

RTSA SA CHAPTER NEWSLETTER

July 2011 Edition



NEXT MEETING: Introducing Adelaide's first electric passenger trains - the A-city

Introducing Adelaide's first electric passenger trains - the A-city

Randall Barry, Simon Mitchell – Public Transport Services (PTS)

As part of the state's \$2.2 billion Rail Revitalisation Program, the South Australian Government is purchasing 22 3-car Electric Multiple Units (EMU's) from Bombardier Transportation Australia.

The new trains will form the first fleet of electrically powered passenger trains in Adelaide and require engineering to Adelaide's specific requirements and operating environments.

This presentation introduces the new fleet, discusses the challenges of the procurement process, and the approach to addressing Adelaide's design requirements.



Randall Barry is the Director Rollingstock in the recently formed Public Transport Services Division of the Department for Transport, Energy and Infrastructure (DTEI). After a lengthy career in the health portfolio Randall has worked in various Ministerial offices. From his last position with the Minister for Transport he took up the role of Executive Manager of Infrastructure Services in TransAdelaide in 2003. He has also acted as GM of TransAdelaide and has been responsible for the acquisition of new rail rollingstock since mid 2008.

Simon Mitchell is a graduate mechanical engineer working on the Rolling Stock acquisition project. He joined the team fresh out of university at the beginning of 2010 and has been involved with the project from the requirements specification stage through to the current design review stage. Simon has been intimately involved with the engineering and decision making throughout the project.

TECHNICAL PRESENTATION

VENUE:

Engineers Australia
Sir Robert Chapman
Theatre
Level 11
108 King William St
Adelaide

DATE:

Thursday 4th August 2011

TIME:

5.30pm

Light Refreshments will
be provided.

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CHAPTER MEETINGS 2011

Thursday 1st September 2011

George Erdos ATSB
Near miss at Cootamundra

Thursday 6th October 2011

PTS and Bombardier speakers TBA
New PTS railcar depot at Dry Creek – (Site Visit)

Thursday 3rd November 2011

Ian Fox, Phil Campbell ARTC
Train Planning (CORE paper)

Publisher

This newsletter is a publication of the South Australian Chapter of the Railway Technical Society of Australasia. Opinions expressed within are not necessarily those of the Chapter, Society or Editor.

Contributions

Contributions, including news, opinions, or letters to the Editor, are always welcome. Send material by e-mail to saeditor@rtsa.com.au

Continuing Professional Development

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

RTSA Website

The RTSA website www.rtsa.com.au has details of RTSA activities, including future meetings and reports from past meetings, for all Chapters. Membership information for potential new members and an application form may be found at www.rtsa.com.au.

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Editorial

I would remind all our members that we welcome correspondence of all kinds; news, points of interest, activities that members may be interested in or our member's thoughts and views on recent rail related engineering events.

The presentation given by Ian Jaehne and Tom Hampton at the last meeting is provided at the end of this newsletter for those who may have missed it. I have reduced the slides to four per page to reduce the page numbers this month.

It is my intention that any future presentations of this nature will be made available on the RTSA website under the SA chapter 'tab'. I am advised that this will have to wait until the website has been updated and site access is secured by member log in – watch this space.

In this month's chatter Daniel wrestles with the great debate that is the carbon tax and the impact it will have on the transport sector. He also delves into the murky issue of perceived passenger safety/security, or lack thereof.

It is interesting that he can bring personal experience to what is largely considered to be media driven sensationalism.

Daniel's chatter is echoed in part in one of the news items taken from Issue 2 of Rail Express regarding "rail electrification in a carbon restricted future".

We have completed the Bio's of new committee members and next month we will look at established committee members starting with Mike Hurd.

All news articles are taken from <http://www.rail.co> except where listed.



Russell Fuller
Newsletter Editor

RTSA SA CHAPTER NEWSLETTER

Chatter from the Chair – Carbon, Security & ‘Motorists’



Carbon Tax and rail?

Elsewhere in the newsletter you will find a thought-provoking piece relating to rail electrification, and the improvement in this concept's business case resulting from a polluter-pays system. Of course, the point of order in all such arguments is the nature of the generation source - but that's another debate. The real debate. On this, I saw some interesting thoughts on this lately; here are a few highlights:

- "... the energy market ... must be opened to real competition."
- "If we try to pick winners and ban competitors, as we are currently doing, we risk high costs, few gains and lost time."
- "Renewables, fossil fuels with carbon-capture-and-storage, nuclear - all must be allowed to compete on a fair and level playing field ... technology-specific subsidies should be eliminated."

