

NEWSLETTER No 8/2003



Railway Technical Society of Australasia
SA Chapter
Engineering House, Bagot Street
NORTH ADELAIDE SA 5006

SEPTEMBER 2003

NEXT MEETING

**THURSDAY 2nd OCTOBER AT BAGOT ST, NORTH
ADELAIDE - Starting at 17:30**

A FATIGUE SAFE CAPACITY SYSTEMS DESIGN APPROACH TO IMPROVING SUPPLY CHAIN PERFORMANCE

This presentation will be a combination of the story of development of InterDynamics (the journey) and the 'product' that has emerged from that process.

Headline issues associated with capacity design are

- Significant performance improvements flow from capacity system design efforts.
- The dynamics of demand can be efficiently serviced by steady supply capacity.
- Simple, repeatable service patterns can be used to "float" steady supply capacity.
- Work schedule predictability is a leading component of quality of life issues.

Despite the efforts of many people and companies, supply chain performance continues to be a major topic of discussion as supply chains continue to perform at levels below expectation. It is proposed that the central issue at play is not the technology, nor the willingness of parties to collaborate, nor the contractual frameworks in place; rather the key issue is that the supply chains have not been appropriately designed in the first place. No amount of real-time optimisation software can compensate for a fundamentally flawed design. Too often local optimisation tactics have been assumed to suffice for overall supply chain performance. Too often coordination opportunities between transport and handling service providers which could significantly improve throughput performance have been missed through the use of performance measures which do not reflect the dynamic, interconnected nature of a supply chain.

The presenter will share his experience of well designed supply chains which do not require real-time systems for optimised performance. The operational people within the supply chain make better coordinated decisions within pre-designed limits, than the assumed constraints of conventional optimisation software.

An animated capacity simulator will be used to convey the fatigue safe capacity systems design concept.

The presenter - Bob Bridges, FAICD, is Managing Director and joint founder of InterDynamics. Bob works with organisations, unions and the government to assist them to achieve sustainable change. His commercial interests include capacity systems design and improvement, fatigue safe workplaces and the use of animated simulators to convey leading edge concepts and principles. He led the team which designed and implemented the logistics system for the Sydney 2000 Olympics. Examples of organisations that Bob works with include: ADF, Alcoa, ARG, AWB, BHPB, Chp, Pacific National, QR, Rio Tinto, Sensis, Swedish Rail, Union Pacific Railway and Workcover.

LAST MEETING

The September joint meeting with RTSA and PWI was a twin presentation on the subject of "Adelaide Trams – Their Past and Future" with two speakers - Tom Wilson, Principal Service Consultant, Service Development – PTB who spoke about the history of the Adelaide Tram System, and Dean Lambert, SA Government Project Director who spoke about the proposed redevelopment of the Adelaide to Glenelg tramway.

It is curious that electric tramways in various cities had their origins in other forms of traction: Sydney had its steam trams, Melbourne its cable cars and Adelaide its horse trams. Adelaide in fact developed a horse tram network that became the largest such system in Australia. This was probably a result of the relatively flat topography of the Adelaide plains. The horse tramways were privately owned by up to 11 companies with the first commencing operation in 1878 and the last closing down at Gawler in 1930. The largest of the tram companies was the Adelaide and Suburban Tramway Company, which operated in the northern and eastern suburbs, and whose first line ran to Kensington. With the exception of the Port Adelaide and Gawler systems, which were 1600mm gauge, all of the remaining tramways were 1435mm gauge.

The tramcars were of various designs and configurations including single and double-decked cars, normally hauled by a pair of horses, but with 'banker' horses on hilly sections.

Early suburban development was mainly along the early tram routes rather than the rail lines. With the exception

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of the Port line, rail tended to serve semi rural areas until after WW2. Development of strip shopping precincts at Unley, Parkside, Hyde Park and The Parade Norwood are prime examples of the impact of the horse trams.

