of 25 May 2007 at Perth of the Executive Committee, Rebecca Taylor of WA and Daniel

Martucci of SA were welcomed as the first special interest representatives. Also welcomed to this meeting was Andrew Hunt from the New Zealand Steering Committee.



Peter Martinovich receives his award trophy from Ravi Ravitharan at AusRail Plus 2007
Photo: Mark Carter

An early task for Rebecca Taylor and Daniel Martucci was to suggest changes to, and then reorganise, the RTSA website. Their suggestions, that were adopted, included a redesign of the 'look' of the webpage, updating ability, inclusion of photos and links to other websites.



Rebecca Taylor and Daniel Martucci

Professional development

In recent years, the RTSA has put renewed emphasis on Professional Development. This has included support for the initiatives of the former Rail CRC (its Theme 6 projects in Industry Skills Development) to introduce postgraduate courses at three Universities.

The first was Central Queensland University with Graduate Certificate and Graduate Diploma courses in Railway Signalling Engineering. This was followed by Rail Operations Management in 2007. At University of Wollongong, a Graduate Certificate and Masters program in Rollingstock Engineering had its first student intake in 2007. These courses were developed by the former Rail CRC (Project 63) in consultation with the rail industry and the RTSA (including Chris Venn-Brown, David Ferris and Philip Laird). Queensland University of Technology (QUT), offered for some years continuing and professional development courses for the rail industry (with enrolment of over 300 Australian and overseas students) as a joint venture with the Australian Railway Research Institute (Wardina Oghanna). In July 2008, QUT introduced a new Masters of Engineering (Railway Infrastructure) degree. This included the option of an early exit with a Graduate Certificate in Railway Infrastructure.

Whilst new postgraduate courses were being introduced, three new Professional Development initiatives were launched by the RTSA to help address the critical skills shortage in the railway industry work force. The three interrelated initiatives were:

- conducting a further short survey on professional development activities and skill shortages within the railway industry;
- developing an industry-based Professional Development and Assessment Program (PDAP) in collaboration with Engineers Australia, and;
- hold a series of Australia-wide symposiums on professional development involving a broad range of railway industry participants.

The short survey on professional development activities was to update the understanding of technologies and sub-specializations within the railway industry. The aim was to provide guidance to the RTSA for Continuing Professional Development (CPD), a program administered by Engineers Australia. The survey was targeted at senior managers within the railway industry.

The Professional Development and Assessment Program (PDAP) was developed with Engineers Australia and is designed to suit emerging requirements for career development within the rail industry. The RTSA is the first industry-based institution to develop a structured approach to improve the standing of railway professionals and to assist the industry to address the critical skilled work force shortage. The PDAP program complements currently existing organisation-based development activities (e.g. internal graduate training programs) and also provides an opportunity to railway professionals, in organisations without any structured development programs, to achieve professional recognition. The first person to enrol in the RTSA PDAP was Naty Lee who completed her BE (Honours - Mechanical) at Monash University in 2007.

Professional Development Symposiums

Two half-day Professional Development Symposiums have been hosted by the RTSA, one on 19 September 2007 in Melbourne and another on 12 February 2008 in Sydney. The objects were to identify the characteristics of the various training and development programs currently offered within the Australian railway industry and to facilitate discussion designed to improve current training and development programs.

In Melbourne, several presenters outlined a range of different development programs offered by their particular organisations. One speaker (David Anderson from Interfleet) noted the fragmentation that has occurred in both the UK and Australian rail industries and how the UK has a 'Passport' scheme which endeavours to meet the demands of the railway professional and the railway organisations. Earlier efforts by the RTSA to introduce a similar scheme in Australia "... did not take off" and could now be well suited for adoption by the Rails Skills and Careers Council associated with the ARA.

Other speakers stressed the importance of recruitment and retention programs, the importance of staff development in the context

of the organisational environment and graduate training programs. One example is a three-year 'Rotational Rail Engineering Graduate Program' within the Victorian Department of Transport that initially focused on signalling and electrical engineers. The fragmentation within the railway industry which led to a lack of comprehensive training opportunities could be alleviated by a rotational training program administered by an industry body.

At Sydney, Steve Dilli, Associate Director Professional Development Program at Engineers Australia acknowledged that the RTSA plays a leading role in professional development. Several large organisations within the railway industry are already participating in a professional development program (PDP) linked to the Engineers Australia PDP.

The Symposium also identified that the railway industry should more proactively promote itself among school leavers and early undergraduate students to encourage them to consider a career within the industry. This is an ongoing challenge for both the RTSA and the rail industry as a whole.

Grain lines

Following AusRail November 2005 in Sydney where much attention was given to grain lines, a special Study Tour on Railway Engineering (STORE) was organised by the Sydney RTSA Chapter. This tour gave the RTSA and others (including ARTC Chairman Barry Murphy) a good insight into the precarious condition of many NSW grain lines, and the need for their rehabilitation.

Grain Line STORE2006

This study tour was organised by the NSW Chapter of the RTSA with 17 participants from NSW and interstate. It was held between 22–25 March 2006.

The main purpose of the study tour was to gain an insight into the handling of grain in the Central West and the Riverina regions of NSW. Visits were made to the grain loading facilities at Parkes, West Wyalong, Boree Creek and The Rock. The study tour allowed participants to meet with grain silo operators from Grain Corp, the Australian Wheat Board Ltd (AWB), Australian Bulk Alliance (ABA), grain farmers at Kikoira and Weethalle and inspect Manildra Flour Mills, the FCL intermodal terminal at Parkes, Patricks at Griffith and Casella wines.

The study tour saw older Grain Corp silos with limited load out rates that formed part of a large network as well as modern facilities (ABA and AWA) designed for quick loading of trains at 800 tonnes or more per hour with road only receipt. Many Grain Corp silos are located on branch lines such as West Wyalong, Kikoira and Boree Creek, which can only load wagons to 76 tonnes gross (19 tonne axle loads or TAL). Owing to the track rating, the locomotives used to haul trains are light and tend to be older and underpowered. In addition, the effectiveness of modern silos at West Wyalong

and The Rock were constrained by their branch lines being restricted to 19 TAL. This is the case of the ABA silo at The Rock, despite the mainline capable of handling 25 TAL being no more than two km away.

At Boree Creek, the tour met with a local committee that had been active in attempting to persuade the NSW Government to not only retain their branch line (57 km from The Rock) but upgrade it from 19 to 23 TAL. To this end, they had retained consultants to estimate the scope of work and cost to upgrade (\$11m + 30%) and in 2004 had made a detailed submission to the NSW Grain Infrastructure Advisory Committee (GIAC). The Boree Creek Committee considered that the GIAC had under-estimated the cost of the impact of heavy trucks and overestimated the cost to upgrade their branch line, and, has made ongoing representations to government at all levels.

The tour also saw how limited weight for wagon loadings also affects the Patrick Intermodal operations at Griffith. Their trains go through Leeton to Junee and then Melbourne, but the branch line to Junee is restricted to 19 TAL. Here, a modest increase to 21 TAL would give good benefits.

John Watsford

The Study Tour concluded that there is a good case for rehabilitation of branch lines. The alternative was to see more and more freight move by B-Doubles on lightly constructed roads. These and other observations were conveyed to the Neville Committee, the NSW Government and the 2007-08 Victorian Rail Freight Network review chaired by Tim Fischer AC.



James Morrison at the CORE 2006 dinner
Photo: Mark Carter

A regional symposium

Encouraged by the interest shown by the Neville Committee at a public hearing held in August 2006 in Sydney, the RTSA then teamed up with Professor Ian Gray of Charles Sturt University (who had been on the above STORE) to host a 'Future Frameworks for Regional Rail Symposium'. This was held on 1 February 2007 on campus at Wagga Wagga.

As part of the Symposium, a 'can-do' public servant and rail services director with the Province of Saskatchewan in Canada, Ed Zsombor, was invited to be keynote speaker. His approach was refreshing, and with a small staff his role is to assist small rail operators to maintain rail track released (under Federal legislation) by major rail companies, and operate grain trains. This was opposed to enforcing regulations affecting small rail operators where the end result was often to see more grain moved by heavy trucks on lightly constructed rural roads.

CORE2006 Rail achieving growth

CORE2006 was held between 30 April and 3 May at the Melbourne Grand Hyatt Hotel. The conference was opened by the Victorian Minister of Transport, the Hon. Peter Batchelor MLA. At the opening plenary session David Marchant (ARTC Managing Director) gave an insight on the work ARTC is doing in upgrading the track on the North - South rail corridor and pledged his ongoing support for CORE. A total of 61 high-quality technical papers were presented in three separate parallel streams over two days focusing on a range of railway related issues including Projects and Planning, Systems and Management, Safety and Risk Management, Track and Rail Maintenance, Vehicle and Wheel Maintenance, Vehicle-Track Interaction, Signalling, Rolling Stock, Locomotives and Condition Monitoring.

The final session of the conference was a panel discussion moderated by ABC Radio identity Jon Faine. That evening a gala dinner with Shane Bourne as MC was held in the Grand Hyatt ballroom. Following presentation of four categories of RTSA awards all present were entertained by James Morrison.

On the final day, many of the delegates participated in technical tours. Three were on offer namely 'Something Old, Something New', 'Victoria's Real Railway Hub', and 'Behind the Scenes'. The tours gave first hand experience of the railway infrastructure investments in Victoria, particularly the Regional Fast Rail (RFR) and Southern Cross Station projects as well as the steam-operated Castlemaine to Maldon heritage railway along with various railway facilities and workshops in the Melbourne and surrounding areas.

Ravi Ravitharan
CORE2006 Chairman



Ed Zsombor from Canada at the Future Frameworks for Regional Rail Symposium. Photo: Mark Carter

As well as addressing RTSA Chapter meetings in each mainland state capital, Ed and the RTSA were also asked to appear at a special public hearing convened by the Neville Committee on 14 February in Canberra. As noted in its August 2007 report, the Committee: *"took advantage of the visit to Australia of a Canadian expert on regional railways – Mr Ed Zsombor, Director of Rail Services in Saskatchewan."*

The report noted that Canada does not have a railway gauge problem; both the Federal and Provincial governments own grain wagons, and outlined how both levels of government in Canada act to facilitate short line operations for the movement of grain and other commodities.

The Neville Committee in its 2007 report found that:

"... the type of structure outlined by Mr Zsombor is worth closer examination in Australia. The concept of local businesses and authorities arranging to take over the short regional lines, with some help from the State or Australian governments, could be a useful way of keeping the infrastructure available."

Awards

The Awards Committee chaired by John Dring continues to administer the individual, corporate, undergraduate thesis and Young Railway Engineer awards.

In 2007, a new Contact Mechanics award was introduced for a thesis related to the contact conditions between wheel and rail and the consequences of these conditions in terms of material behaviour and damage modes. The inaugural award was made in 2008 to Mr Mina Hanna of Monash University.

Government Relations

Since 2005, the Government Relations committee has been focus on providing advice to the government in technical, engineering and professional development issues related to railway industry. Along with the Grains Symposium, a further Government Relations Committee initiative under its new chairman Andrew Honan was to bring to the attention of the NSW Roads and Traffic Authority of NSW the need to consider the potential for shared road – rail (and telecommunications) corridors when planning for Pacific Highway Upgrades. The RTSA also made a submission along these lines to a Committee of the Legislative Council of NSW that was well received.

Submissions were also made on behalf of the RTSA to the Neville Committee in its inquiry into freight. Again, these submissions were well received, and along with detailed comments on grain transport, the report noted other RTSA inputs. One was a recognition (p 128) that:

"... the greatest need for Australia is the reconstruction and realignment of the main freight networks. This would:

- *allow faster speeds and greater axle loads;*
- *clear the way for longer trains and double stacked containers;*
- *make it possible to reduce the steepness of grades, straighten lines and remove loops; and*
- *allow for the elimination of many level crossings."*

As a case study, the Neville Committee report noted the benefits of construction of a new 67 km line from Hexham to Stroud Road that was outlined in a Karuah River rail proposal by RTSA Member Alex Stony in the January 2000 national newsletter [see also Laird et al (2005) and Track and Signal magazine (April-June, 2006)]. The new line would get rid of 97 km of steam age' alignment, cut train transit times from 82 to 42 minutes, and reduces fuel use in the track section by 40 per cent.

In addition, the Neville report noted (page 103) a RTSA submission indicating:

"...a demonstrable need to expedite Caboolture - Landsborough duplication and re-alignment and to start planning for other rail deviations and bridges..."

and that the bridge on the Burnett River near Bundaberg was:

"...now subject to a 15 km/h 'flat' speed restriction (i.e. no acceleration or braking)"

and in need of replacement.