This unemotive, impartial, economics-based approach seems a breath of fresh air in this debate - pardon the pun. Look up our very own Professor Barry Brook from Adelaide University when you get some free time next, for more pearls of wisdom like these.

'The Public': the problem with Public Transport?

Saying "Rail Safety" often promotes images of track protectors, signalling protocol, wheel-rail-interface and perway maintenance, usually with a heavy side-helping of anything *hi-vis*. Yet if recent press about rail public transport is to be believed, the risk of derailments, collisions and other catastrophes (or even of *having an accident if driving instead*) pales into insignificance compared to the risk imposed by the average punter's fellow travelling public.

Overbaked this proposition may be, but it is interesting to compare risks perceived by the public. My own experience over the last fifteen years, doing most of my journey-to-study/work by rail, suggests the media's proposition is not totally incorrect.

I have even been in a derailment, but in a heartbeat I would agree some of my esteemed co-commuters seemed to pose greater threats. Fondly I recall the omnipresent vandalism, or the litany of drunk, anti-social, abusive and aggressive folk I've had the pleasure of riding with, or the groups of blokes trying to out-foul mouth each other, seemingly baiting someone to intervene, or the mass brawl that took out a Chubb staffer I only narrowly avoided. Interestingly these experiences tally with those of many I've discussed this with in that perceived trouble in the passenger saloon seems far more common than perceived trouble at stations.

These encounters from my experience would be statistically minor - and touch-wood I have thus far emerged unscathed - but they cross your mind if you are considering a late-night train ride home. If I was a solo attractive young petite female, or the father of one, I'm sure it would do more than just cross my mind.

Yet surely this exposure to society's underbelly is not unique to rail public transport, as the media's online comments suggested. I would say when driving many of us would have been glad to be behind a windscreen, and to be able to drive away. What *is* unique to public transport is the *lack* of that 4mm pane of glass, or the apparent ability to 'escape'. And what is unique to *rail* PT, compared to *bus* PT, is the corridor's frequent isolation, the separation of driver from the passenger saloon, and the fleeting presence of any thinly-spread supervision.

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Chatter from the Chair – Carbon, Security & ‘Motorists’



‘Security’: through history some have made others feel they need this simple practicality. To feel they *have* it, our potential rail PT passengers seem to have few choices, and stark ones at that:

- rely on their hand-to-hand combat and hostage-negotiation skills (‘carrying’ anything even *potentially* offensive is illegal, so our hapless punter must go into territory even police/armed forces consider specialised, and confronting);
- make decisions to ‘stay out of trouble’ (ironically annihilating the effect of ‘safety-in-numbers’);
- derive cold comfort that their abuse/assault/rape or worse is diligently recorded by CCTV, and be encouraged by how effective this feature has clearly been in stopping the graffiti, etched windows and ripped seats surrounding them;
- stick to peak periods for 9-to-5 office workers (and never finish late, or do anything after work);
- walk or ride instead, if they are blessed with a simple, short, single-purpose commute, without much cargo, to a single, nearby workplace, with shower facilities, and with both the time and inclination to maintain a remote second wardrobe on their weekends (Adelaide isn’t Amsterdam: our outer suburbs are their *neighbouring cities*);
- resort to private transport involving a motor, and be branded with the increasingly-vilified stamp of ‘motorist’.

‘Motorists’ are people too - true or false?

Speaking of ‘motorists’, other simple practicalities also tend to hurt PT and favour joining the accursed queues of climate-changing cars, apparently always a globally-inappropriate transit choice deserving nothing but active suppression:

- You were born too late to avoid the property boom rendering your mortgage-servicing capacity useless until you reach the ‘cultural wasteland’ of the outer suburbs. You sheepishly like the selfish luxury in our tiny, overpopulated country of some room and/or outdoor privacy for you, your partner and your 2.3 kids; perhaps you even migrated here for that very reason and long aspired to live in what you now hear pejoratively referred to as a “McMansion”. You have hobbies apart from embodying environmental activism through transit choice and thus require some storage and space for your materialistic trophies of fickle consumerism – eg the extravagance of a 30hp tinnie. Carpooling from this place to the CBD with your partner takes an hour, but 50% more by PT. You regularly work long hours paying off your vilified abode so you value your remaining after-hours time ... You’re probably a ‘motorist’.
- You don’t work in the city, and face the reality of saving ten hours a week if you don’t use often-inefficient cross-suburban PT. ‘Motorist!’
- Your local park’n’ride PT interchange is 45 minute’s bike-ride away up hill and down dale (plus the cycle-commuting prerequisites described earlier) or a 10min drive away. ‘Motorist!’
- You’re an athlete or are blessed with those cycle-commuting prerequisites, but still have an all-too-human need for the i of ‘shelter’ when it comes to 40-degree days or wet’n’wild conditions. ‘Motorist!’
- You travel to places other than home-work-home, sometimes unpredictably, sometimes even carrying and delivering things - like family, or shopping occasionally purchased in-person. ‘Motorist!’

PT is challenged enough by these simple practicalities experienced in life by everyday folks living in existing urban areas not of their making or design - practicalities that are generally outside the influence of your average rail PT operator. Security, however, *can* be within this influence - and it would seem likely that improving it, or at least the perception of it, would pay dividends more handsome than I previously thought.



Daniel Martucci
Chair, RTSA SA Chapter

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RTSA SA CHAPTER NEWSLETTER

Chatter from the Chair – Carbon, Security & ‘Motorists’



COMING EVENTS

Advance Notification of next year's RTSA Awards

Please note that nominations for the 2012 Railway Engineering Student Thesis Award and the Wheel-Rail Interface Award are now being taken.

For both awards the closing date is Friday 24th November 2011.

Both awards attract prizes of:
\$4000;
Plaque and;
One year free membership of the RTSA.

Full details can be found in the March newsletter (available on the RTSA Website under the SA tab)

LETTERS TO THE EDITOR

There has not been any correspondence for the chapter this month.

If you have a comment or observation you would like to raise or even a relevant anecdote, the SA Editor would be pleased to hear from you at saeditor@rtsa.com.au

RTSA SA CHAPTER NEWSLETTER

News – Rail electrification's role in a carbon constrained future



Rail electrification's role in a carbon constrained future

The Federal Government's carbon strategy provides real opportunity for rail electrification to play a part in Australia's carbon constrained future as the electricity generation industry progressively moves towards reducing emissions by developing renewable energy power sources, writes Peter Winder.

As the grid-connected electricity generation industry reduces its emissions by developing large scale renewable energy power sources such as solar, wind, hydro and geothermal, the advantage of electric trains over diesel trains will increase.

An electric train is typically estimated to emit between 20% and 35% less carbon per passenger mile than a diesel locomotive. With a carbon price mechanism draft paper recently released by the Federal Government, this is going to become a critical issue in the delivery of local transport networks in the future.

Electric trains have zero emissions in their own right, at point of operation, which is significant when you consider urban air quality and pollution levels. Additionally, electric lines have significantly lower running costs due to the trains being lighter and faster.

States take up the "electrification challenge"

Federal and state governments have already "taken up the challenge" of rail electrification, with major electrification projects underway in both the passenger and freight rail "space" across many of Australia's jurisdictions.

Queensland has led the way in electrification and already has approximately 1000km of electrified rail, including mine to port lines.

Other significant projects include Victoria's \$270m Sunbury Electrification project, with works started last

year, and the just announced \$400m electrification program for Adelaide's rail network in South Australia.

Victoria's Sunbury project will see the electrification of 12km of line from Watergardens to Sunbury. As a member of the Sunbury Electrification Project alliance, O'Donnell Griffin is on track to deliver the new electrified line to the Department of Transport for commencement of services in December this year.

Details announced in February by South Australian transport minister Patrick Conlon "pinpoint" the scope and benefits of the rail electrification works including installation of the poles, wires and signalling and communication systems that are required to run a modern electric rail system with brand new trains.

Under the SA project, some 100km of track will be electrified across the metropolitan area from Gawler to Seaford and from Adelaide to Outer Harbour. The first electrified services are expected to run on the new Seaford rail line in 2013.

We are seeing a similar "electrification theme" in New South Wales, where Sydney's \$1bn

Novo Rail urban renewal works includes electrification upgrades of RailCorp NSW's passenger network.

