

# NEWSLETTER No 4/2007



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

**April 2007**

## NEXT MEETING

The next RTSA meeting will be held on:

**Thursday 3rd May 2007  
at the IEAust Building,  
Bagot Street, North Adelaide  
commencing at 5.30pm.**

The speaker for the next meeting will be:

**Mr Larry Matters  
of The Australian Transportation Safety Bureau**

who will talk about

### **"The Lismore Level Crossing Accident"**

In this presentation Larry will examine the causes and consequences of a major level crossing collision between a laden truck/quad axle combination and a 4300 tonne freight train that occurred in heavy fog shortly before sunrise on 25 May 2006 at Lismore in rural Victoria.

This collision resulted in the death of the truck driver and wreckage of an almost unimaginable scale. The material costs were in the vicinity of \$13.5 million and the line was closed for nearly six days.

The risk presented at road/rail interfaces, particularly passive crossings when visibility is reduced, was a key point of the investigation and is a key point of this presentation. The ATSB investigation report was released in early February 2007.

Larry has some 34 years experience in the rail industry, comprising twenty years with QR, nearly ten years with National Rail/Pacific National and four years as a Senior Transport Safety Investigator with the ATSB. During this time he has gained considerable knowledge in operational, industrial, managerial and accident investigation facets of the rail industry. Larry's base qualification is a locomotive driver.

Larry has a Diploma of Management with Deakin University and a Diploma of Transport Safety Investigation with the ATSB.

Refreshments will be served before the meeting.

#### Continuous Professional Development (CPD)

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



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## LAST MEETING

### Mr Roger Wyatt from Janus Railway and Civil

spoke about the Glenelg Tramline switch upgrade and the development of new switched to meet unique conditions associated with the tramline operations.

Roger prepared the following paper.

### ADELAIDE LIGHT RAIL PROJECT TRAM SWITCH UPGRADE

Paper for presentation to PWI/RTSA  
12<sup>th</sup> April 2007

Author: Roger Wyatt, Janus Railway & Civil

## 1. Introduction

The development of the design of the special tram switches, designated Type BW, resulted from a very fruitful collaboration between Keith Charlton, Manager Track & Structures and Dave Burton, Track Superintendent of TransAdelaide and Consultants Max Shuard of Max Shuard & Associates, Fred Mau of Booz Allen Hamilton and the author, Roger Wyatt of Janus Railway & Civil.

Subsequent implementation of the design has required significant input from TransAdelaide's signaling engineers and technicians to cope with the particular operating characteristics of the switches, the skills of the Points & Crossings shop of Transfield Services at Islington in translating the design into the solid and the organizational skills and co-operation of TransAdelaide's project managers, line managers and their staff in getting the switches into track.

Within that context, this paper concentrates on the development of the switches themselves with some reference to the operating implications of the design and the process of obtaining Type Approval for the design.

## 2. Background

### 2.1 The Existing "Glenelg Tramline"

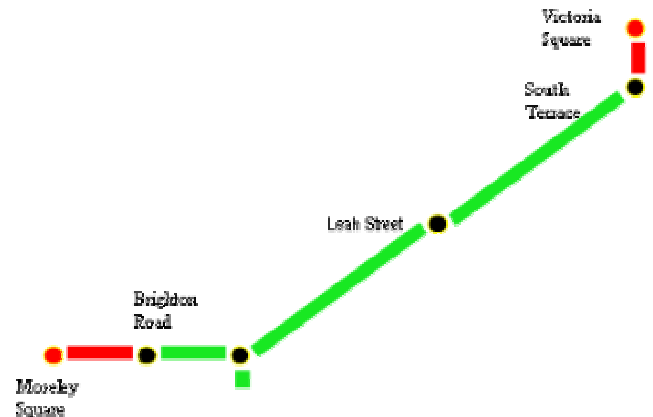


Figure 1 – System Map

The Glenelg Tramline, as it has long been called, runs from Victoria Square in the centre of the city of Adelaide to Moseley Square in the seaside suburb of Glenelg.