There was competition and rivalry between the horse tram companies. One company that operated trams from the northern suburbs into North Adelaide provided a horse bus for its passengers between North Adelaide and Adelaide rather than transferring them to a second tram company that had the franchise to run the latter section.

The tramways also had competition from horse drawn buses and the South Australian Railways. The tramway through Goodwood was apparently never very profitable as it had to compete with the South Australian Railways and The Glenelg Railway; both of which it had to cross, and horse buses. In this area there were three flat rail crossings between tracks of the SAR South line, Glenelg Railway and Goodwood tramway.

In the late nineteenth century the general practice was for city workers (mainly men) to go home for lunch and to cater for this some companies provided special trams that ran from the city to the end of the line then back to the city a suitable time afterwards. These trams ran non stop to ensure a quick journey and passengers had to get on and off with the tram moving. (New Delhi buses still do this as a matter of course!). One curious practice was unplanned crosses on single track – one car would be deliberately derailed clear of the track to let the other through. A similar practice was adopted to interchange cars between unconnected tracks in the city.

A hazard for horse trams on the Henley Beach line was frequent flooding where it crossed a low lying swamp. Later when this line was electrified a long timber viaduct was provided to clear the floodwaters.

The Municipal Tramways Trust (MTT) was formed in 1907 with the aim of converting the tramways to electric traction. The first electric tram commenced running in 1909. Not all of the horse tramlines were converted with the Brighton and Gawler trams being horse drawn until their closure. During conversion horse trams ran on the same tracks as electric cars and provided feeder services from the yet to be converted sections.

Eventually there were 24 Adelaide and 4 Port Adelaide electric tramlines. All of the electric tramways were

1435mm gauge following gauge conversion of the Port Adelaide system. The Paradise line (a tram ride to Paradise) was converted despite serving a largely rural area. A limited number of flat tram/rail crossings were created as part of electrification such as at Semaphore Rd and Finsbury. Melbourne of course still has a number of such crossings including one where double tram tracks cross triple rail tracks.

There were various designs of electric trams used of which the bogie drop centre type was the most common with 80 being constructed.

Competition from buses was intense and one story was told of extra trams being sent out along a route until they spied a bus heading towards Adelaide. The driver would then change ends and the tram would head back into town picking up all passengers and thereby depriving the bus of passengers and revenue.

Until the 1950s Most lines had a 12 minute service interval most days reducing to 3 to 5 minutes during the peak periods, comparing well with the 15 to 60 minute off peak bus frequencies today.

To service the electric trams there were three main tram depots being Adelaide, Hackney and Port Adelaide.

An interesting story was told of the Adelaide Tram shed on the corner of Victoria Square and Angas Street during its design and construction in 1917. The Adelaide City Council of the day did not permit the tracks within the shed to face Victoria Square so they had to face Angas Street. Further the city council did not want the trams running directly from Angas Street to Victoria Square so they insisted that the storage tracks leading out of the shed curve away from Victoria Square towards Pulteney Street with the intention that the access to the shed be from Pulteney Street. However this never occurred. During the dead of one night a short connecting track was laid down Angas Street to connect with the tracks in Victoria Square and this remained the access to the tram shed (with trams having to shunt on every occasion) until it eventually closed in the late 1980's after the tram depot was moved to Glengowrie.

In 1929 the Glenelg Railway was converted to an electric tramway with new Class H tramcars. These same tramcars still operate the line 74 years later. This was the first LRT conversion in the country and has proved to be a very durable part of Adelaide's transport infrastructure. The Glenelg cars were (and still are) operated in coupled pairs and were even run in triples

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for a while. The large cars from Glenelg did not normally work north of Victoria Square in MTT days, which may explain the obscure terminal arrangements that exist today.

The first closures of the electric tram system occurred in 1935 with the Port Adelaide system being replaced by trolley buses from 1938.