Some 2008 initiatives

Along with the February 2008 Professional Development Symposium in Sydney, planning for CORE2008 in September in Perth and a Metro Symposium in November in Sydney, a significant event occurred on 1 April 2008 in Wellington New Zealand with the first formal meeting of the New Zealand Chapter.

As noted in Section 2, it had been intended from the establishment of the RTSA in 1998 to form a New Zealand Chapter. This proved out of reach for some years, and in more recent years, there were still challenges to address. By 2007 and with the support of the Institution of Professional Engineers New Zealand (IPENZ) there was an interim committee established. The April 2008 meeting was chaired by RTSA Executive Chairman Ravi Ravitharan and saw the election of a committee including Andrew Hunt as NZ Chapter Chair and Rob Schofield as NZ Chapter Secretary.

The formation of the New Zealand Chapter and the other initiatives led to the RTSA reaching 1000 members in May 2008. By mid June, RTSA had a total of 1017 members plus ten Corporate members. The membership of the chapters were NSW (with ACT) 314, Victoria (with Tasmania) 262, Queensland 167, South Australia (with NT) 96, Western Australia 104, New Zealand 49 and other overseas 25. The recent growth in membership will assist future RTSA activities.

4 Engineering and rail sector growth

Many NCRE and RTSA members have been involved in engineering and technical projects to construct new railways and to upgrade existing railways. Such projects have underpinned the ongoing growth in the rail freight task and the increase in urban rail passenger numbers.

As noted in Section 1, in the 30 years to 2006-07, the rail freight task has more than tripled and the passenger task has doubled. This Section outlines nine examples of rail sector growth in Australia with a brief account of railways in New Zealand.

4.1 The iron ore railways

The haulage of iron ore in the Pilbara Region of Western Australia by rail from mine to port is now a longstanding 'text book' example of World Best Practice. The initial development took place during the 1960s with four railways: Yarrie to Finnuacane Island near Port Hedland, Pannawonica to Cape Lambert, Mt Newman to Port Hedland, and Mt Tom Price to Dampier. By 1969, there were some 1025 route km of railways in the Pilbara, and that year, they moved over 20 million tonnes of iron ore.

During the 1970s, iron ore exports continued to grow and by 1978 had reached about 75 million tonnes. The new iron railways were pushed to their limits, and track had to be strengthened to accommodate the increased tonnage (see, for example, Vanselow, 1989). The demands placed on these railways, with the much increased tonnages, resulted in Australia undertaking research and development in heavier axle loadings for wagons, along with increased efficiency and reliability of operations. In this process, which drew on resources such as at BHP's Melbourne Research Laboratory, Australia became a world leader in heavy rail haulage. An account of MRL and its successor the Institute of Railway Technology (IRT) is given by Peter Mutton IRT Associate Director.

Railway research and engineering excellence

Railway research activities commenced at BHP-Melbourne Research Laboratories (MRL) in 1972. This followed the start of rail haulage operations in 1969 at the Mt Newman Mining Company Ltd Joint Venture in the Pilbara. The initial focus of the research activities was to address the high rates of component deterioration that occurred in a railroad that was designed to carry five million tonnes of iron ore per year. Capacity expansion requirements that existed at that time meant that the research activities expanded into a broader program covering behaviour of the track structure, vehicle/track interaction, train handling and rolling stock maintenance. This program continues to the present day, with mean axle loads of 36.6 tonnes and a 14-train per day schedule, and BHP Billiton's annual haulage rates approaching 200 million of tonnes of iron ore per year (a far cry, indeed, from 1969!).

Railway research activities were expanded outside the confines of BHP, initially with Hamersley Iron (now Rio Tinto) and then under Railways of Australia (now ARA) to meet the needs of the public sector railways. In 1989, a partnership with Hong Kong's MTR Corporation was established. This, over the years, has yielded significant direct savings through the adoption of improved rail maintenance procedures and practices.

The core of the railway research team relocated to Monash University following the closure of BHP-MRL in 2000 to form the Institute of Railway Technology (IRT). The Institute is now a recognized world leader in railway research and technology development for heavy haul, mass transit, light rail, general passenger and freight operations. IRT has been involved in the first Rail CRC whilst its personnel have made ongoing contributions to Australian and international conferences.

Peter Mutton



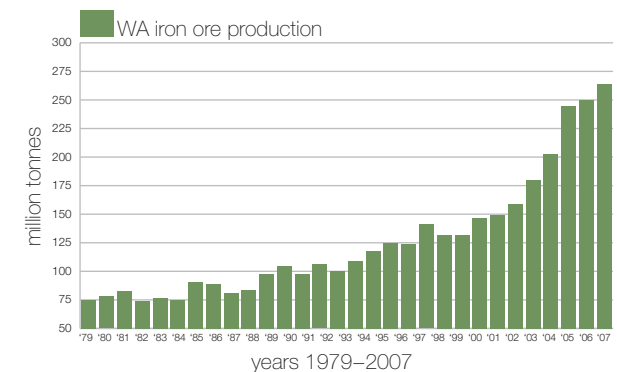
One of thirty new SD70ACe locomotives to move iron ore to Port Hedland. Photo: BHP Billiton

By 1990, the iron ore trains in the Pilbara were demonstrably the most efficient freight trains in the world. Further extensions followed and the iron ore railways became even more efficient from new locomotives and higher standards of track maintenance. At the 2001 Heavy Haul conference in Brisbane, Mike Darby of BHP Iron Ore outlined improvements in fuel and other efficiencies to handle increased tonnages. In brief, these included improved wheel/rail interaction, more efficient locomotives, longer trains and increased axle loads. In the two decades from 1980 to 2000, fuel use per tonne of iron ore moved to the mineheads to Port Hedland fell 43 per cent (from about 1.45 litres of diesel in 1980 to 0.75 litres in 2000), tonnes carried per ore car increased by 36 per cent and manning levels dropped from about 32 persons to just over 5 persons per million tonnes of iron ore.

The longest and heaviest freight train in the world was a trial by BHP Iron Ore to Port Hedland on 21 June 2001. This was a train with eight locomotives and 682 wagons with an aggregate payload of 82,262 tonnes of iron ore and a length of some 7.4 km. This beat a 1996 record with ten locomotives and 540 wagons with a length of some 5.9 km. Many BHP Billiton iron ore trains on the Mt Newman system now have 6,000 horsepower locomotives pulling more than 26,000 tonnes of ore in trains up to 3.75 km in length.

Further challenges were to come during the present decade to meet an escalating global demand for iron ore. In 2005, Western Australia's iron ore exports jumped 22 per cent from the previous year to 240.5 million tonnes and exceeded, for the first time, Australia's black coal exports.

Figure 2



Most, but not all, is for Pilbara region exports. Reference: WA Department of Industry and Resources.

WA iron ore production over 30 years showing four fold growth

To meet escalating tonnages both BHP Billiton (incorporating Goldsworthy) and Pilbara Iron (Hamersley Iron and Robe River) have opened new mines and expanded rail capacity. By 1999, their combined length of track was about 1540 km (from 1025 km in 1970), it now exceeds 2000km. BHP Billiton had, and continues to have, 'Rapid Growth Projects'. One such included the completion of a 39.4 km line from Mining Area C to Yandi Mine Railroad which won the RTSA Industry Award in 2004. This project required nearly 3 million cubic metres of earthworks, deep cuttings up to 33 metres, embankments up to 48 metres and two major bridges.

Pilbara Iron rail operations and their future expansion from 150 mtpa to 220 mtpa was outlined by Richard Cohen of Rio Tinto at AusRail 2007. Feasibility studies are now underway to expand to production to 320 mtpa by 2012.

4.2 Rail electrification in Queensland

Electrification in Queensland brought two major advances to Australia. The first was the choice of 25,000 volts AC as opposed to the older 1500 volt DC system used in NSW and Victoria. The second was the giant Main Line Electrification (MLE) project of the 1980s. This major undertaking was then noted as *“Australia’s biggest railway project”* and *“The largest rail electrification project in the Western World.”*

As noted by Kerr (1998), a series of consultants’ reports preceded electrification. In 1960, Ford, Bacon and Davis preferred the use of diesel to electric traction for Brisbane’s rail network (thus stopping work on a 1500 volt DC system). Wilbur Smith and Associates in 1965 favoured a network of freeways and new roads (leading to Brisbane’s last tram running in 1969) but by 1970 conceded a place for rail with 1500 volt DC electrification and recommended a bridge to link Roma St to South Brisbane (completed in 1978). In 1974 Elrail and other consultants were appointed to advise QR on electrification, and favoured 25,000 volt AC. Although the higher voltage added to rolling stock costs and required both greater clearances and resignalling, it reduced the weight of overhead wiring and the number of substations.

The year of 1974 also saw the introduction of Commonwealth funding of urban public transport in Australia’s major cities under the *States Grants (Urban Public Transport) Act* by the Whitlam Government. The initiative was in:

“...recognition of the need for national Government to accept a share of responsibility for the public transport systems of Australian cities. This was essential if the serious deterioration in our urban environment attributable to over-reliance on the motor car as a means of transport was to be overcome.”

The additional Federal funds were put to good use in Queensland. The two political figures (who were often in conflict) of former Prime Minister Gough Whitlam and Queensland Premier Sir Joh Bjelke-Petersen both worked to electrify Queensland’s railways at 25,000 volts AC. On one visit to Brisbane, Mr Whitlam asked Sir Joh why his government was not using the new Federal funds for public transport. Sir Joh replied along the lines that *“Your bureaucrats in Canberra won’t let me.”* Thereupon Mr Whitlam asked for a phone, and found that some people in Canberra preferred 1500 volts DC. Mr Whitlam quickly sorted that one out.

Brisbane’s electric trains officially started on 12 November 1979 from Roma Street to Corinda. Electrification on other lines was expedited to be ready in time for the 1982 Commonwealth Games. Further development included electrification on improved alignments to Beenleigh and Caboolture in 1984 and Nambour in April 1988. This was in time for the 1988 World Expo held from April to October in Brisbane near the South Brisbane Station. This major event helped bring Brisbane to international attention and the upgraded and electrified rail system did much to ensure its success and enjoyment by over 13 million visitors.

As the first Brisbane lines were being electrified, design work was underway to electrify the main Central Queensland coal railways. The first stage to be announced in August 1983 was the Blackwater - Rockhampton - Gladstone system. Twelve months later, in the first of 22 Facts Sheets, Transport Minister Don Lane was able to announce the awarding of contracts for 146 electric locomotives at a cost of \$189 million (76 to Comeng and 70 to Clyde/ASEA-Walkers) along with three other MLE stages. These were the Goonyella System to Dalrymple Bay and Hay Point, Gladstone to Emerald, and Stage 4 as the electrification of the line from Newlands to Collinsville and north east to Abbot Point. Stage 4 as then announced, was replaced in February 1986 by Nambour to Gladstone.



The Eumundi deviation under construction as part of MLE. A plaque nearby unveiled on 21 January 1989 notes that it *“...permits the operation of larger and faster trains.”*
Photo: Philip Laird

One project followed another. Along the way, curves were eased between Blackwater and Gladstone and an elevated joint road and rail corridor was built just south of Rockhampton to improve flood mitigation. A ‘missing link’ between Clermont and the Goonyella system at Blair Athol was completed in July 1986 followed by the official opening on 6 September 1986 of MLE between Gladstone and Rockhampton. By May 1987, electric trains on the Blackwater system were reaching the Curragh mine, and MLE Stage 2 was opened. The official opening of MLE Stage 3 took place in October 1987. By then, at a time that pricing was favourable, the cost of MLE was \$1065 million. Electric locomotives were progressively phased in on the coal lines by 1989, when they were then hauling more than one million tonnes of coal a year. This resulted in considerable diesel fuel savings that were estimated at the time to be at 100 megalitres per year. The savings are now approaching 200 megalitres per year.

As part of the civil works carried out in association with MLE Stage 4, four major deviations were completed (Eumundi, Gympie, Maryborough and south of Gladstone) with a combined length of 42.5 km. As a result of these and related works, the transit times for freight trains between Brisbane and Rockhampton were reduced from an average of about 15 hours to 12 hours whilst freight train gross loads were lifted from 760 to 1200 tonnes; in

short, faster and heavier freight trains. Passenger train times between Brisbane and Rockhampton were also reduced from 14 hours to 9.5 hours with the introduction of the electric *Spirit of Capricorn* intercity trains on 3 July 1989. This marked the completion of MLE Stage 4.

So ended a series of projects that were completed on time and within budget. From the initial planning approval for Brisbane electrification to the end of MLE in 1989, QR had upgraded and electrified 2085 km of track.