Several new substations have been built, including West Ryde and the Art Gallery, and a series of upgrades to the overhead wiring (OHW) on the Parramatta to Penrith, Bankstown, Strathfield, Hornsby to Woy Woy, and North Shore lines are complete, or in progress. ODG carried out the majority of these works on behalf of the Novo Rail alliance.

Overseas in New Zealand, KiwiRail has shown strong commitment to electrification of its networks in Auckland and Wellington.

The first passengers on KiwiRail's electrified rail service, running from Paraparaumu to Waikanae in Wellington,

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RTSA SA CHAPTER NEWSLETTER

News – Rail electrification's role in a carbon constrained future



travelled on the line back in February this year.

Consideration of costs required

The social costs associated with air and noise pollution from diesel locomotives, and the quantifiable long-term lower operating costs need to be analysed when making investment decisions regarding the electrification of a rail line.

Though the initial capital cost for overhead electrification has fallen by over 30% since 2004, it is still necessary for the industry to innovate in order to further reduce the cost per track kilometre.

As electrification projects are rolled out across the nation, rail has an opportunity to play a significant part in Australia's commercial, social and environmental "scenario".

Rail will hopefully become an increasingly attractive transport mode as Australia takes the steps towards reducing its emissions and developing renewable power sources.

This article can be found at
[:http://www.railexpress.com.au/archive/2011/july/july-20th-2011/other-top-stories/rail-electrification2019s-role-in-a-carbon-constrained-future](http://www.railexpress.com.au/archive/2011/july/july-20th-2011/other-top-stories/rail-electrification2019s-role-in-a-carbon-constrained-future)

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News – Light Rail Australia



Public Transport in Perth 2031' plan includes light rail project



The plans include the introduction of light rail. Photo: PerthNow.

The introduction of light rail, development of bus rapid transit services and extension of the rail line to Yanchep are the State Government's priority projects to meet Perth's public transport needs for the next 20 years.

Transport Minister Troy Buswell said the 'Public Transport in Perth in 2031' plan outlined a strategy to increase capacity and efficiency of the current network and further expand it, as well as implementing a rapid transit system to move more people during peak hours.

"Over the past 10 years, public transport use in Perth has increased by 67%, and by 2031, Perth residents will more than double their use of public transport, which will see it account for nearly 70% of all trips to the CBD. To cope with this increase and the future growth of the city, which has a predicted population of 2.2 million by 2031, we need to develop a mass transit system which integrates the heavy rail

system, buses and road-based rapid transit services, using light rail or bus.

"The Minister said on-road rapid transit, which would operate with dedicated priority within existing streets, utilises the capacity of public transport to move many more people in one road lane than cars.

"Rapid transit services will provide connections to strategic centres, which have a large workforce or are centres of education or health, where demand for public transport is currently high and will grow significantly," he said.

"Our first priority for the implementation of this type of service is for Ellenbrook, where projected passenger numbers show a Bus Rapid Transit service between Ellenbrook and Bassendean, and across to Morley is feasible." Mr Buswell said the Government would use \$11million allocated in the 2011-12 State Budget to progress planning for the three priority projects.

The plan also identifies the need for:

- A significant expansion of the bus and train fleet
- A new train stations and bus interchanges
- Introduction of 180 route kilometers of bus priority infrastructure
- The construction of a new rail line to Perth Airport.

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News – Infrastructure Europe



Rotterdam port conducts study to build new railway yard



The Port of Rotterdam is the largest port in Europe, located in the city of Rotterdam. Photo: Freek Van Arkel

A study to build a new railway yard in the outskirts of the Dutch city of Rotterdam has been selected by the EU for co-financing under the 2010 TEN-T (Trans European Transportation Network) Annual Calls with a grant of almost €1.5 million.

The study will lead the way to the construction of the yard, which will have a positive impact on the capacity of the port to handle rail freight.

The study financed by the European Union, relates to the design and procurement procedures necessary to increase the railway yard capacity of the port of Rotterdam, the largest port in Europe and starting point of Priority Project 24 (Railway axis Lyon/Genova-Basel-Duisburg-Rotterdam/Antwerpen).

The subsequent implementation of the works will remove an important transport bottleneck and increase the share of intermodal rail freight traffic.

It will also fill the capacity gaps on the hinterland rail freight corridor and trigger economic growth and development in Europe by ensuring a dynamic and efficient maritime and continental transport chain.

The study is expected to be completed by May 2012.