The tracks in the vicinity of the two termini are "in street" but the remainder are in a dedicated right-of-way and are of open construction consisting of conventional rails on sleepers in ballast.

The system is double track throughout and apart from turnouts at the two termini, crossovers are provided at South Terrace, Leah Street, Glengowrie and Brighton Road.

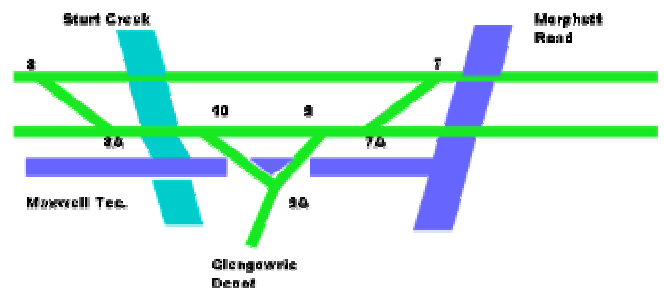


Figure 2 – Layout at Glengowrie

The trams are stabled and serviced in a depot at Glengowrie, resulting in an additional crossover and turnouts forming a wye junction into the depot.

The Glenelg line is the last remnant of what was once a substantial suburban street tram network, which was pulled up, mostly during the 1950s, and replaced with buses. It had come about in 1929 when the then Glenelg Railway was converted to an electric tramway. With its predominantly dedicated right-of-way and its newly-acquired H Class trams, it had taken on the character of an American style rapid inter-urban line.

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Over several decades, the combination of lightly trafficked streets and indifferent bus services has resulted in Adelaide becoming highly car-dependent. In spite of this, the Glenelg line survived the purge and the heritage H Class cars have sustained the service until the recent acquisition of modern European style Flexity trams from Bombardier.

## 2.2 The Existing Trackwork

### 2.2.1 Flange-Bearing Running with In-Filled V-Crossings

The wheels and tracks of the system were influenced by the predominantly “in-street” background. The running was flange-bearing throughout the “in-street” areas and this was carried through to the non-street turnouts with the provision of flange-bearing V-crossings as seen in Figure 4. These crossings and the associated switch assemblies were built to railway standards. Flangeways between vee and wingrails were 45mm, but to be effective, the checkrails opposite the vees had a much smaller flangeway, measuring in the vicinity of 23mm. This tight setting, whilst effective in keeping the wheels clear of the crossing nose, resulted in some heavy wear in the checkrails themselves.



**Figure 3 – Infilled V-Crossing**



**Figure 4 - Wear on Checkrail**

### 2.2.2 Undercut Switches

The switches were undercut as shown in Figure 5. This configuration results in a relatively fragile point as evidenced in Figure 6 and the blades were also developing unhealthy wear patterns as shown in Figure 7. External checks were installed to protect these blades and these show clearly in Figures 6 and 7.



**Figure 5 – Form of Existing Switchblade**

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Figure 6 – Broken Point of Blade and External Checkrail



Figure 7 – Wear in Blade

### 2.3 The Advent of the New Trams

Maintaining the fleet of ageing H Class trams was becoming more difficult and expensive and, in spite of their obvious appeal to sentimentalists it was only a matter of time before they would be replaced by newer cars or, less satisfactorily, by a road-based service. In the event, it was the former and, in May 2003, the South Australian Government announced a major upgrade of the Glenelg tram with funding to acquire a fleet of modern European-style tram sets and to upgrade the permanent way to an appropriate standard.

The new tram sets chosen were the Bombardier “Flexity” sets. These have been the subject of other

papers but, for the purposes of this discussion, features which had a bearing on consequent track upgrade decisions were:

- A new wheel profile, different from that of the H Class cars, was chosen.
- Wheel diameter was 600mm compared with 851mm for the H Class.
- Accessibility requirements were met by a low floor height over most of the length of the set and this was achieved by using independently rotating wheels on some of the wheelsets.
- A set consisted of three articulated units sharing four bogies. The central unit was carried on two of these.
- The bogies were fitted with electro-magnetic brakes, which provided minimal clearance above rail height.