Subsequent extensions of electrified track have taken place including to the Gold Coast and Brisbane’s airport. In addition, starting with three prototype refurbishments of electric locomotives (hauling coal since February 2007), the 1980s fleet is now being upgraded to AC traction. As a result, coal operations will benefit from a ‘three-for-five’ locomotive replacement programme.



A QR electric train negotiates the single track between Caboolture and Beerburrum. This track is currently being duplicated on an improved alignment.
Photo: Trackstar Alliance

4.3 Queensland's North Coast Line

Up to 1986, Brisbane - Cairns train operations were restricted by low axle loads and numerous speed - weight restrictions. Track straightening and strengthening was completed as part of Main Line Electrification (MLE) during the 1980s, the Main Line Upgrade (MLU) of the 1990s, and subsequent works.

Whilst MLE had four deviations, MLU included over 45 rail deviations between Nambour and Cairns - all in all, a total of more than 160 km of new track. In addition, MLU saw the acquisition of 40 new generation locomotives, 250 new container wagons, replacement of 672 old timber bridges with new bridges and strengthening of a further 157 bridges. The combined MLE and MLU rail deviations with subsequent work at Bowen and Mackay led to a total reduction in the Brisbane - Cairns track distance by some 26km.

Over 95 per cent of the Brisbane and Rockhampton track was re-laid on concrete sleepers. This work was subsequently extended to Townsville. Other work to accommodate faster freight trains and tilt trains included changes to signals, improved level crossing protection and an Automatic Train Protection (ATP) system. In the mid 1980s, passenger trains travelling between Brisbane and Rockhampton took some 14 hours. This was reduced in November 1998 to 7 hours by electric tilt train. In 2003, Brisbane - Cairns diesel tilt train services commenced.

The main reasons for the MLU project as seen by Project Manager Ross Hunter (1994) were:

"Without substantial upgrading, the quality of rail freight services possible could not keep pace with the quantum improvements enjoyed by our major competitor, road transport. Rail would continue to lose market share, compounding the losses from having to retain services. The Mainline Upgrade Project is targeted at improving services and picking up market share, and reducing the costs of providing these services to enable rail to compete more effectively on price."



The 12.5 km Watalgan deviation under construction in May 1995 as part of MLU. As noted by a 1996 QR Facts Sheet this project allowed "... trailing loads to be significantly increased."

As a result, the transit times for freight trains between Brisbane and Cairns fell from 40 hours to 27 hours. Axle loads increased from a low 15.75 tonnes to 20 tonnes and the load behind a locomotive was progressively lifted from 760 to 1500 tonnes.

The faster and heavier freight trains with improved reliability allowed QR to increase freight tonnages and maintain livestock traffic on its North Coast Line (NCL). This was at a time when rail freight operations had increased competition from road freight with more and heavier trucks including B-Doubles. By 2003, the total of all interstate intermodal freight on the NCL line was at least 1.5 million tonnes per annum (mtpa). In addition, MLU provided track infrastructure of sufficient quality to support competition between rail freight operators (QR and PN) on the NCL from 2005. New narrow gauge diesel electric locomotives with AC traction were constructed by EDI Rail at Maryborough for both Queensland Rail and Pacific National.

It is clear that the upgrading of Queensland's North Coast line has brought major benefits to all who live in Central and Far North Queensland. One result is that rail has been able to carry 25 to 30 per cent of the 6 mtpa of intermodal/containerised freight that moves along part or all of the Brisbane - Cairns corridor. Even at a 25 per cent modal share, rail is moving about 1.5 mtpa of intermodal freight on the Queensland NCL. This exceeds the

1 mtpa of such freight moving between Sydney and Brisbane by rail. Without the Queensland NCL upgrades, the cost of living would be higher in cities such as Townsville and Cairns and there would be many more heavy trucks on the Bruce Highway.

Work started in July 2006 on straightening and duplicating 14km of rail line between Caboolture and Beerburum. This work is currently due to be completed in mid-2009, and will include upgrades to two rail stations. This project is being delivered by QR through a program alliance (Trackstar) with the private sector. The next stage will see the single track line between Beerburum and Landsborough (17km) straightened and duplicated with similar work over the next decade onto Nambour.

Despite the gains made by MLE and MLU, the Brisbane - Cairns track still has significant speed constraints. As noted in Section 3, the Neville Report noted a:

"demonstrable need to expedite Caboolture-Landsborough duplication and re-alignment and to start planning for other rail deviations and bridges..."

The Neville Report (2007, p 128) also found that;

"... the greatest need for Australia is the reconstruction and realignment of the main freight networks."

Most NCL 'permanent' speed restrictions are now due to tight radius curves. There are approximately 550 curves of less than 800 metres radius between Landsborough and Townsville. A minimum curve radius of 800 metres is necessary to sustain normal train running operations at 90 km/h on narrow gauge track. These speed restrictions partly reflects the fact that MLU did not meet the full extent of upgrading recommended in a detailed 1992 report for Queensland Rail that included easing all necessary curves to allow 100km/h through running and grade easing to at least 1-in-75.



The old meets the new. A 1995 Waltzing Matilda steam train seen on the then new Gunalda deviation in March 1995. This 8km deviation replaced 10 km of 'steam age' alignment and cut up to 8 minutes of transit time.

Further studies have since taken place including a 1994 one for the National Transport Planning Taskforce, a 'Straight Track Study' in 2002 for Queensland Transport, a 'North Coast Line Corridor Study' (PWC, unpublished 2005) and the Brisbane - Cairns draft AusLink corridor strategy. In addition, a 'Brisbane - Cairns Freight Development Plan' (Queensland Rail, unpublished 2007) includes a first stage proposal to be funded under AusLink from 2009 to 2014 to provide significant outcomes and benefits for rail.

Further upgrading of this line will bring additional benefits. A series of further deviations between Caboolture and Maryborough West would do much to improve freight and passenger train operations. A saving of at least 30 megalitres of diesel per year by 2014 (80,700 tonnes CO₂-e) was estimated by the author (Laird, 2008) if the NCL was further upgraded and rail was to win an average of 50 per cent of corridor freight and 70 per cent of the longer haul freight. The corresponding reduction in external costs (including road crashes, air pollution, greenhouse gas emission and road system costs) was estimated to be about \$50 million per year.

4.4 East West success story

Rail freight movements on the East-West interstate rail network have continued to increase and rail now wins just over 80 per cent of the land freight between the Eastern States and Perth. Such a modal share for rail is high by world standards.

This high modal share has been supported by 'fit for purpose' infrastructure that is capable of supporting competition between rail freight operators. In July 1995 freight forwarder SCT started their Melbourne - Perth rail freight service to compete with National Rail's freight trains. This was an early application of National Competition Policy and a weekly 600 metre train with 22 louvre vans and hired locomotives was placed into service. Now, SCT run four and sometimes five trains per week with each train having up to 70 wagons. In May 2008, SCT announced a freight train service from Parkes to Perth with a trailing weight of 6,000 tonnes, using their new 4,500 horse power AC traction locomotives.

From 1998 to 2007, the freight task has doubled on the East - West rail corridor. Figure 3 shows the growth in billion gross tonne km for non-bulk freight. Underpinning this strong growth were three major Federal initiatives:

- Kalgoorlie-Perth gauge standardisation including a new route through the Avon Valley,
- The formation of Australian National and their Adelaide-Crystal Brook gauge standardisation project plus concrete resleepering in South Australia and,
- The Keating Government's Melbourne-Adelaide Rail Standardisation project.

The upgraded standard gauge line between Perth and Kalgoorlie, with dual-gauge track along the Avon Valley, was officially opened in August 1968. This major work allowed Kalgoorlie-Perth freight train times to be reduced from 31



1995 - New standard gauge track for Melbourne Adelaide rail standardization (MARS) as part of the Keating Government's One Nation rail upgrade. Photo: Philip Laird.

hours to 13 hours, and passenger train times from 14 to 8 hours - both significant gains. This was one of three gauge standardisation projects recommended in 1956 by a Government Member's Rail Standardisation Committee in 1956 chaired by W. C. Wentworth, with the support of the Federal Parliamentary Labor Party. The other two projects were Wodonga to Melbourne (completed 1962), and Broken Hill to Port Pirie (completed 1970).

It took the formation of the Australian National Railways Commission or Australian National (AN) as an initiative of the Whitlam Government to take the next major step. The enabling legislation for Australian National was signed into law on 10 November 1975, and AN commenced full operations in 1978. AN worked hard to provide reliable and competitive freight and passenger train services, and in early years made an economic case for extending standard gauge into Adelaide. This was in contrast to a long held aversion by the South Australian Government to adopt standard gauge. However, the Federal Government required AN to raise loans for this gauge standardisation project. Conversion of a broad gauge line to standard gauge from Crystal Brook near Port Pirie to Adelaide (by the cost effective method of generally transposing one existing rail on the existing timber sleepers), on improved alignment, was finally effected in 1982.

Freight services started in 1983, with passenger trains in 1984. This project was promoted by AN, who found that the benefits would exceed the costs over 25-years by a factor of 2.8, and raised loan funds for the project.

A further initiative of Australian National starting in 1987 was a six-year programme of track upgrading with the specific aim of providing for 23 tonne axle loads at a speed of 80 km/h for freight on the existing mainly 47 kg/m rail whilst allowing for increases to 115 km/h on sections progressively re-laid with 60 kg/m rail. The upgrading consisted of acceleration of completion of concrete resleepering, dip weld straightening and rail profile grinding on the Adelaide-Kalgoorlie and Crystal Brook-Broken Hill lines. For this project a Plasser SMD80 concrete sleepering machine, STRAIT rail end bending machine and a Speno Rail Grinding train were purchased. This work was in conjunction with signalling improvements and crossing loop extensions and rationalisation. As seen by AN (*AN Freight*, January 1992):

"Good quality track is the bedrock on which fast, efficient freight operations are based".

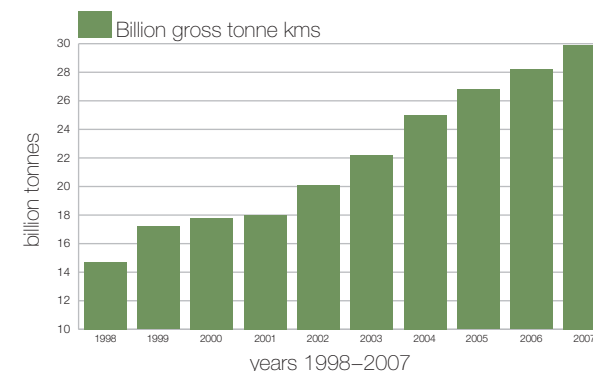
To achieve Melbourne-Adelaide rail standardisation again required a national approach. Although standardisation had been favoured by Australian National in the 1980s as per a preliminary V/Line-AN joint study (Adams, 1983), it took until 1995 to complete the work. This was helped by a House of Representatives Standing Committee 1989 report *Rail: Five Systems - One Solution* that held, into alia, that:

"Considerable benefits would flow to the nation from the standardisation of the Melbourne-Adelaide route."

The Hawke Government's initial, negative response to this finding was made in December 1990. By then, an intergovernmental agreement had been made to form a National Rail Freight Corporation (NRFC) and the Government view was that this project was:

"...a matter for the NRFC's commercial judgement ... without reliance on government guarantees."

Figure 3



East-West Intermodal Volumes.

Reference: ARTC May 2008 Links No 17

Fortunately, a wider view prevailed and new Prime Minister Paul Keating (after consideration of a National Rail Corporation report) was able to announce, on 23 February 1992, a commitment of \$450 million for a 'One Nation' rail programme. The main project was Melbourne - Adelaide rail standardisation (MARS).

Throughout 1992, there was uncertainty as to whether standard gauge would proceed through Ballarat or Geelong. In addition, NSW track upgrading cost estimates proved to be unreliable. This led to Prime Minister Paul Keating on ABC's *Lateline* in November 1992 describing the Victorian and NSW rail systems as "dinosaurs" and the Federal Treasurer announcing that month that funding for the rail projects had been re-allocated because of "design and logistical delays". In early 1993, it was agreed standard gauge would proceed via Geelong - as recommended in 1983 by AN.

The MARS project was officially opened on 4 June 1995 at Melbourne's Dynon intermodal terminal by Prime Minister Paul Keating, at a final cost of \$166.7 million. As Paul Keating said later (*Railway Digest*, July 2005) completion of MARS was:

"...not just a big strike for rail but an even bigger strike for the country."

4.5 The ARTC

On the eve of the official opening of the Adelaide-Melbourne standard gauge line on 4 June 1995, the Keating Government announced its intention to form a new authority called Track Australia. Track Australia would have a mandate to introduce competition in rail freight by providing investment and open-access to Australia's interstate rail network.