The studies are preparing the following railway components that will be added to the existent layout of Maasvlakte West, located on the west side of the port of Rotterdam:

- 10 yard tracks of 750 meters each;
- 11 tracks used for the storage of locomotives;
- Train Control System on each of the new tracks;
- 25kV traction power on each of the new tracks;
- Service paths and roads.

RTSA SA CHAPTER NEWSLETTER

National Rail Safety Law Draft for review



The National Transport Commission (NTC)

NTC has released a proposed National Rail Safety Law that would create an Australia-wide system of rail safety regulation for the first time in Australia's history.

Chief Executive of the NTC, Nick Dimopoulos said the proposed law would be administered by a new National Rail Safety Regulator and would slash red tape and boost safety across the industry.

"Australia currently has seven rail safety regulators across eight States and Territories, all with their own rail safety laws," Mr Dimopoulos said.

Comment invited on plans

"The proposed Law will streamline the requirements for interstate operators and allow them to spend less time on red tape and more time on managing safety and getting the job done."

He said the law, which would come into effect in 2013, would also provide greater clarity about the requirements for assessing worker competence and create consistency in the communication requirements between train drivers and network

control officers across the country.

Director of the National Rail Safety Regulator Project Office, Julie Bullas said that the national approach would also benefit intrastate operators and contractors ensuring a national approach to data collection improved benchmarks across the country.

"The National Rail Safety Regulator will support operators to deliver better rail safety outcomes for Australia, as it will draw on a national pool of data, knowledge and resources," Ms Bullas said.

"The Regulator will become a central point for information and education in rail safety, making it easier to share information on best practice across the country."

Mr Dimopoulos said the NTC and the National Rail Safety Regulator Project Office would hold information forums on the proposed law throughout Australia, including regional cities and towns prior to the close of the public consultation period on 12 August.

The draft National Rail Safety Law and draft regulatory impact statement are available to download on the NTC website at this link http://www.psnews.com.au/Page_psn27512.html

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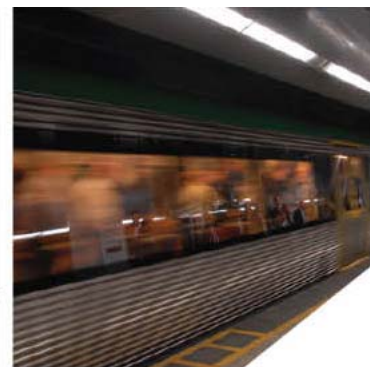


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National Rail Safety Law Draft for review



Flood Damage to Tarcoola to Alice Springs Line'





Flood Damage to the Alice Springs – Darwin Railway

Tom Hampton, National Track Manager, GWA
Peter Jaehne, Former Rail Infrastructure Manager, FreightLink

RTSA SA Chapter Meeting, 7 July 2011



Alice Springs – Darwin railway history

- Route selection and detail design commenced in early 1980s and then shelved.
- Railway revived by NT and SA Governments in late 1990s
- Asia Pacific Transport Consortium won the right to Build, Own and Operate the railway with a 50 year Concession in 2001.
- Construction completed in late 2003 and FreightLink freight operations commenced in January 2004.
- While the operation of the railway was quite profitable over the years, FreightLink was unable to support the level of construction debt and the business was sold to Genesee & Wyoming Inc. in December 2010.

Genesee & Wyoming Australia

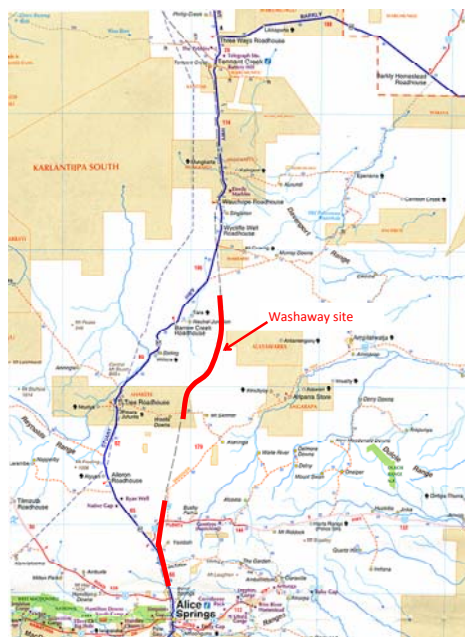
- GWA has been quick to integrate and build on the business.
- Brand new head office at Keswick.
- 7 new 4,000hp locomotives ordered for intermodal services.
- Contract with WPG Resources secured to transport 3Mtpa of iron ore from Wirrida to Port Pirie, commencing in May 2012.
- Additional 9 new 4,000hp locomotives and 4 crew cars for the WPG Resources services. Trains will be 15,000 tonne gross with distributive power.
- Tarcoola – Darwin railway infrastructure investment planning commenced.