After the Second World War, financial losses began to be accrued by the MTT and the system needed major investment as it was basically worn out. The decision was taken to close the tram system. With the exception of the Glenelg line, all of the lines were closed by 1958. The Glenelg line, because of its newer tramcars and reserved right of way was at the time left open as an interim measure, possibly up to 10 years, but has managed to remain open well beyond its originally intended extension of life. Improvements to the Glenelg line since that time include full protection at level crossings, express peak trams, pantographs replacing trolley poles and a new purpose built depot.

In May 2003 the South Australian Government announced that the Glenelg Tramline would be upgraded at a cost of approximately \$56M with about half to be spent on new trams and half on track upgrades. In addition to the new trams a number of refurbished Class H trams will be retained for heritage purposes.

The new trams are to be obtained and in operation by 2005. The short lead-time means that the new trams will have to be off the shelf designs. There are basically only three manufacturers of trams worldwide with off the shelf designs being Bombardier, Siemens and Alstom. Each of the designs offered by these manufacturers are being considered. Melbourne has two standard European tram types being introduced at the present time, while a version of the third can be seen in Sydney.

Any new tram must be Disability Act compliant which means a low floor design, must meet public expectations which means modern and sleek and be modular in design, approximately 30 to 40 metres long carrying approximately 80 passengers seated and 120 standing. The new trams will also be bi-directional, air-conditioned, have space for wheelchairs, gophers and bicycles and have windows with UV protection.

It is planned that the tender for the supply of the trams should be issued late September or early October and closed 6 weeks later. A shortlist of suppliers will be

determined by early December with a contract being awarded by March 2004 and delivery planned for September 2005. Commissioning of the trams will probably take place in Melbourne so as to prevent conflicts with the existing service on the Glenelg line.

Just as a modern motorcar requires a modern road to operate to its best ability, so does a modern tram require a modern track. The infrastructure of the Glenelg tramway requires an upgrade to suit the new trams. Some sections of the track require renewal with new rail, sleepers and ballast while other sections require refurbishing. No extension of the existing tracks through Adelaide is currently being considered as part of the upgrade proposal, however this may occur in the future if the new trams prove to be successful (it is presumed that 'successful' in this context will be mainly determined by passenger demand rather than technical or political measures!!). Extensions are expensive and an estimate of the cost of extending the tracks through the city area is between \$15M and \$18M per kilometre.

The power supply system also needs to be updated to ensure adequate electrical supply and voltage regulation, as the new trams with their electronic control systems are highly sensitive to voltage fluctuations. At present, without any alterations to electrical supply, the voltage drop that occurs as an existing tram accelerates from a stop would be enough to cause a modern tram to cease operating. Air conditioning and high acceleration rates will place a higher power load on the electrical system than the existing cars, as has been found with the Sydney rail and Melbourne rail and tram systems when they added air-conditioning to the electrical load.

The upgrade of the track and power supply system will be carried out during the next 18 months to be ready when the new trams arrive.

TRACK ENGINEERING SEMINARS

The Permanent Way Institute (PWI) is running a series of track engineering seminars that should be of interest to everyone who has even a vague interest in this aspect of the industry. The next of these, on the topic of Track Structure Design and Rail Fastenings, will be held on Wed 15th Oct 2003 from 13.00 to 15.30. This is just one of what is likely to be come a long running a valuable series of seminars. Interested persons should contact Stephen Townsend at Box 732 Morphett Vale SA 5162, or by e-mail to TownsendSJ@onesteel.com.

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SA DRAFT TRANSPORT PLAN

Part two of the RTSA SA Chapter submission is reproduced below. It follows on from the excerpt in the August Newsletter. This excerpt deals with Metropolitan Rail.

The Adelaide metropolitan rail network is the smallest and most underutilised of the Australian capital city passenger rail networks. This is not to say that it is not a good system – it is but has scope to improve its performance with a number of changes of emphasis.