The concept had bipartisan political support and was endorsed at a historic 'Rail Summit' of Australia's Transport Ministers in September 1997. This subsequently led to an Inter-Governmental Agreement (IGA) between the Commonwealth and the mainland States.

Coinciding with the IGA, the Federally-owned Australian National (AN) 'above-rail' operations were sold, along with intrastate track leases in South Australia and Tasmania. The AN Track Access Unit, which had responsibility for some 4400 km of standard gauge interstate track and associated infrastructure, remained under Federal Government ownership.

On 25 February 1998, the Australian Rail Track Corporation Ltd (ARTC) was incorporated with an interim board and opened for business on 1 July 1998. By Federal Ministerial direction, ARTC acquired the AN Track Access Unit. Also in 1998, long-term Managing Director David Marchant was appointed and in 1999, Barry Murphy was appointed as ARTC Chairman. In keeping with the IGA, ARTC assumed the operations and management of the Victorian standard gauge interstate rail network on a five-year lease; later extended to 15-years.

ARTC's initial objectives were to:

- Improve network reliability
- Improve the yield for train operators and the track infrastructure
- Improve transit times, and,
- Establish the foundations for a one-stop shop over the interstate rail network from Brisbane to Perth.

Train control functions were progressively consolidated to the ARTC train control centre at Mile End in Adelaide. This effectively gave ARTC control of all train operations (signalling, safe-working and communications) over the interstate track from Kalgoorlie through Adelaide to Melbourne and on to Albury.

Initial infrastructure works were focussed on upgrading the standard gauge track infrastructure and increasing the capacity and reliability of the network. This included installing a large number of new concrete sleepers that had been sitting for some years adjacent to the track near Maroona in Victoria as a leftover from the original 'One Nation' MARS project.

Around half of an initial Federal Government investment of \$250 million was used on a program of crossing loop extensions (1800m Adelaide to Kalgoorlie; 1500m Melbourne to Adelaide), and track upgrades to handle axle loads in line with the Australian Transport Council benchmark of 21 tonnes at 100 km/h for interstate superfreighters.

ARTC pursued a holistic 'five-step' program of relatively low-cost track upgrading and maintenance strategies to allow ARTC to achieve its stated goals and objectives. This program was focused on extending track life and performance through attention to: Rail Surface Condition, Installation of Resilient Track Fastening Systems, Sleeper Condition (and deferring their replacement), Ballast Condition and Profile (with use of a shoulder ballast cleaning machine) and Formation Drainage.

ARTC has also introduced a wayside monitoring program including Wheel Impact Load Detectors, Acoustic Bearing Monitors, and more recently, a noise detector array in the Adelaide Hills.

In 2001, ARTC entered into negotiations with the NSW Government with a view to taking up a long term lease over the NSW interstate track. However, negotiations were protracted and it was not until 4 June 2004 that a formal lease agreement was signed. A commitment was made to invest over \$870 million in infrastructure improvements.

On 5 September 2004, ARTC took up a 60-year lease of the NSW interstate mainlines and Hunter Valley coal lines. A separate agreement was entered between ARTC and the NSW for the maintenance and management of the NSW country rail network funded by the NSW Government.

A detailed scope of work for the North South rail corridor was announced in May 2005. Again, there was a five fold strategic approach - Price (above and below rail yield), Availability, Reliability, Capacity and Transit time - and selection of those projects that would best deliver these outcomes. One casualty, however, was that NSW North Coast (and Main South) track straightening was deferred to later.

With further Federal funding the scope of work was widened to include complete concrete re-sleeping of the entire ARTC North South corridor. By March 2008 over one million concrete sleepers had been laid with a further 1.2m to follow by February 2009.

The first major project to be completed as part of the NSW lease was the \$80 million flyover at Sandgate, north of Newcastle, removing the conflict at this location between coal trains accessing the Kooragang Island export terminal and general freight and passenger services. Other ARTC infrastructure projects in the region are aimed at lifting the capacity of the Lower Hunter rail network to accommodate 140 mtpa of export coal by 2011, in line with industry demand.

This upgrade was quickly followed by replacement of the original 1880 rail bridge over the Murrumbidgee River at Wagga Wagga. For many years, trains using the bridge had been subject to a 20 km/h speed restriction. Work started on manufacturing the new concrete beams in mid-2006, and in a tight 96-hour possession from 5.00am on 30 December 2006, the new concrete structure was installed at a project cost of \$17 million.

During 2007 there was marked progress in replacing the many antiquated safeworking installations on the NSW Main South line and between Casino (NSW) and the Queensland border. A major Train Control Consolidation project saw

all signalling, safeworking and communications consolidated to just two network control centres at Junee and Broadmeadow.



New rail bridge at Wagga Wagga. This bridge over the Murrumbidgee River was constructed in record time by the ARTC and commissioned in January 2007. It replaced a 1880 structure with a long standing 20 km/h speed restriction. Photo: Mark Carter

The overall aim of the \$2.1 billion North-South Improvement program, scheduled for completion in 2010, is to bring about a marked reduction in freight train transit times on the corridor to bring rail line with road transit and delivery times. The planned reduction in transit times for 1500 metre superfreighters will see a saving of 9 hours 35 minutes between Melbourne to Brisbane with transit time of 26 hours 10 minutes.

On 30 May 2008, it was announced that joint Federal/ARTC/ Victorian \$501 million North-East Rail Revitalisation Project would proceed along with a 45-year lease of standard gauge track to the ARTC. The project includes upgrading the standard-gauge line between Melbourne and Seymour including new passing loops, upgrading and conversion of 200-km of broad gauge track between Seymour and Albury to standard gauge and a five km rail bypass of Wodonga. The aim is to build:

"...an interstate rail freight super-highway and deliver major passenger rail service improvements ..."

4.6 Perth's rail renaissance

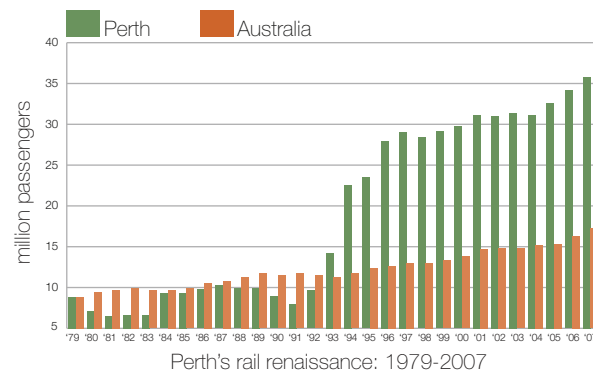
Following the closure of the Perth-Fremantle passenger service in 1979, there were some 48 route km of urban passenger railways in Perth. By 1981, there were less than 7 million passengers per year using the rail service which was destined for closure and replacement by buses. However, a change in Government in 1983 led to the reinstatement of the Perth-Fremantle passenger service. This was followed later in the decade by electrification at 25,000 volts AC and construction of the Northern Suburbs Railway (NSR) that became fully operational in March 1993. Most of the new railway made use of the median of the Mitchell Freeway. In 2004, the NSR was extended by 6 km.

With the completion of the Southern Suburbs Railway between Perth and Mandurah in December 2007 at a cost of some \$1.6 billion, Perth's urban railways extended to 172 route km. In 2006-07, there were nearly 36 million passengers. By March 2008, assisted by a world-class service, patronage on the new line was 80 per cent above projections. During the weekday peaks, there are six trains an hour each way on the 71 km Perth-Mandurah line travelling at speeds up to 130 km/h, with some taking as little as 48 minutes. This compares favourably with a 70-minute journey time by car.

The major expansion of rail services is a remarkable change in a heavily car dependent city. However, it was not all smooth sailing. To quote PTA Project Director Peter Martinovich (2007):

"Even after the decision to electrify the rail network in 1985, in mid-1988 transport planners recommended to the State Government ... a bus system to serve the northern suburbs. And then, despite electrification of the existing railway and building of the Northern Suburbs Railway (NSR), initial proposals in the early 1990s for a mass transit mode to serve coastal suburbs south of Perth ... heavily favoured buses. It was only the assertive efforts of rail planners in support of the State's

Figure 4



Reference: Perth data provided by the Public Transport Authority of WA. Australian data is scaled urban passenger kilometres from (BITRE) *Transport Statistics Yearbook 2007* extrapolated to 2006-07.

Department of Planning and Urban Development in 1992-94 that resulted in government acceptance of a rail route from Perth to Mandurah."

Critical decisions determined the final form of the Perth - Mandurah line. One that was strongly supported by the Minister for Planning and Infrastructure (the Hon. Allanah MacTiernan MLA) was the final route alteration of the Perth to Mandurah railway late in 2002 to give the most direct access to the CBD from the southern suburbs.

In the process of building the Perth-Mandurah line, Perth gained two new underground stations (William Street and the Esplanade) that were commissioned in October 2007. This was followed by opening of the line to Mandurah on 23 December 2007. Like other major rail projects, signalling caused some delays to the opening.

To serve the expanding railways, a \$300 million contract for the supply of 93 electric multiple units (EMUs) in 31 three-car sets and construction of a railcar depot was awarded to EDI/Bombardier in May 2002.

At the time the project was in full swing, Minister Allanah MacTiernan told the AusRail 2005 conference:

"The big picture plan is designed to future-proof Perth delivering a sustainable and exciting city for the 21st Century. We need to build resilience into our city if we are to manage growth and deal with/withstand the global challenges of climate change and oil depletion.... While buses will always be an important part of our public transport system, the evidence is that rail services have the greatest ability to attract commuters who have a choice. If we are to get people out of their cars and onto public transport, rail is a much better bet."

The Minister also noted that the Perth-Mandurah railway is expected to take an estimated 25,000 cars off the freeway every day; and importantly save around 15 megalitres of fuel and 67,000 tonnes of greenhouse gases each year.

The renaissance of Perth's urban railways and its future prospects are well summarised by Peter Newman, Professor of Sustainability at Curtin University.



Peter Newman and Perth's Northern Suburbs Railway
Photo: Track and Signal

Rail and the Future of our City

In 1979 Sir Charles Court's government closed the Fremantle railway in order to build a freeway along the coastal suburbs. His Minister for Transport said it was 'futile' to oppose this decision. Perth was a modern car-based city and there was no place for old-fashioned trains.

As an academic and a Fremantle Councillor who had seen the effects of the first oil price shock in 1973, I started the 'Friends of the Railways' to lobby for the reinstatement and upgrading of the railway. The public came out in large numbers in support of our campaign for building a state of the art rail system.

In 1983 the ALP Government was elected with a mandate to re-open the railway and examine options for upgrading. In 1991 the system was electrified and in 1993 the Northern Line was opened – with strong public support although many transport experts were opposed. The rail system grew dramatically from less than 7 million passengers a year to over 35 million, a story that reverberated around the world and brought people from all over to have a look. The Northern Line was an astonishing success carrying the equivalent of eight lanes of traffic in just a few years.

By 2001, there was bi-partisan support for building a New Southern Railway. Later Allanah MacTiernan took on the job of implementing this policy and we all watched as she battled cynical opponents of the railway until 23 December 2007 when no opponent seemed to be left standing. Those who have flocked to the new train have experienced a first class urban rail service. The predictions for the whole network in five years are around 100 million passengers a year. Meantime, every train is full at peak hour and events like the football just couldn't happen without the train.

It is a remarkable turnaround. It is also a source of great hope when we look at issues like global warming and peak oil to see that public movements can help set the long term agenda for a better future of our city.

Peter Newman

4.7 Rail in other capital cities

Rail's recovery in moving urban passengers in Australia's major cities from a low point of about 310 million passengers in the late 1970s to more than 560 million in 2006-07 has been in part assisted by expanding capacity. Having considered Perth we now look at the cities of Sydney, Melbourne and Brisbane that have electric trains.

In June 2008, the SA Government announced a major public transport initiative. The rail elements include completing a concrete resleeper program, gauge standardisation and electrification (as 25,000 volts AC) on the main corridors to Noarlunga, Outer Harbor and Gawler. Funds were also allocated for continuing the extending the Noarlunga Centre Line rail corridor to Aldinga.

Sydney

Each weekday, there are over 900,000 passenger movements on the CityRail system which extends to 3236 route km of track and has 300 stations (plus four on the Airport Line). In 2006-07 there were 281 million passenger journeys.

On 23 June 1979, Sydney finally gained its Eastern Suburbs Railway (ESR). As NSW Premier Neville Wran remarked at the official opening, it took some 100 years to build, similar to the time taken to build the Great Pyramid of Cheops. The new double-track railway was mostly built in tunnels with underground platforms in seven stations (three existing and expanded, four new). The line was terminated at Bondi Junction instead of continuing on. Of interest is that patronage projections made for the new railway were too low and were then exceeded by about 40 per cent in the first year. In addition, with the new line came Australia's first use of an automatic fare collection system using magnetically encoded tickets. Nearly thirty years on, it is hard now to imagine Sydney without the ESR.