The climatic environment

- The railway covers a range of environments from the semi desert of Central Australia to the tropical conditions of the Top End.
- Since 2009 there has been an unusually wet period with consistent winter rains in the centre and even heavy July rain in Darwin last year.
- Prior to 2010 the railway had been disrupted by flooding on two occasions:
 - Near Adelaide River (2647km) in 2007
 - At Bridge Creek (2621km) in 2008 after Cyclone Helen
- There have been several other instances where water has been up to or over the ballast for short periods with minimal damage.
- 94 bridges and 1,390 culverts in total

January and February 2010 flood events

- A low pressure system developed off the NT coast in early January and was monitored as a potential cyclone until it crossed the coast near Waddeye.
- The system remained active with heavy rain and strong winds travelling S-E into Central Australia. The system eventually dissipated S-E of Alice Springs about the 10th January.
- Rainfall from this system during 6th/7th January resulted in runoff overtopping the railway at 1577km and damaging the track, preventing train movements for over a week.



The rainfall

- A review of the limited local rainfall records was conducted by WRM Water and Environment and concluded that nearby recording stations received 3 and 6 hour falls in the 2 to 20 year recurrence range on the 7th January and a 50 to 100 year fall on the 9th January after the railway was damaged.
- This recording station was over 100km from the railway washout and there could have been considerable variation in rainfall intensity over that distance.

The rainfall

- The following tables show total rainfall and estimated rainfall frequencies (WRM Report) and rainfall distribution (BOM)

Table 1 - Recorded Daily Rainfall

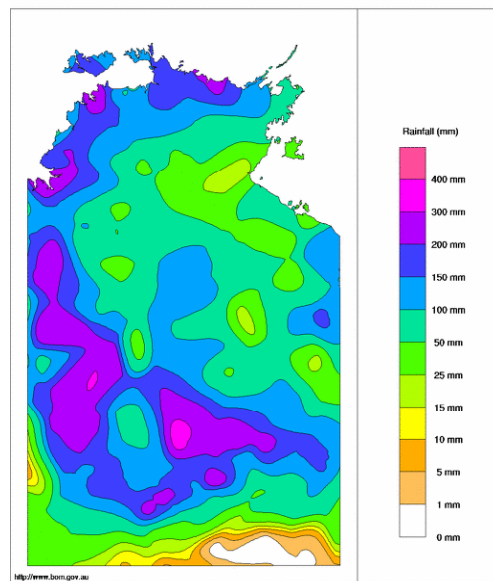
Station	Mount Skinner 15661	Wycliffe Well 15550	Territory Grape Farm 15643
6/01/2010		21.2	2.2
7/01/2010	121.6	21.6	111
8/01/2010	36	2	59
9/01/2010	14.2	15.4	93.2
10/01/2010	18	31.9	4
11/01/2010		6.4	9.4
12/01/2010			

The rainfall

Table 2 - Estimated ARIs for Territory Grape Farm Rainfall Station

Duration (hours)	Prior to 2400 hrs 7-Jan-10		Prior to 2400 hrs 9-Jan-10	
	Rainfall (mm/hour)	ARI (years)	Rainfall (mm/hour)	ARI (years)
3	13.7	2 - 5	27.5	20 - 50
6	11.3	5 - 10	14.4	10 - 20
12	8.1	10 - 20	7.5	5 - 10
24	6.2	20 - 50	4.0	2 - 5
49	3.3	10 - 20	3.3	10 - 20
72	2.2	5 - 10	3.7	50 - 100

Northern Territory Rainfall Totals (mm) Week Ending 10th January 2010
Product of the National Climate Centre