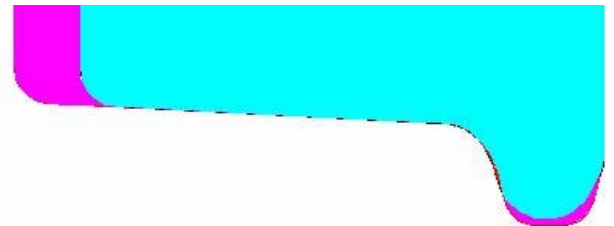


Figure 8 – Comparison of Wheel Profiles – H Class and Flexity

### 2.4 Plain Track Upgrading

The open plain track regions were upgraded with concrete sleepers and partial re-railing with new 50kgAS rail. This was achieved during a 9-week period of shut-down and has been the subject of another paper presented to PWI and RTSA.

### 2.5 Switch and Crossing Concerns

Although the intention was to progressively change wheel sets on the old trams to match the new tram wheel profile, it was clear that, in the shorter term at least, some modifications would be needed at the points and crossings to deal with the different wheel profiles.

The provision of independently rotating wheels on the inner bogies of the new tram sets was another source of concern in that experience of their use in other systems had shown they had an increased likelihood of derailment and were subject to increased rates of wear. This experience supported the expectations, based on theory, that the independently rotating wheels could not contribute to their own steering and would place increased reliance on flange contact and the tracking of the full tram set.

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These two factors led to early preferences to abolish flange-bearing running, in order to counter the effects of different flange depths, and to introduce checkrails in the turnouts to reduce wear and derailment potential.

The desire to provide checkrails through the switch regions of the turnouts gave rise to another set of problems which needed addressing. The differing wheel tread widths precluded use of external checks and the magnetic brakes on the new trams prevented use of any internal checks projecting above running rail level.

The proximity of mainline turnouts to the bridge over the Sturt Creek was another factor which weighed heavily in the thoughts of TransAdelaide's Track and Structures Manager. Every reasonable precaution needed to be taken to avoid derailing a new tram, particularly in the immediate vicinity of the Sturt Creek.

The style of the existing switchblades was particularly vulnerable to heavily worn wheel sets such as illustrated in Figure 9, which was derived from a study of TransAdelaide's Tram Car Wheel Inspection Manual.



**Figure 9 – Worn Profile of H Class Wheel**

All of these concerns were further heightened by a series of low-speed derailments of non-service trams, all in the vicinity of the Glengowrie Depot and the Sturt Creek.

### **3. Development of New Turnouts**

Whereas initially there had been a possibility that the existing turnouts, with some modification, could be retained, the concerns which had arisen made it imperative that a better design of switch assembly be found and the additional security afforded by checkrails might feature in a new design. TransAdelaide initiated investigations into the experiences of other users of modern trams on conventional non-street tracks and into better forms of switchblade housing.

### **3.1 Review of Practice on Other Systems**

Fred Mau of Booz Allen Hamilton was commissioned to provide an overview of checkrail and guardrail practices, particularly as they related to the switch area of turnouts. In his report he drew on his involvement in the investigation of related problems encountered on the Boston MBTA system and the experience of Booz Allen Hamilton in some other systems.



**Figure 10 - Blade Protection Measures Adopted in Boston**



**Figures 11 – Blade Protection Measures Adopted in Washington**

Some of the measures observed included:

- External blade protectors (as existing on TransAdelaide)
- "Training" checkrails at the approaches to facing points (include in the measures shown in Figures 10 and 11)
- Attachments to the backs of switchblades to extend their ability to check over a greater length than the limited length in the "intersection"

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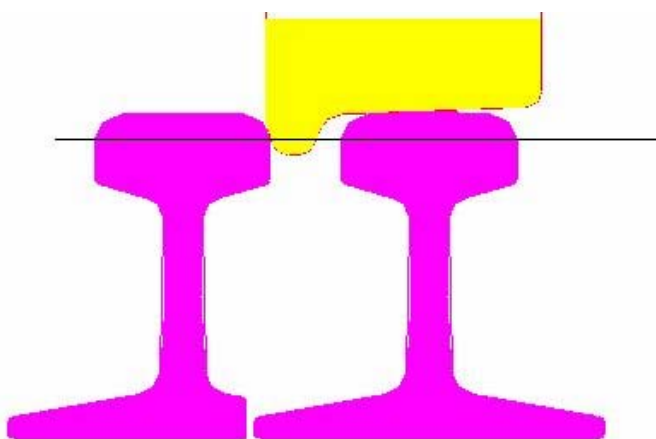
of heads" vicinity (an example can be seen in Figure 10).