A CityRail Tangara set arrives at Sydney's Central Station. Photo: Mark Carter

In 1988, Sydney gained an extension between East Hills and Glenfield and in 1998 a 6 km loop line was opened from Lidcombe to the Olympic site at Homebush Bay. This line and a special station (Olympic Park) that was designed to facilitate the movement of large crowds, helped City Rail put on a 'Gold Medal' performance for the 2000 Sydney Olympics. In 1999, a cross-city 'Y-link' between Merrylands and Harris Park was completed (funded by the Keating Government's 'Building Better Cities' program). In early 2000 an underground-double track line with five new stations between Central and the East Hills line opened, providing more rail capacity, assisting in the urban renewal of the inner south-eastern suburbs and serving the domestic and international airport terminals. Unlike the ESR, four new stations for the new airport line were built as a Public Private Partnership (PPP). There is one publicly-owned station at Wolli Creek. In further contrast to the ESR, the patronage projections were altogether too high with actual patronage reaching only 25% of expectations. In November 2000, the PPP company went into receivership after failing to draw expected passenger numbers and revenue. The four stations are now operated by a private company.

In late 2008, a further underground railway is due to open – the 12.5 km Epping-Chatswood Rail Link (ECRL) at a cost of about \$2.2 billion. Like the ESR, the new railway started as part of a larger promised project: a Parramatta-Chatswood

railway. However, in 2003 the scope was restricted to the ECRL. This decision, during a period of extensive freeway and tollway building within Sydney led to one comment that in the present decade, 'Sydney has only succeeded in building half a dozen motorways and just half a railway'. However, a wide ranging 'Rail Clearways' programme, costing about \$1.8 billion is also underway.

Melbourne

In 2006-07, the Melbourne urban rail system moved 179 million passengers, an increase of some 34 per cent from 2001-02 and double the 89 million passengers carried in 1978-79. The increase in patronage is in part driven by growth in Melbourne's population and CBD employment along with higher petrol prices. The doubling of passengers has been largely achieved on the same suburban network of 30 years ago, with the addition of the City Loop and extensions to electrification (Altona-Laverton [1985], Dandenong-Cranbourne [1995], St Albans-Sydenham [2002] and Broadmeadows-Craigieburn [2007]) and track amplifications.

The City Loop has a long history, going back to 1929. Enabling legislation was passed in 1960 and the Melbourne Underground Rail Loop Authority was established in 1971 to build the City Loop and three new stations. The first station to be opened was Museum (now called Melbourne Central) in 1981, followed by Parliament in 1983 and Flagstaff in 1985. Particular care was taken to reducing noise and vibration under the CBD with use of a 'double sleeper' floating track structure. As Robert Lee (2007) states:

"Melbourne's loop has some of the best designed and quietest underground stations in the world, far superior to any of Sydney's stations in these respects."

The City Loop has four tracks, with entry portals at Jolimont (Clifton Hill group of lines), North Melbourne (Northern group), and two more portals between Richmond and Flinders Street stations for the Caulfield and Burnley groups. An interesting operational feature of

the City Loop is the change of direction of train running in the middle of the day. In the mornings, Burnley, Caulfield and Clifton Hill group trains run anticlockwise changing directions in the afternoon, while the Northern group operates in the opposite direction.

Along with the procurement of new trains to meet the strong increase in urban rail patronage, a program of upgrades to the network is currently planned or underway including duplication between Clifton Hill and Westgarth, triplications on the Dandenong and Sunshine lines, and a new interchange at North Melbourne station. The Victorian Government's 2006 *Meeting our Transport Challenges* plan notes an investment on the rail network of more than \$2 billion over 10 years to meet current and future demand.

Brisbane

The Brisbane urban rail system has also seen strong growth, up 28 per cent over the five years to 2006-07 to 57 million passengers. This is more than double the 26 million passengers carried in 1978-79. Revitalisation of Brisbane's urban railways has proceeded on many fronts in addition to electrification starting in 1979. Major projects include the opening in 1978 of a new rail bridge (double-track/dual gauge) over the Brisbane River and during the 1990s the development of a new Roma Street station and quadruplication between Roma Street and Brunswick Street. This capacity upgrade required construction of new tunnels and in common with many major railway projects, commissioning was delayed whilst railway signalling was installed.

Other Brisbane rail projects (in addition to ongoing augmentation of track capacity) include the re-construction of a railway to the Gold Coast (another 'Building Better Cities' project) and an Airport rail link. The South East Queensland Infrastructure State Plan includes an investment of \$6.6 billion in rail infrastructure (SEQIPRAIL) to deliver 144km of new track in 28 rail projects. This investment in the future of rail includes an impressive scope of work of extensions and track amplifications.

4.8 Trams and light rail

Trams were widely used in Australian cities for the first half of the twentieth Century and in 1950 tramways could be found in all state capitals and seven other cities. Australia's trams were moving during the mid-1940s over one billion passengers per year. In 1950, Sydney's tram network was about 245 route km as against Melbourne's 210 route km. However, by 1970, trams ran only in Melbourne and Adelaide.

Melbourne

In keeping its trams, Melbourne was favoured with wider streets, a relatively 'young' electric tram system and the remarkable Major-General Sir Robert Risson, who as Chairman of the Melbourne and Metropolitan Tramways Board from 1949 to 1970 argued forcefully for their retention. By 1980, patronage had fallen to about 100 million passengers per year. In 2006-07, it had surged to 155 million passengers.



A modern Citadis tram heads down Melbourne's famous Collins Street on a Route 109 service bound for Port Melbourne. Photo: Mark Carter

Having made the decision to retain trams, the system was extended over time. Following conversion of the former suburban railway lines to St Kilda and Port Melbourne to 'light rail' routes in 1987, the next major extensions took place in the mid-1990s, including extensions to East Burwood. Two more tram extensions were partly funded by the Federal Government as part of the *Building*

Better Cities program. A 'City Circle tram loop' opened in 1994, while the last of three extensions to Bundoora opened in 1995. In the last decade, the tram network was further extended to Box Hill (2003), Docklands and Vermont South (2005).

Other improvements have included the construction of 'platform' tram stops across the network and the purchase of 95 low-floor trams. Melbourne's tram network now extends to about 250 route km operated by some 500 trams and is now one of the largest in the world. Melbourne's trams also assisted in moving hundreds of thousands of people to the 2006 Commonwealth Games and help to service other major events.

Adelaide

After the closing of the rest of its tram network, Adelaide retained a solitary line from Glenelg (venue for CORE2000) to Victoria Square. This line was Australia's first 'light rail' conversion of a heavy rail line, being converted from broad to standard gauge and electrified in 1929. In 2004, new trams were purchased and track upgraded on the Glenelg line after 'years of neglect'. In 2005, the Rann Government decided to extend the tramline down King William Street to the western end of North Terrace. On 14 October 2007, the 1.6 km extension (costing \$31 million) was opened.

Although the extension generated some noisy opposition, it has been well received by both the traveling public (albeit with free down town rides, replacing a previous free city bus) and business. Within six months, ticketed tram patronage in Adelaide had increased about 15 per cent since the city extension was opened. As well (*Australian Financial Review* 24 April 2008), the Property Council of Australia had noted the tram extension:

"has opened the city right up ... [and] had created a significant interest in property development" in the West End of the Adelaide CBD and favoured extending the tramline to Port Adelaide. This would be facilitated by the concrete gauge convertible sleepers installed in 2002 to Outer Harbour."

On 5 June 2008, the SA Government announced connection of the tramway onto the Outer Harbor railway for operation with hybrid vehicles, tramway branchline extensions to Semaphore via Port Adelaide and West Lakes.



Two modern Flexity trams pass each other at a platform stop on King William Street, part of the extension of the Glenelg tramline through the Adelaide CBD to the city's 'West End'. Photo: Mark Carter

Sydney

The removal of the Sydney tram system took place between 1950 (when trams from Watsons Bay were removed and then reinstated) and 1961. On some routes, when the last trams had run, by the next day the overhead wiring had been removed and the tracks tarred over to prevent their reintroduction.

In August 1997, a light rail service commenced between the old tram concourse at Sydney's Central Station and Wentworth Park with an intermediate stop at Sydney's Casino using 'Variotram' light rail vehicles built by ABB at Dandenong in Victoria. The route has a mixture of street and off-street running, with the majority of the line using the old Darling Harbour goods line. In August 2000, the line was extended to Lilyfield making a total length of 7.2 km.

The \$65 million cost of the first section was augmented by \$21 million from the Federal Government's 'Building Better Cities' programme, whilst the second stage received \$16 million of NSW Government funding. The Sydney light rail is operated by Metro Transport Sydney who also

operates the Sydney Monorail (opened in 1988). Recent combined patronage was over 7.5 million passengers per year, which is an increase of some 22 per cent over the past five years.

There has been no shortage of ideas for extending light rail in Sydney. One was an Inner West Stage 2 to continue along the former Rozelle Goods line. There have also been suggestions of a CBD loop, either to Park Street or Circular Quay, and extending light rail to the University of NSW main campus at Kensington.

In 2005 (*Sydney Morning Herald* 21 February) a report commissioned by the City of Sydney recommended the building of five tramlines between the CBD and each of Bondi Beach, Maroubra and Mascot, with two lines through the inner west to Burwood. As the Sydney Lord Mayor Cr Clover Moore MLA said:

"...the time is right for light rail after the NSW Government has spent billions of dollars on road tunnels and toll roads - and further entrenching our dependence on road transport."

By 2008 (*Daily Telegraph* 6 April), the NSW Government was considering building a 4.1 km, \$135m light rail service running from Circular Quay to Central Station via The Rocks by 2011. This was to provide direct access to a redeveloped East Darling Harbour project (Barangaroo) as opposed to running trams down George Street. Also under consideration was a long-proposed extension of the existing light rail system from Lilyfield to Summer Hill along a former section of the Metropolitan Goods Line.

Other Australian cities

Just as proposals to extend Sydney's light rail are yet to proceed, official proposals made in 1999 to bring light rail to Brisbane have been abandoned in favour of more motorways and busways. This may also happen in Queensland's Gold Coast, while light rail proposals for Canberra have not proceeded beyond the concept stage. However, light rail is increasingly finding favour in Canada, the United States and Europe.

Darwin and was followed in early February by The Ghan passenger train.

4.9 New railways in Australia

In addition to the expansion of the Perth and other urban rail systems over the past 10 years, there has been expansion of non-urban rail systems. We outline some of these projects.

The Alice Springs - Darwin Railway

Many accounts have been given of the new 1420 km railway, including by the RTSA in 2003 that included a detailed account by the line's chief surveyor, Des Smith OAM.



Tracklaying on the Alice Springs – Darwin railway.
Photo: Mark Carter

In brief, after many years of waiting, work on the Alice Springs-Darwin railway was commenced by the Fraser Government, stopped by the Hawke Government whilst Prime Minister Keating found funds in 1993 to complete the survey. The Howard Government supported a joint initiative of the NT and South Australian Government to engage the private sector to build, own, operate, and eventually transfer back (a 'BOOT' arrangement) the railway. From selection of the preferred tenderer (Asia Pacific Transport Consortium) in June 1998, it took 34 months to 'financially close' on 20 April 2001 in Sydney. After good planning and some preconstruction, it took just 29 months to complete the construction on four fronts centred at Tennant Creek and Katherine. The first revenue freight train left Adelaide on 15 January 2004 for

Within 16 months, demand was so high that a weekly Adelaide - Darwin 'Ghan service was made into a twice-weekly service. Freight services, initially three intermodal trains each way each week, have grown over the past four years, with a 67 per cent increase of tonnage to 1.1 million tonnes in 2006-07. By spring 2008, there were each week at least five intermodal trains (now winning over 90 per cent of the SA-Darwin freight market) and ten bulk trains (four Bootu Creek Mine Manganese and six iron ore) with further trains pending. To accommodate the extra trains, new crossing loops will be required.

Victoria's Regional Fast Rail (RFR) project

For some 150 years, the railways of Victoria have operated trains from Melbourne to regional towns and cities. With the Kennett Government's franchising of suburban train and tram services in 1999 (along with sale of the regional freight business packaged with a long-term track lease) the state's regional railway network was also affected. The election of the Labor Party into office later that year was in part due to a commitment towards upgrading rail links to regional Victoria.

RFR was one of three projects designed to provide better trains between Melbourne and four key regional areas (Ballarat, Bendigo, Geelong and Latrobe Valley) as part of the Bracks Government's *Linking Victoria* strategy: the other two being a new Southern Cross rail and coach terminal replacing Spencer Street station and procurement of 38 (initially 29) two car 'V/Locity' DMU sets.