- The two most significant factors inhibiting the attractiveness of metro rail is the relatively poor frequency during the normal working day, and the extent that competing public transport services are run in parallel with the rail routes. In our view there is a need to improve frequency, as has been partially implemented on the Noarlunga and Gawler lines, and to start focusing local bus routes into key 'nodal' stations along the rail routes. Where there are residual 'competing' public transport routes these should be retained only where they enhance the overall public transport outcomes (financial and social). Canberra has a trunk and local service public transport network which is all bus but is still a model of its kind. Adelaide, with its long north-south orientation lends itself to this sort of transport structure using the Noarlunga – Gawler rail corridor as its backbone.
- In the city area there are three major public transport 'terminals', all of which are separated by two city blocks. The rail terminal is in North Terrace, the bus-way in Grenfell/Currie St and the Glenelg tram in Victoria Square (three pedestrian lights remote from any undercover walkways). Although these three are linked by the City-link buses this is only a partial fix for a long running problem. The most effective solution would be extension of the about to be upgraded tram route from Victoria Square to North Terrace – Elder Park, thus providing a measure of linkage between these major public transport routes. A further enhancement would be provision of a tram stop at Goodwood Station to provide an interchange between the Glenelg tram, and the Belair and Noarlunga railway lines.
- A major issue for metropolitan public policy is the exponential cost growth of service provision as the city area expands. Public transport is just one element of this as are roads, water and gas reticulation, and power and communication lines. The Transport Plan needs to place very high store on metropolitan planning coordination, so that land development and provision of services are coordinated for an efficient outcome (i.e. low total cost and equity among all participants). With low population growth there should be plenty of scope to develop and implement a 'whole of government' approach to planning that would have the potential to make Adelaide the most 'efficient' city in the Commonwealth – and by definition the most 'livable'.
- Very few if any metropolitan public transport services make a cash box profit. Various means are used ranging from taxations measures to indirect subsidization by government to cover the shortfall of revenue in order to achieve 'non cash box' objectives of public transport. However, there is obviously a need to optimize the extent that the public transport entity is self funding, and this is particularly so for rail with the incumbent high right of way and track costs. The opportunities are many but generally evolve into
 1. Maximization of passenger usage in terms of the overall public transport objectives.
 2. Maximization of associated opportunities for commercial use of station facilities and land not immediately required – such as kiosks, advertising or leasing of land.
 3. Optimising the use of track where possible by allowing third party operators (by definition these will almost always be freight or long haul passenger) to have access to unused capacity.
- Adelaide rail, at the time of separation in 1975, had a one gauge network surrounding it and so had no gauge related problems. Freight trains were able to and did use most of the metropolitan network on a regular basis and in so doing generated a quite a substantial

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financial offset for the core public transport business. Subsequent events have largely isolated the Adelaide network, with just a relatively small broad gauge freight network remaining which is able to make use of TransAdelaide tracks.

TransAdelaide has taken the very wise view that they need to reduce maintenance costs and at the same time have observed the desirability of eventually converting their network to standard gauge. The complete replacement of sleepers on the Outer Harbor line with gauge-convertible concrete sleepers has been a good start in this regard. As a matter of policy, both to do with the financial health of TransAdelaide and the facilitation of freight activity within the Adelaide area, the Transport Plan needs to recognise the value to the State of planning the eventual removal of the break of gauge within the Adelaide and surrounding areas.

Adelaide city is long and narrow (bounded by the Gulf and the Hills) and has developed two major industrial nodes – in the north centred on the Dry Creek – Outer Harbor corridor, and in the south around the Clovelly Park – Lonsdale nexus. Beyond this there are major freight generators lying just outside the city area in the Elizabeth, Barossa and McLaren Vale areas. Quite apart from the obvious track access revenue potential from freight, the existence of standard gauge would allow more flexibility in temporarily or permanently drafting existing rolling stock into the TransAdelaide operation to cover short term eventualities. For instance with an all standard gauge network and a growing peak hour task it could be a low cost option to hire in a locomotive and carriages rather than invest in new dedicated railcars that will by definition only run the single least efficient peak journey. A common gauge will also make operation of work trains (for track maintenance or construction) a simple proposition, rather than having to rely on sub-optimal ways of doing these activities while 'isolated' on broad gauge.