- Internal blade protectors cantilevered over the opposite open blade (as adopted on the Boston MBTA system and shown in Figures 10 and 11)
- In-street switch assemblies with heavily housed blades checking over their full lengths.

It was reported that some systems seemed to be operating quite satisfactorily without any form of checking whereas others, notably in Boston and Washington had adopted elaborate measures. Fred Mau also suggested some form of positive housing of the blade to hide it from facing movements but this was not viewed favourably because of its adverse effect on trailing movements and the fact that the majority of movements over the population of turnouts was trailing.

### 3.2 Evolution of the BW Switches

A firm decision had been taken to abolish flange-bearing operation. This did not directly affect the switches of the turnouts but it did result in the adoption of a 26mm flangeway at the crossings and their associated checkrails. Tied in with this decision was the one to adopt the gauge reference line on the rail profile as 12mm below top of rail. Both of these numbers dictated the key geometry of the new switches.



**Figure 12 – 26mm Flangeway and 12mm Gauge Line**

Prior to the track upgrade, there was a mixture of rail profiles in use on the line. Most of the turnouts were of 41kgAS rail and it had been decided that any new turnout components would use that profile.

The desirability of some form of internal checking of the switch region, particularly in the point-of-blade region but preferably over the full length of the blade, remained but the obstacles seemed insurmountable. Figure 13 shows in simplified two-dimensional terms the nature of the problem.



**Figure 13 – Diagram of Normal Switch (top) and the Geometric Problem to be Overcome in Achieving Internal Checking**

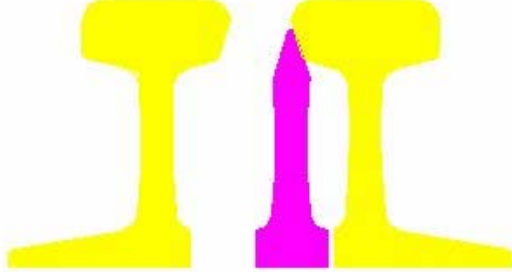
With time beginning to press and a checkrail solution not forthcoming, Janus Railway & Civil were commissioned to investigate the potential for improving the housing of the switchblades to make them less likely to cause a derailment and less vulnerable to damage. A design was developed, based closely on the 60kgAS tangential switches developed by Australian National for Adelaide Yard. The key feature was the bevel undercut of the stockrail, which was a necessity to overcome the 1 in 20 side slope on the 60kgAS rail profile but, in addition to satisfactorily housing the blade, it resulted in a much more robust blade.



**Figure 14 – 60kgAS Bevel Undercut Switch at Wye Cabin**

Discussions on internal checkrails were continuing with Dave Burton suggesting that it would be possible to fit a blade between a stockrail and checkrail with 26mm flangeway and with the author agreeing but holding the view that it could not function satisfactorily as a continuous checkrail and still be satisfactorily supported by its adjacent stockrail or checkrail. All was resolved during a brief session at the author's CAD workstation. A diagram similar to Figure 15 showed to Dave's satisfaction what the point of blade would look like and, in the process; the author saw a way of providing the required support for it.

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**Figure 15 – Section at Point of Blade**

A series of closely spaced cross-sections was generated to illustrate the extent of support available to the blade and, after a little thought, a way of machining the required shapes was developed.

On that basis, it was agreed to go ahead with working up the design to the point where a prototype assembly could be manufactured. At one of the review meetings involving Keith Charlton, Dave Burton, Max Shuard and the author, a suggestion was made that the switch should be designated Type BW in recognition of the contributions of Messrs. Burton and Wyatt to its initial concept and subsequent development.