The rail and signalling upgrading contracts were let in mid-2002: Thiess Alstom Joint Venture won the Ballarat and Geelong lines, and Regional Rail Links (a John Holland-Transfield consortium) won the Bendigo and Latrobe Valley lines. Construction officially began on 25 October 2002.

Although the scope of work did not extend to either gauge convertible sleepers or retaining double track all the way to Bendigo, some 500 route km of track were upgraded to modern standards with heavier rail and extensive resleepering (over 460,000 concrete sleepers were laid) and new

signalling systems. The most notable part of the RFR track upgrades was an 8.2 km deviation bypassing the curves at Bungaree east of Ballarat. The deviation included two of Australia's largest rail bridges, spanning Lal Lal Creek (363 metres) and Moorabool River (270 metres).

The track and signalling upgrades on all four corridors were completed by early 2006 and the new trains were then tested. In September 2006, a new timetable was introduced with increased numbers of services on all four RFR lines. These were well received by the travelling public and by July 2007 patronage had increased by some 30 per cent. To meet the increased demand, 22 new centre cars to 'build up' two-car V/Locity sets into three-car sets were ordered in 2006 and 2007 for delivery from mid-2008.

Iron Ore Railways

We have already noted in Section 4.1 the ongoing growth and development of the iron ore railways within the Pilbara Region to meet escalating export tonnages. In summary, in 1998, there was about 1540 route km of track. Both BHP Billiton and Pilbara Iron track has since had been further extended.

In May 2008, a new 260 km line was completed by The Pilbara Infrastructure Pty Ltd - a subsidiary of Fortescue Metals Group to give its mines access to Port Anderson in Port Hedland. An initial rail fleet of 816 rail cars and 15 GE Dash-9 locomotives was used to form two loco, 200-wagon, 2.5 km long trains to carry almost 28,000 tonnes of ore. The new railway is designed to have a 40-tonne axle load capacity.

Bauhinia Regional Rail Project

In October 2005, a 110km spur and associated rail infrastructure from the Kinrola branch line to the new Rolleston Coal Mine in Central Queensland was opened. It was completed ahead of schedule within 18 months at a cost of \$240 million by Queensland Rail (QR). The work included excavation of 2.4 million cubic metres of soil and rock (with a fill of 2m cubic metres), construction of 19 bridges and 106 culverts along

with track laying of 160,000 concrete sleepers (up to 8 km per week) and two level crossings. Typically, coal trains using this line have three locomotives and up to 86 wagons each with 83 tonnes payload and are some 1.65 km long. The axle load is 26 tonnes with an 80 km/h maximum speed. Related Projects included duplication of some existing track to Gladstone, relaying the Kinrola branch line, and construction a third balloon loop at Gladstone port.

Queensland's Northern missing link

In March 2008, QR announced a \$1 billion expansion project for the export coal rail network from Goonyella to Abbot Point. The project included a new 69-km 'Northern Missing Link' between North Goonyella and Newlands, upgrades along the existing track between Newlands and Buckley along with QR's Pring rail yards through to additional works at Abbot Point. In addition, QR is looking at electrifying the entire track through to the Port.

Earthworks are due to commence in September 2008 by the CoalConnect project alliance. The work is part of a \$3 billion plus investment in lifting the capacity and performance of the Central Queensland coal network including new and upgraded track, and new locomotives and wagons to give by 2010-11 the capacity to haul 261 mtpa of coal across all networks.



The Nepean River approach viaducts constructed in 1985 for the Maldon Port Kembla Railway Photo: Leon Oberg/Track and Signal

4.10 New Zealand railways

The former New Zealand Railways (NZR) had a long history of innovation and making improvements. By way of example, Centralized Traffic Control (CTC) to remotely control electrically-operated signals and points were first used in New Zealand in 1938 over a short North Island Main Trunk (NIMT) section. This was the first time CTC had been used outside North America and was quickly expanded to other NIMT sections. CTC was also used for the 8 km Rimutaka Tunnel that opened in 1955, and by 1966 CTC was operating over all single-line sections of the NIMT between Wellington and Auckland.

In contrast, Australia had to wait to 1958 for its first CTC installation in Victoria, followed closely by Western Australia. Only in 2008 was CTC operating on all single-line sections between Sydney and Brisbane.

Other NZR innovations included the operation of inter-island roll-on/roll-off ferries from 1962 (when the private sector declined government assistance to introduce the new ships) and the development of its own computer-based wagon management system in the 1970s.

From the mid-1950s, New Zealand was also completing mainline duplication and track straightening projects. In 1978, the 8.9 km Kaimai rail tunnel and major deviation was opened and reduced the rail distance between Hamilton and Tauranga by 52 km. In 1981, a 9.5 km NIMT rail deviation south of Taihape with three large viaducts was opened. This was followed by start of modern high voltage electrification (25 000 volts AC) along with civil engineering works on the 408 km NIMT section between Palmerston North and Hamilton.

The NIMT electrification and upgrade project was completed in 1988 and included a new concrete viaduct near Ohakune on an improved alignment. The New Zealand Treasury (who in the early 1980s had considered closing down the entire rail system - instead NZR was corporatised in 1982 and then subject to vigorous reform) questioned the need for a new viaduct. A resourceful railway engineer within NZR was able to provide the evidence to support management's case for a new viaduct as part of a rail deviation. A key requirement was to demonstrate that the extra cost was justified by improvements to rail productivity. The new Hapuawhenua Viaduct epitomises three aims of engineering (Wright 1999): function, economy and grace.

The overall NIMT project was well described by a NZR journalist Philip Hoskin in 1985 in part as follows.

NIMT electrification and track upgrades

"The decision to proceed with electrification has led to many major civil engineering projects, including massive earthworks, to improve the NIMT central section."

"These track improvements include making it straighter and flatter through easing curves and gradients; alterations to 10 tunnels either by lowering floor or 'daylighting' and providing longer, and some new, crossing loops."

"It is improvements to the track such as these, together with the new signalling and communications systems, which will enable trains to travel faster."

"Electrification and modern electronics allow energy conservation through regenerative braking - locomotives when going downhill can convert energy to electricity for use by other trains in the area. In the hilly country in the centre of the North Island as much as a fifth of the energy required could be recovered in this way."

After the major reforms of the 1980s, the New Zealand Railways Corporation was sold in 1993 to a consortium (TranzRail Holdings) involving a New Zealand company and Wisconsin Central. As seen, in part by a 2005 World Bank Paper:

"The new owners increased labour and freight car productivity, introduced new technology and for the first few years made increasing profits. Financial distress arose from about 2000 due to the cost and service impacts of inadequate track maintenance, ineffective commercial strategies and increasing road competition."

A somewhat different view of New Zealand rail privatisation was given in a TV One documentary *Assignment* that went to air on 25 October 2001 and noted that there had been both winners and losers in rail privatisation. As then Greens Co-Leader Rod Donald said:

"We gave away rail at a ridiculous price."

The Hon Winston Peters MP went further:

"It was a terrible rip off then and it has been seen as that now."

In September 2004, the New Zealand Railways Corporation (Ontrack) formed by the New Zealand Government repurchased the network for \$NZ1 with the recognition that:

"there had been significant underinvestment in infrastructure during its years in private sector ownership."

As part of the agreement with Toll, Ontrack agreed to invest \$200 million to upgrade the infrastructure. In June 2008, the New Zealand Government acquired from Toll the above rail and ferry operations for \$NZ665 million (\$A555.35 million).

In July 2003, New Zealand gained a new underground railway station in Auckland as part of a multimodal transport hub costing Auckland City Council about \$NZ200 million, supported by Infrastructure Auckland (\$NZ45 million) and Transfund New Zealand (\$NZ20 million). The new station has assisted with other factors

(including higher petrol prices [\$NZ1.75 per litre in February 2008] behind the rise in rail passenger numbers from a low base of two million per year (using older Diesel Multiple Units from Perth) to about 6 million per year. However, this number is small when compared with the smaller cities of Wellington and Adelaide.

Since September 2004, the New Zealand Government has committed over \$NZ1 billion for Auckland rail upgrades. This includes track duplication and upgraded stations (partly completed) along with electrification of urban railways by 2013 under Project DART (Developing Auckland's Rail Transport). Other work includes re-opening of the Onehunga line and construction of a Manukau spur line. Electrification (at 1500 volts DC) is also been extended north of Wellington which will also get new rolling stock. This system may be converted later to 25 000 volts AC and may one day extend to Auckland.



A North Island Main Trunk small deviation slices through a hill
Photo: Philip Laird

5 A vision for the future

This Section includes outlines of proposed rail projects and the findings of the RTSA's Forward Vision Rail Task Force.

5.1 Proposals for new or upgraded railways

Over the years, many proposals have been made for constructing new railways and upgrading existing ones. Some proceed to be eventually built like Alice Springs - Darwin. Others, like the Sandy Hollow-Maryvale line in NSW have been started but may never be completed. Examples include the long standing proposals to link Darwin to Queensland by rail, a railway from the Pilbara Region to Townsville, an airport railway to Melbourne (CORE2006 papers), Mildura to Menindee (*Railway Digest April 2008*) and a bypass of the Adelaide Hills. Brief outlines are made of some proposals that have been considered, or even proposed, by the NCRE and RTSA.

Sydney - Melbourne electrification

In 1980, the Fraser Government offered to assist the NSW and Victorian Governments to electrify the Sydney - Melbourne railway using modern 25,000 volt AC equipment. This was supported by a consultant's report and the offer was at a time of high oil prices. However, with a negative response from the State Governments of NSW and Victoria, the offer was withdrawn in 1981.

NSW Main South Deviations

We have already noted in Section 2 that in 1981 the NCRE published a detailed *Bicentennial High Speed Rail Proposal* report with a brochure to propose a new 'T-Line' railway from Goulburn to Yass with a spur to North Canberra. Some 20 years later, in 2001 the RTSA produced a brochure *Sydney - Canberra - Melbourne 'Bringing Rail up to Speed'* that also included a map of the T line. This brochure was supplemented by a detailed

submission to government.

Other Main South rail deviation proposals include that of W.C. Wentworth in 1991 for a direct route from near Menangle to Mittagong, and by John Hoare in 2001 for a direct route from Bowring to near Cootamundra (Laird et al 2005). These two deviations, coupled with Goulburn Yass and two smaller deviations (Moss Vale to Exeter and a bypass of the Bethungra Bypass) would involve the construction of 196 km of new track to modern engineering standards between Menangle and Junee. This would bypass some 256 km of track with substandard alignment and reduce freight train transit times by over two hours.

The Very Fast Train and Speedrail

In 1984, CSIRO proposed construction of a new Sydney - Canberra - Melbourne railway to French TGV standards. The proposal generated more interest from the private sector than government, and was subject to numerous studies and some parliamentary inquiries. By 1990, it had been all but abandoned.

Attention was later directed at constructing a new high speed Sydney - Canberra railway which was called Speedrail. The new proposal led to expressions being formally invited by the Federal, NSW and ACT governments. In late 1997, four detailed proposals were made: Speedrail; a Maglev; an electric tilt train; and, a diesel tilt train. In August 1998, Prime Minister Howard announced with great fanfare that the preferred option was Speedrail. However, by December 2000, this project was rejected by the Federal Government in favour of yet another study.

An inland route from Melbourne to Brisbane

This proposal goes back to at least 1979 by Ken Thomas (founder of TNT - 'Making our railways pay' *Sydney Morning Herald* 10 May 1979). His article included a route map showing Brisbane - Wallangarra (dual gauge) - Orange - Albury - Melbourne - Adelaide as well as Sydney - Orange - Perth. The aim was to provide an "inland rail system" to link the five mainland State capitals with provision of an "80 knot" speed capability. Since then, there have been many proposals, with most but not all favouring Melbourne-Parkes-Moree-Toowoomba-Brisbane.

After several studies supported by the Federal Government, a major North-South Rail Corridor Study report was released in 2006 by the Federal Government. In March 2008, the ARTC was commissioned to conduct a study at a cost of up to \$15 million to include determining the optimum alignment of an inland railway and the likely order of construction costs within 20 per cent. The results are due August 2009. Meantime, a corridor has been reserved from Gowrie to Grandchester in Queensland where construction by 2026 is noted as part of the major SEQUIP rail program.

Maldon Port Kembla Railway

Along with an upgrade of Port Kembla to Dombarton (actually completed), a 35 km link from Maldon to Dombarton was started in 1983 by the Wran Government. This included 25 km of right of way and approach viaducts to a bridge. The project was all but shelved by 1986, resurrected in 1987 with the award of a four km tunnel contract by the Unsworth Government which was cancelled in 1998 by the Greiner Government. The new railway was originally intended to support coal exports which did not meet projections, however, with rail congestion increasing in Sydney and Port Kembla expanding to handle car imports, there is a stronger case for its completion.