FUTURE MEETINGS

The SA Chapter AGM, and more importantly the very sociable dinner, will be on Tuesday 25th November, commencing at 19:00 hours, at the same venue as for the last few years – Classics Restaurant in Walkerville. Details are being formulated right now and will be

advised early next month. In the mean time keep this date free.

The 2004 program will start on Thursday evening 5th February at the usual Bagot St venue.

The AusRail Plus 2003 conference will be in Sydney over the period Mon 17th Nov to Wed 19th Nov. Be warned that as a result of a conflict with the Rugby World Cup accommodation in Sydney has been hard to get and at elevated prices – but if you are a (the?) Rugby fan then there may be an opportunity available to combine two interests.

CORE 2004 is to be in Darwin from 20th to 24th June and promises to be a highlight of the railway year. The chosen authors are busily completing their papers as this issue goes to press, and it certainly looks to be a most interesting and diverse range of topics that will be on display in Darwin. The NT Government will host the Sunday evening cocktail welcome in the grounds of Parliament House as well as sponsoring the Exhibition marquee (an air-conditioned one at that!!). Two dinners are planned – on Monday and Tuesday nights – at suitable Darwin type venues taking full advantage of the mild evening temperatures and lack of 'winter' rain. Darwin is tropical after all and CORE2004 presents a wonderful opportunity to escape from southern winter miseries for a while!. The web site has details as at the present time, while it is expected that registration brochures will be out early in the New Year. Air booking can now be made (up to 355 days ahead) but cheap fares and Frequent Flyer flights are sure to go quickly once the CORE2004 bookings are opened so think about getting in early and saving the dollars.

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DARWIN PROGRESS

By the time you read this the actual tracklaying should have been completed and finishing touches being applied. The Alice end is the first to be completed, but as it would appear only by a few days. There is considerable work to yet be done; including finishing the ballasting to the level required by the construction contract, provision of loops, sidings and the like, and construction of terminals and facilities. Part of this will no doubt be the removal of now surplus construction facilities. While the track near Tennant Creek and Katherine will be well consolidated by now the outer reaches of the line at Alice and Darwin will no doubt require some activity in the next few months to get the track adequately bedded down to allow commercial operation.

Actual track construction started mid April 2002 and will have finished around mid September 2003, averaging around 2.6 km per day for every day of that period. There is little doubt that this would be far and away the best continuous construction rate for a long haul railway in this country and would be hard to beat anywhere with limited resources and in the remote locations involved here.

NEWSLETTER DESPATCH

The majority of SA RTSA Chapter members receive their newsletter by e-mail. Every so often the e-mail will bounce (in effect the electronic equivalent of 'address unknown'). In these cases the member will automatically revert to hard copy mailing until a new e-mail address is advised. The main issue here is to let Malcolm Menadue know IN ADVANCE of any e-mail address change so that you don't fall on hard (copy) times. In all cases let Malcolm Menadue know at mmenadue@ozemail.com.au

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Articles or editorial comment for Newsletter are more than welcome. Between well over 100 members locally there must be some stories, events or developments of interest that could be the basis of an interesting article in Newsletter. After all part of the function of RTSA is to keep members in touch with what is going on in the industry and with each other.

Send copy to the Editor, Max Michell at samrom@bigpond.com or fax to 08 8390 3772

CONTINUING PROFESSIONAL DEVELOPMENT

Those of you who are members of I of E (i.e. are professional engineers) should be aware that attendance at RTSA meetings can be counted toward your CPD requirements. The most convenient way to record this will be in your professional diary or similar form. A short paper covering CPD in some detail is available from Malcolm Menadue or Max Michell.