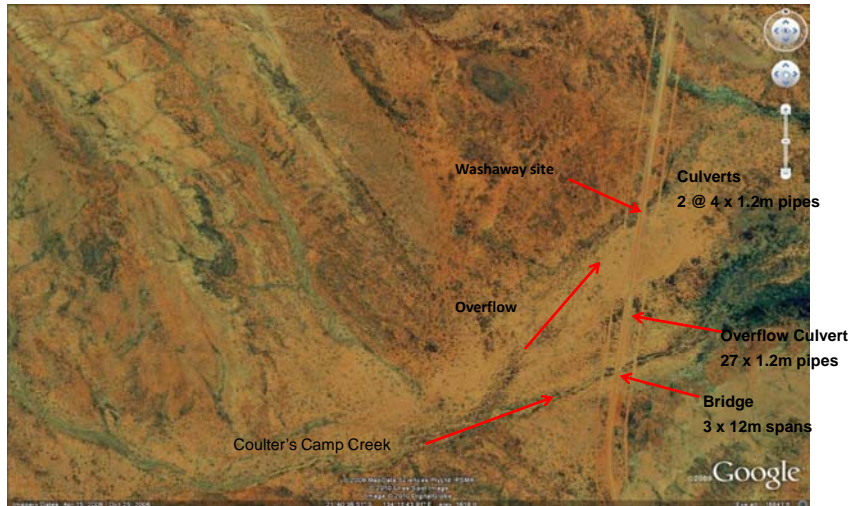
What happened on the night of 6th/7th January?

- 2AD1 travelled from Alice Springs to Tennant Creek in the early hours of 7th January and did not report any unusual conditions.
- 4DA8 (Ghan) departed Tennant Creek on the cross and as it progressed further south drivers noted increasing amounts of water at culverts and accumulating adjacent to the track.
- South of the Stuart Highway overpass the drivers reported the conditions to Transport Control and reduced their speed as a precaution.
- They stopped the train north of the 1577km when they observed water over the track. The train was moved back to a local high point and waited until the track behind was inspected and cleared for traffic and then returned to Tennant Creek.

1577km, 7th January



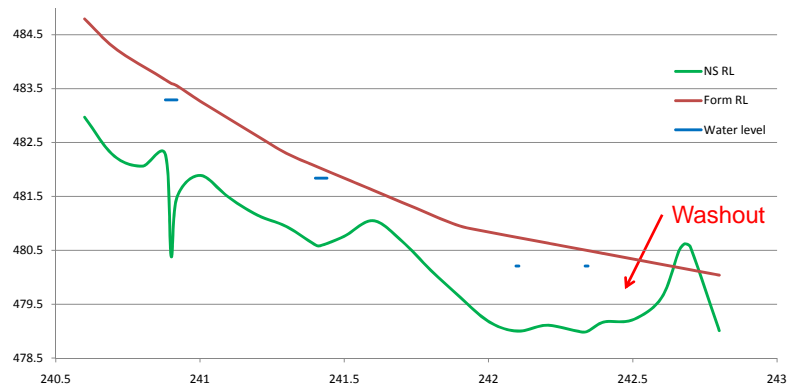
What happened?



What happened?

- The rainfall event is unlikely to have exceeded the design intensity, although we will never know for certain.
- The design assumed the flow from Coulter's Camp Creek (3 x 12m span bridge) would overflow and be shared with a 27 x 1.2m pipe culvert to the north, with a catchment boundary preventing flow going further to the north.
- Total design flow - 141.9 cumec
- Bridge capacity - 87.3 cumec
- Culvert capacity - 54.6 cumec
- Unfortunately there is no effective boundary and flow continued down the slope to a real ridge where the only escape was over the railway.

Where did the water go?



Where did the water go?

- The main creek channel was quite small when compared to the design flood flow.
- A walk upstream showed overflow was occurring 200m upstream from the bridge and was flowing N-E away from the stream.
- Sheet flow 200-300mm deep was evident from the debris.
- The only place for the water to flow was to the low point at 1577km.

The damage



Genesee & Wyoming Australia

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The damage



Genesee & Wyoming Australia

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The restoration

- The ultimate solution has been to construct a 20 cell 1.5m x 1.2m box culvert in the area of the washout.
- Access to the site was impossible except by rail.
- Earthmoving plant was mobilised to site by train and an earth mound was constructed against the end wagon to unload.
- The crew travelled 40km by road and 60km by rail morning and night to access the site.
- The track was dismantled, sleepers and rail cleared.
- The earthworks crew restored 200m of formation shoulder and then restored approximately 100m of missing formation.
- Track was reassembled, ballast run and hand tamped fit for very restricted train operations.