Action for Transport NSW and a Metro for Sydney

In 1998, the Carr Government released an official statement *Action for Transport 2010* that listed a number of rail projects for completion by 2010. Along with Dapto-Kiama electrification (completed), these include:

- Parramatta Rail Link (now Epping-Chatswood)
- Newcastle to Sydney High Speed Rail Link Stage 1 Hornsby - Warnervale by 2007
- High speed rail link - Thirroul tunnel prior to 2010
- Completion of Maldon Port Kembla railway (subject to some Federal/private funding)
- Epping to Castle Hill rail by 2010 (underground - 7 km)
- Priority freight line from Macarthur to Chullora and to Cowan.

A number of further new rail lines for construction between 2010 and 2020 were also listed. Most of these projects have not proceeded. In 2008, the NSW Government proposed a 38 km Metro from the CBD to Rouse Hill.

Fassifern-Hexham-Stroud Road

This major deviation, along with how the northern section (Hexham-Stroud Road) formed a case study in the 2007 Neville Report, is outlined in Section 3.3.

5.2 The Forward Vision Task Force

The report *Rail in the next decade: where to and how?* was presented at CORE2002 and included two scenarios 'Steady as we go' and 'Leadership and vision', assuming we were in the year 2010 surveying the changes since 2002. To highlight the two scenarios, they were sharpened for live presentation at CORE2002 to a 'Worst case scenario' and an 'Optimistic Scenario' as follows:

Worst case scenario

Just as the 1990s have been and gone with many changes for rail, so also has the present decade. As we all know in 2010, Australia's major cities now have horrendous traffic problems. As well as many more cars, they are larger. Governments have bowed to popular demands for the dangerous combination of more highways and low road pricing. Despite an idea called AusLink floated by the Federal Government in 2002, there is little land transport public funding for new railway lines, and the private sector remains keen on toll roads. So in Sydney, the only major rail project delivered by 2010 has been Epping - Chatswood. All other *Action for Transport 2010* projects remain the subject of ongoing studies. Indeed, following geo-technical problems on the Illawarra line, people who used to catch the train are now conveyed by bus from Wollongong to Waterfall.



A train winds its way on the NSW North Coast line
Photo: Mark Carter

Although the Perth urban rail system was extended, Adelaide's urban rail system was closed in 2006. There has been no further extension of urban rail in either Brisbane or Melbourne. Each year, rail continues to move much iron ore and coal, and continues to give trucks a run for their money across the Nullarbor. However, rail can no longer compete with B-Triples on the Hume-Highway or the new super road trains on the Newell Highway. Thus, the inland Melbourne - Brisbane route which held so much promise in the late 1990s, did not proceed. Worse, as predicted by official reports in the 1990s, the Maitland - Brisbane line was closed. Given the failure of the NSW Government to enter into any agreement with the ARTC after years of protracted negotiations that finally stopped in 2003, the Federal Government was not interested in saving the line it had helped complete in 1930.

Branch lines, which already had been cut in the late twentieth century, have continued to be cut. Although some wheat may go by rail, most goes by road, if not directly to a port outside a major city, then for long distances to a transfer station.

Needless to say, Australia's highways are clogged with heavy trucks. Public dismay is only tempered by the high level of enforcement of safe driving of heavy trucks by the authorities. Truck operators, of course, continue to enjoy access to the National Highway System with low road pricing and no tolls outside urban areas. Indeed, the National Transport Commission formed in 2004 continues to use road user charges with no mass-distance component.

Some private companies offering rail freight services in Australia have all but closed. Not even outsourcing of locomotives and track maintenance could save them. Even Queensland Rail, which looked so promising in the 1990s, has contracted since privatisation in 2005 and recently retreated to coal only.

Likewise, Queensland's TravelTrain services have been all but closed. The pensioners' strong objections faded away when they were advised that they could use their pensioner discounts for air travel.

The ancillary rail based industries, which had once supplied domestic and growing export markets, have all been moved off shore.

The RTSA folded in 2008 into a new Road Technical Society.

Optimistic Scenario

We are again at 2010 looking back over the last decade, but it is a lot different from the other scenario.

The start of the decade saw the drive of the NT and SA Governments to link Adelaide and Darwin by rail to secure an agreement to build a new railway. Once actually started, the line was quickly completed in late 2003. By then, work was well underway with the Parramatta Rail Link, upgrading the Victorian regional lines, and an inland route from Melbourne to Brisbane.

The main breakthrough was a long awaited agreement between the ARTC and the NSW Government and a start on long overdue track straightening on the Main South Line to help reduce Sydney - Melbourne freight trains to 10 hours. This was at the initiative of more than one interstate rail freight operator. The track upgrades have been rolled out progressively with a mixture of funds. The new funds include Government guaranteed loan funds that were initiated when the rail industry was able to convince Government that the initial AusLink proposals made in 2002 had to change. The changes included more attention to the real costs of road transport including health costs where the "invisible road toll" was found to be larger than the road toll from road crashes. The Government then quickly saw the benefits of investment in safer and cleaner transport. Although it has taken a few years to increase road pricing to internalise all costs, more funds have gone to rail infrastructure. This has been assisted by train operators ensuring that Government track authorities do have 'advanced plans in the top drawer'.

Not only did the rail track authorities have detailed engineering plans 'ready to roll' but they had learned from their state road colleagues to acquire land well ahead of track upgrades, and to get environmental impact assessment up to speed. This was accompanied by reports that clearly spelt out the benefits of the proposed track upgrades for the wider community as well as the train operators and track owners.



A Queensland Main Line Upgrade (Tandur Traveston deviation). Such mainline track straightening is recommended for New South Wales. Photo: Philip Laird

As rail has continued to deliver enhanced services with better reliability and lower transit times, people as well as freight customers have come back to rail. This in itself has helped to make a more favourable climate for both Government support and private investment in rail.

You can see that by 2010 rail is in a much healthier situation than it was in 2000. To see how 'Leadership and Vision' with a new generation of rail managers have helped to bring the changes in, you will need to read the full report of the Task Force.

Other notable features of 'Leadership and vision' was the energy injected by two new leaders, Ric Ganesh to head the Australian Freight Group and the appointment of the ARA's lobbyist Tom DiMaggio, both of whom assisted Federal Parliament to enact a *Land Transport Equity Act*, greatly strengthening the earlier AusLink plan. By 2008 mass distance charging was in place for the heavier long distance trucks, and the broad gauge non - metropolitan track in Victoria and South Australia had been converted to standard gauge.

The ARTC lease in NSW led to good results and a start of judicious realignment of sections of the NSW Main South line and a Fassifern - Hexham - Stroud Road line was now underway. Queensland continued to do well, and the inland route has been a huge success.

Looking backwards to looking forward

Australia has elements of both the 'worst case/ steady as we go' and the 'optimistic/ leadership and vision' scenarios. Most *Action for Transport 2010* major projects committed in 1998 did not proceed and the National Transport Commission formed in 2004 continues to use road user charges with no mass-distance component. The ARA did move its office from Melbourne to Canberra in 2003 and an agreement between the ARTC and the NSW Government was finally reached in 2004. The forward vision report also noted the importance of skills training.

The two sets of scenarios also contain events that have not occurred to date. Queensland Rail was not privatised in 2005 and continues to offer general freight and TravelTrain services. The NSW Government is still to get engineering plans or environmental impact assessment 'ready to roll' and acquire land for track straightening in a way that the Queensland Government has done for Grandchester to Gowrie.

What is interesting is what the report did not predict. This includes churning of rail assets sold off by the Victorian and West Australian state governments, and the need for governments to 'take back the track' in Tasmania and Victoria following New Zealand in 2004. To some, the need to take back the track, and a less than inspiring performance over the years by a large rail freight operator have given support to a view that rail privatization was a 'failed experiment'.

Although the 2002 report noted greenhouse gas emissions as an issue, it did not foresee climate change as a major potential driving force. The report did not anticipate the current mining boom and was silent on concepts such as peak oil, or even the need to improve energy efficiency.

5.3 RTSA and the future

Along the way, from a notable International Heavy Haul Conference held in September 1978 at Perth, it has been a long journey, firstly for the National Committee on Railway Engineering of the Institution of Engineers to 1998, and then the Railway Technical Society of Australasia. It is clear that the decision, once taken, by the NCRE to form a Technical Society did lead to an 'extension and enhancement' of its activities, both at a national and at the important Chapter level.

In addition, participation in RTSA activities is not restricted to engineers and technicians but it offers an opportunity for not only railway professionals including investigators, operation managers and financial analysts but for all people interested in railways to get 'on board'.

Although the Australian and New Zealand rail industry is very different from what it was thirty years ago, there have been common themes over this period of time for the NCRE and the RTSA. These include liaison with the rail industry as a whole and groups within it, a major Conference on Railway Engineering running every two or so years, Study Tours on Railway Engineering, awards, publications, submissions from time to time to government, and an ongoing concern about training of young railway engineers. It is to be expected that such activities and concerns will continue.

Over the last thirty years, the rail freight task has grown more than three-fold whilst the urban rail passenger task has doubled in Australia. The present indications are that with continuously increasing fuel prices and the likely introduction of a carbon emissions trading regime, rail will be expected to perform an even larger share of moving people and freight in Australia and New Zealand.

Members of the RTSA will continue to play a part in meeting the new challenges.

Appendices

Appendix A

Annual General Meetings

2008	9 September Perth
2007	4 December Sydney
2006	2 May Melbourne
2005	20 July Brisbane
2004	22 June Darwin
2003	23 November Sydney
2002	12 November Wollongong
2001	12 November Canberra
2000	23 May Adelaide
1999	9 May Melbourne
1998	7 September Yeppoon

Appendix B

Life Members

Under the RTSA Constitution, life membership may be awarded by the Executive (formerly National Council) as an honour to selected recipients.

2002	John Adams
2002	Les McNaughton
2002	Ian Nibloe
2006	Ian Macfarlane (deceased)

Appendix C

NCRE Chairmen

1996 - 1998	George Erdos, South Australia (1.5 terms)
1992 - 1995	John Adams, South Australia (2 terms)
1988 - 1991	Michael O'Rourke, then Victoria (2 terms)
1986 - 1987	Paul Jenkins, Queensland
1984 - 1985	Les McNaughton, NSW
1982 - 1983	Ian Macfarlane, then ACT
1979 - 1981	Peter Booth, Western Australia

Appendix D

National Office Bearers and Chapter Chairs of the RTSA

National* Chairman

2006 - 2008	Ravi Ravitharan
2004 - 2006	George Erdos
2002 - 2004	John Watsford
2000 - 2002	Robert Schweiger
1998 - 2000	Philip Laird

National* Treasurer

2004 -	Robert Schweiger
1999 - 2004	Ravi Ravitharan
1998 - 1999	Robert Schweiger

National* Secretary

2006	John Dring
2001 - 2006	Chris Venn-Brown
1998 - 2001	Ian Nibloe

Queensland Chapter Chair:

2006 -	Mark Wishart
2004 - 2006	Cameron Smart
1999 - 2004	George Nikandros

NSW (formerly Sydney) Chapter Chair

2007 -	Andrew Honan
2003 - 2007	Bill Laidlaw
2000 - 2002	John Watsford
1998 - 2000	Les McNaughton

Victoria Chapter Chair

2005 -	Martin Baggott
1998 - 2005	David Ferris

Note: With the exception of Chapter Chairs, National Office Bearers normally assume office between Annual General Meetings. In addition to those listed, there is also the office of Immediate Past National Chairman, the National Deputy Chair (including 1998-1999 John Adams and 2006 - 2008 Martin Baggott) who by the Constitution becomes the next National Chairman. The Council has also included the Chair of the Government Relations Committee (2005 - 2008 Andrew Honan and 1998 - 2005 Philip Laird).

* All 'National' positions have become 'Executive' positions from 2006 onwards.

South Australia Chapter Chair

2006 -	Duncan McLeod
2002 - 2006	Robert Schweiger
2000 - 2002	George Erdos
1998 - 2000	John Adams

Western Australia Chapter Chair:

2001 -	John Syers
2000	Shane Hinchcliffe, Bill Larke

New Zealand Chapter Chair

2008 -	Andrew Hunt
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Appendix E

Conferences on Railway Engineering

The NCRE/RTSA railway engineering conference programme has included the following:

RTSA

2008 Perth - The CORE of integrated transport (John Goddall, Bill Singleton)

2006 Melbourne - Rail achieving growth (Ravi Ravitharan, Stephen Marich)

2004 Darwin - New Horizons for Rail (Robert Schweiger, John Dring)

2002 Wollongong - Cost efficient railways through engineering (Les McNaughton, Philip Laird)

2000 Adelaide - Railway technology for the 21st century (John Adams, John Dring)

NCRE

1998 Capricornia - Engineering innovation for a competitive edge

1995 Melbourne - World Best Practice

1993 Newcastle - Contracting Railways

1992 Sydney - 10th International Wheelset Congress

1991 Adelaide - Asset Maintenance

(with the Conference chairs and Technical Committee chairs in brackets for RTSA events, also John Adams was chair of CORE1991 as well as CORE2000, and Les McNaughton was chair of the first Railway Engineering Conference in 1981 and for CORE2002).