#### **4. Features of the BW Switches**

##### **4.1 The Point of the Blade**

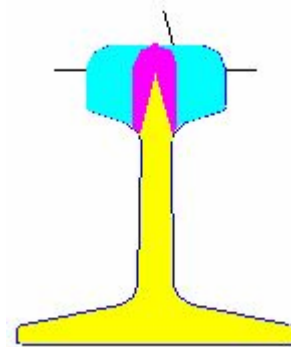
The AN design for the 60kgAS switches, similarly to most switch assemblies, has a nominal blade thickness, at the point, of 9.5mm or 10mm. There is wide gauge commencing from the bend point or tangent point on the diverging stockrail and reaching a maximum immediately before the point of blade. The combination of top planing and 15° lead-in on the running face of the point of the blade eliminates any blunt end on the blade and runs the wide gauge out over the length of the 15° lead-in. Because of the lead-in, at gauge height the point of blade has effectively zero width. The 15° slope of the side faces enables the zero width to occur without unduly weakening the section.

In order for the BW switch to work, the point of the blade has to have zero effective width. Also it makes sense for it to be symmetrical so that both stockrail and checkrail can have the same form. Unlike the conventional switches of similar form, the zero width in the BW type is genuine and the key feature of the geometry is that a horizontal section taken through the planed portion of the blade at gauge height consists of two straight lines converging at the point of blade.

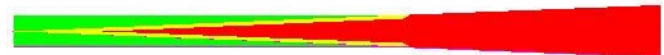


**Figure 16 – Simplified Plan of BW2 Assembly**

The BW switches have a length of 4571mm and use a standard 146mm heel spread. With allowance for a constant flangeway of 26mm, the working surfaces of the blade, measured at gauge height therefore make an angle of  $(146-26)/4571$  radians ( $1.5042^\circ$ ) for a switch angle of  $1.83^\circ$ .



Section at Point of Blade



Plan at Point of Blade

**Figure 17 – Point of Blade Machining**

In the section at the point of the blade in Figure 17, the 15° sloping faces of the blade intersect at gauge height. In the plan view, the green represents the 15° faces below gauge line and the yellow above. The red is the untouched top surface of the rail (ignoring any finishing radius). At 172mm from point-of-blade the sloping faces intersect at top-of-rail. This has the same effect as the provision of a short length of top planing amounting to 12mm running out over a length of 172mm. From a consideration of wheel load transfer from stockrail to switchblade, consideration was given to applying top planing to extend the run-out over a greater length and achieve a more substantial blade cross-section where the load transfers. On the other hand, the more rapid gain in height of blade provided by the natural intersection of the planes was expected to provide a more favourable wheel-rail contact angle for reducing flange climb potential at initial contact. It was decided to not apply any top planing as such and to observe blade wear patterns in service.

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In broad terms, machining the blades involves application of a set at 800mm from point-of-blade, machining one side of the rail head, applying the same amount of set in the reverse direction and machining the other side of the head. After all machining, including 15° working faces and forming a radius at the corners, the set is removed, resulting in a symmetrically machined blade. A final set is then applied at the intersection of heads to produce either a right-hand or left-hand blade.

## 4.2 The Stockrails and Checkrails

The stockrail and checkrail have machining details similar to each other.

In a normal stockrail, the bevel undercut is of constant section for the full length of the planing length of the blade and the blade is supported against the bevel undercut surface over this length. By running out the bevel undercut in the stockrail and checkrail over a relatively short distance it becomes possible for these rails to retain the normal plan geometry of their running and checking faces while the support provided by the machined surface follows an angle favourable to supporting the blade. In practical terms this means that the blade can be supported for the first 800mm.

Because the blade has zero effective width at the point, the bend point of the diverging stockrail or checkrail is at the point of blade. There is no region of wide gauge in the approach to the point of blade.