Earthworks



Trackworks



Genesee & Wyoming Australia

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Trackworks



Genesee & Wyoming Australia

22

The first train on 18th January



Genesee & Wyoming Australia

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Other damage

- While the major disruption was at 1577km there was significant other damage over 250km of the corridor.
- Culvert, formation and corridor scouring occurred at over 60 sites.
- Damage ranged from small outlet scours to significant sections of access road washed away and side drains scouring within half a meter of the ballast toe.

Genesee & Wyoming Australia

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Other damage



Other damage



Other damage



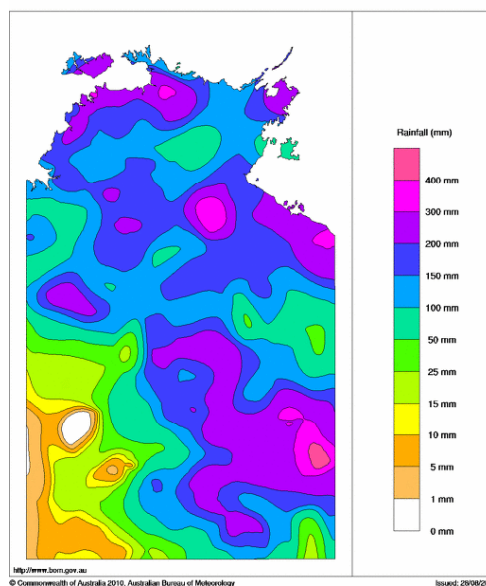
Other damage



28th February, it's gone again!

- A monsoonal trough moved south through the Territory in late February and by now we had introduced some additional processes to monitor this extreme weather event.
- The forecast was predicting very heavy fall between Alice Springs and Tennant Creek on the night of 28th February and train services were suspended.
- The following day an inspection revealed the track again washed out at 1577km, but new damage along the remainder of the corridor was light.
- WRM again analysed the available records and Mt Skinner received a 5 – 10 year 12 hour fall.
- With the saturated nature of the catchment this was enough to flood the railway again.

Northern Territory Rainfall Totals (mm) Week Ending 1st March 2010
Product of the National Climate Centre



28th February, it's gone again!



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Shorter but deeper this time



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Building the ramp



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Well equipped



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Rail removed, sleepers cleared. Lets fill the hole.



Progress



Sleepers and rail



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Someone had to do, it so I obliged



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The new culvert

- KBR reviewed the design and recommended a range of solutions.
- FreightLink chose to adopt the upper end of their range and build a 20 cell 1200 x 1500 RC box culvert in the vicinity of the washouts.

Ballast and tamp



The new culvert



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The new culvert



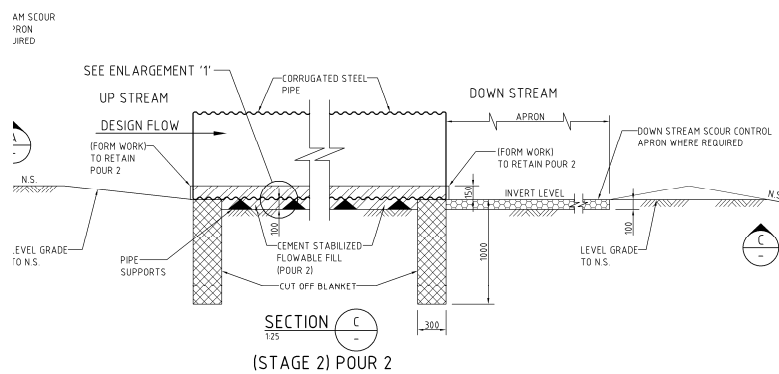
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Culvert aprons

- How were they built?
- Why did they fail?

Culvert aprons



- Extract from Culvert General Arrangement drawing
- No cut-off wall at toe of apron

Drains

- Some side drains constructed close to toe of formation and eroded into the formation.
- These drains have been moved further away and capacity increased to limit future damage.



Weather monitoring

- Informal system of weather monitoring in place and were aware of the potential for damage.
- Following this event, this system was formalised and alert levels introduced based on forecast or actual reported conditions and operational restrictions imposed in response to extreme events.
- In the case of the second washout traffic had been suspended until an inspection was conducted.