1989 Brisbane - 4th International Heavy Haul Conference

1987 Perth - Productivity - What can engineers contribute?

1985 Brisbane - Electrification

1983 Melbourne - Upgrading Australia's Railways

1981 Sydney - Track and Vehicle Dynamics

Appendix F

RTSA Eminent Speakers

The RTSA programme has included the following:

2008 Andrew McCusker, Operations Director, MTR Corporation, Hong Kong

2007 Ed Zsombor, Rail Services Director, Government of Saskatchewan, Canada

2004 Hans Bier, German Rail - DB Netz AG and Dr. Manfred Sedello, Quattron Management Consulting

2002 Mysore Nagaraja, New York City Transit

2001 Braam Le Roux, South Africa and UIC

2000 Mike Franke, former Chief Engineer of Burlington Northern Santa Fe railroad

Appendix G

International Heavy Haul Main Conferences

2005 Rio de Janeiro, Brazil - Heavy Haul: Safety, Environment, and Productivity

2001 Brisbane - Confronting the Barriers of Heavy Haul Technology - cosponsored by the RTSA and in association with AusRail

1997 Cape Town, South Africa - Strategies Beyond 2000

1993 Beijing, China - Efficiency and Safety within the Heavy Haul Field of Operation

1989 Brisbane - Railways in Action

1986 Vancouver, Canada - Profitability Through Technology and Operating Efficiency

1982 Colorado Springs USA - Heavy Haul Railways

1978 Perth, Australia

Appendix H

RTSA Awards

The RTSA offers a number of awards, with recipients listed below.

Annual Individual Awards

The Individual Award is offered annually, since 1999, to a person who has made an outstanding contribution to the railway industry.

2007 Peter Martinovich, Deputy Project Director, New MetroRail Project, Public Transport Authority of Western Australia for technical development and expansion of railways in Perth including the new Southern Railway Project.

2006 David Ferris, Consultant for rolling stock engineering in the Victorian public and private sectors, also within Railways of Australia, the RTSA and the Rail CRC in the development of postgraduate courses in Rollingstock Engineering.

2005 Vince Graham, Chief Executive Officer the Rail Corporation of NSW and former National Rail Corporation (including a 1992-1995 major rail capital works program and the acquisition of the Dash-8 locomotive fleet) and GrainCorp.

2004 Peter Mutton, Associate Director of the Institution of Railway Technology (IRT) at Monash University. He was one of the founding members of the railway research facility MRL (now IRT) and has played a key role in providing technical leadership at that facility.

2003 John Hoare, Managing Director of Concord Consulting. He has assumed over 45-years in varied engineering, executive and advisory roles, mainly in Western Australia but also nationally.

Note: for full citations please see the website <rtsa.com.au>.

2002 David O'Grady, Senior Technical Advisor Fluor Daniel Group, who has served in many roles including Divisional Engineer, Parkes NSW, the Paraburdoo to Dampier railway and significant overseas railway works.

2001 No award was made

2000 Stephen Marich, BHP Melbourne Research Laboratories (MRL). His achievements include assisting BHP Iron Ore in the Pilbara Region of WA via MRL to be a leading heavy haul railway.

1999 Ross Hunter Group, General Manager, Technical Services, Queensland Rail. His achievements in project and capital works management includes Queensland's Main Line Upgrade project.

Biennial Rail Industry Awards

The Biennial Industry Award has been made since 2000 to reward an achievement in the railway industry that is worthy of public recognition.

2006 The Public Transport Authority (Western Australia - PTA) and Union Switch & Signal Pty. Ltd. for the project involving the design, installation and commissioning of a Single Train Control System including for the new Southern Suburbs Railway.

2004 Flour Australia Pty. Ltd. for the design and construction of the 39.4 km. long heavy haul railroad project: Mining Area C to Yandi Mine Railroad in the Pilbara region of Western Australia for BHP Billiton.

An Honorable Mention was made to **NRG Flinders** for the project: Leigh Creek to Port Augusta Rail Line Tie Renewal Project

2002 BHP Institute of Railway Technology. This group was established in 1972 as part of the former BHP Melbourne Research Laboratories (MRL) and has provided railway research for BHP, other Australian railways and the international railway industry.

2000 Kinhill/Connell Wagner Joint Venture and Leighton Construction Pty. Ltd. for the major Jolimont Rationalisation Project at and near Flinders Street station in Melbourne.

Thesis Awards

The Railway Engineering Student Thesis award has been offered annually since 2002 to the author of an outstanding final year undergraduate project, undertaken in Australia or New Zealand, on a topic in railway engineering.

Note: UNSW is the University of NSW, UQ is the University of Queensland and UniSA is the University of South Australia.

2008 **Glen Bearham** Griffith University, **Brendon Gill** Central Queensland University (runner up)

2007 No award was made

2006 **Jonathan Dennis** UQ, Evan Barrett Griffith University (runner up)

2005 **David Caldwell** UNSW and **Luke Cervoni** University of Wollongong (Joint Winners), **Ruth Luscombe** UniSA (runner up)

2004 **Nick Stephens** University of Newcastle and **Savithri Shimada** University of Sydney (Joint Winners), **Liam Walls** UQ (runner up)

2003 **David Hanson** University of Newcastle, and, **Wayne Potter** and **Wayne Londema** UniSA (Joint Winners), **Kittkhun Kittiarom** UNSW and **Leon Zabel** Griffith University (runners up)

2002 **Jeanette Aitken** UNSW, **Evin Jonathan** UNSW and **Choong Yew Kong** UNSW (runners up)

Young Railway Engineer Awards

This award has been made since 2004 to encourage and reward professional engineers, technologists or associates in Australia and New Zealand who are under the age of thirty. Up to two awards and a runner up prize may be made.

2008 **Sakdirat Kaewunruen** a Design Engineer with Amtrak and a recent UOW Ph D student

2007 **Daniel Martucci** Engineer, Rail Planning and Investment, in the Policy and Planning Division of the South Australian Department of Transport, Energy and Infrastructure.

Behzad Fatahi PhD student and a researcher in the Centre for Geotechnics and Railway Engineering Research at UOW.

2006 **Tom Hampton** then Project Manager with John Holland Rail responsible for the maintenance and various capital/renewal works on the Tarcoola to Darwin Railway. **Rebecca Taylor** (previously Bignell), then Signals Engineer working in the Network and Infrastructure Division of the Public Transport Authority of Western Australia.

2005 **Wilson Wong**, then Senior Engineer (Rail) with Maunsell Australia at Melbourne. An Honourable Mention was made to Brenden Vosper, then Project Engineer with the Rail Division of the John Holland Group.

2004 **Jacob Latter** then Area Engineer with the Rail Division of John Holland Pty. Ltd. in Rutherford, NSW.

Contact Mechanics

The Contact Mechanics award has been offered annually since 2008 to the author of an outstanding thesis project on this topic, undertaken in Australia or New Zealand.

2008 **Mina Hanna** Monash University

Appendix I

Publications

These include reports and brochures along with a quarterly National Newsletter which since 2003 has been called *Rail Horizons*.

Reports

2003 *Planning a new railway: Alice Springs to Darwin*

2002 *Rail in the next decade: where to and how ?*

2000 *Railway Engineering Professional Formation and Development*

1999 *Keeping Rail on Track* (with IE Aust, ARA and ISRE)

1999 *Engineering for Rail Sector Growth* (with IE Aust, ARA and ISRE)

1998 *Railway Engineering Competency Profiles*

1983 *The status of railway research and development in Australia*

1982 *Bicentennial High Speed Rail Proposal*

Brochures

Along with various awards and membership brochures, the following is a list of RTSA Government Relations Committee brochures.

Fix the Rails V and *VI* were accompanied by postcards that could be signed and sent to the Prime Minister.

2003 June *Rail for sustainable cities*

2002 June *Getting Sydney back on track* (with RTAA)

2001 September *Getting Rail Back on Track*

2001 March *Sydney-Canberra-Melbourne Bringing rail up to speed*

2000 September *Fix the Rails - VI - Australia*

2000 April *Fix the Rails - V - Up to Queensland*

2000 January *Fix the Rails - IV - NSW*

1999 September *Fix the Rails - III - SA/WA*

1999 June *Fix the Rails - Victoria*

1999 March *Fix the Rails* (Neville Committee report)

Appendix J

RTSA Submissions

A list of most submissions made by the RTSA, some of which are located at <rtsa.com.au>. HORSC denotes a House of Representatives Standing Committee.

2007

- Level Crossing Technologies
- Pacific Highway Upgrades Kempsey to Eungai (re shared road - rail corridors)
- Victorian Government Rail Freight Network Review (Fischer Review).

2006

- Senate Committee re Australia's Future Oil Supply and Alternative Transport Fuels
- NSW Legislative Committee Inquiry re Pacific Highway Upgrades
- Productivity Commission re Road and Rail Freight Infrastructure Pricing

2005

- Pre - Budget Submission to the Federal Treasury (also made in earlier years)
- North-South Rail Corridor Study (inland rail)
- 2005 Pacific Highway Upgrades Moorland to Herons Creek
- HORSC re Regional Rail and Road Freight Transport and their Interface with Ports

2004

- NSW Metropolitan Strategy 'High Hopes but Low Expectations'
- Productivity Commission Energy Efficiency
- Victoria's Country Rail Infrastructure
- HORSC re Sustainable Cities
- Productivity Commission re National Competition Policy
- NSW Grain Infrastructure Advisory Committee
- HORSC re Australia and the Kyoto Protocol

2003

- NSW Legislative Council Committee Port Infrastructure in NSW
- National Road Transport Commission
- Ministerial Inquiry into NSW Public Transport
- Fast Freight and Passenger Options
- AusLink Green Paper
- Review of the National Road Transport Commission

2002

- HORSC Local Government and Cost Shifting

2001

- Fuel Tax Inquiry
- Productivity Commission National Access Regime

2000

- Defence White Paper Review
- Draft Rail Network Strategy for Queensland

1999

- Senate Committee re Australia's Response to Global Warming
- Senate Select Committee on a New Tax System
- Productivity Commission Progress in Rail Reform

References

The following are selected references. They are in addition to the RTSA ones already cited in Appendix I.

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House of Representatives Standing Committee on Transport etc (the Neville Committee)

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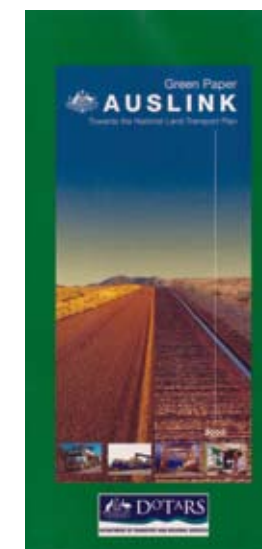
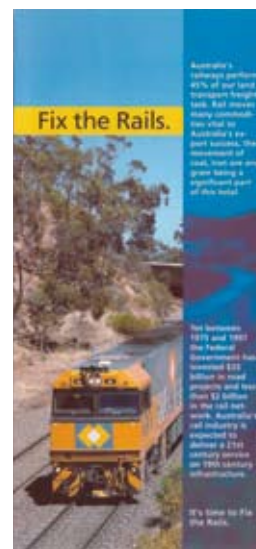
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Opposite page: The front covers of the six Fix the Rails brochures coupled with the RTSA's bringing Rail up to Speed and Rail for Sustainable Cities brochures along with an AusLink 2002 brochure.



The Railway Technical Society of Australasia (RTSA) seeks the advancement of the rail industry through excellence in railway engineering and technology, provides continuing professional development for its members and promotes close working relationships amongst participants in the railway industry.

Along with a New Zealand Chapter, state based Chapters established under the RTSA umbrella comprise a NSW (including NSW and ACT), South Australia (including NT), Victoria Chapter (including Tasmania), Queensland (including other Overseas), and Western Australia. All Chapters arrange regular local technical programmes which address topical railway issues, and also provide opportunities for networking through joint meetings with other similar groups in the railway industry.

Membership in RTSA is available in two grades: Individual and Corporate. For further details visit the RTSA web site at: <rtsa.com.au>

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