## 4.3 The Switch Assembly

The assembly is carried on 8 bearers. The stockrails are fixed to conventional fully welded switch chairs on each of these and there are bolt-on chair brackets at the second and third bearers to support the checkrails in the region where the blades close on them. Ahead of the point-of-blades, the checkrails are fixed to the stockrails with conventional cast checkrail blocks. Switch stops are provided at 5 bearer locations, excluding the first two and the one under the heel. This is more than normally supplied and compensates for the reduced length of support provided by the stockrails.

In the confined space available between stockrail and checkrail, it is impossible to use a standard switch lug to connect to the stretcher bars but this problem had been faced before by the SAR in dual gauge switch assemblies. The proven design was adopted, the only modification necessary being the substitution of a rolled steel angle section for one component because the originally used section is no longer available.

In this form the assembly is designated Type BW1 and provides continuous checking from 1.5m ahead of the point-of-blade to 2.4m into the switch assembly. Beyond

the planed length of the blades there is no checking. Subsequently an option increasing the 1.5m approach length to almost 2.4m was provided.

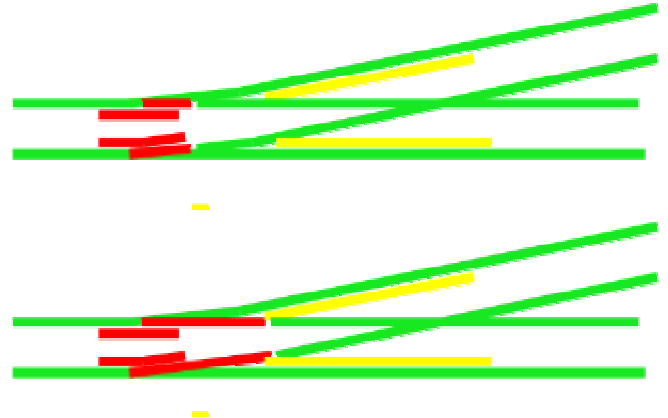


Figure 18 – Diagram of BW1 (upper) and BW2 (lower)

## 4.4 Type BW2 variant

In fact, no assemblies of Type BW1 have been built. Having solved the problem in the point-of-blade region, it was a simple matter to attach plates to the checking side of the blades to provide checking as far as the heel block. A heel block with a formed 26mm flangeway was also produced, enabling the checking to extend beyond the heel. This version was designated BW2 and has been adopted generally in the switch upgrade project. Figure 18 attempts diagrammatically to illustrate the difference between the BW1 and BW2. The internal checkrails and the portions of the blades capable of checking are shown in red. The yellow shows checkrails of the bar type described below.

## 4.5 Bar-Type Checkrails

With the advent of the BW2 switches it became possible to continuously check the stockrails of a turnout.

Incidental to the development of the switches, a design was developed for a checkrail which could easily be retrofitted to any piece of tram track, including where rails were fastened with Pandrol clips. Steel plates had been successfully used in the Melbourne tram system but to retrofit them to rails with resilient fastenings was a laborious process involving the cutting of notches at each fastening location. Rolled steel billets of 50mm square section were available in an appropriate harder-wearing grade of steel and these easily clear the fastenings. A two-piece cast steel bracket was developed enabling the billets to be clamped in the required position. No drilling of the checkrails was required and brackets could be applied at any location where the web of the running rail could be drilled. These

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checkrails can be seen in Figure 19, which also shows an adjoining plate checkrail notched to clear fastenings.



**Figure 19 – Bar-Type Checkrails**

Checkrails of this type are being installed with the new BW2 switches extending from the heel to a point square with the wing rails of the V-crossings.

#### **4.6 Type BW3 Variant**

One further situation led to the development of a BW3 variant of the switch design.

As added protection against a derailed tram approaching the Sturt Creek, re-railers are proposed to be installed each side of the creek on the down track and on the down side of the creek on the up track. These were to be positioned at the terminations of checkrails over the bridge. Turnout number 10, at the down end of the wye junction with the Glengowrie depot is too close to the bridge for re-railers to be positioned between the turnout and the bridge and therefore it became necessary to place them beyond the turnout. Type BW2 switches would allow continuous checkrails to run with the stockrails but from the end of the internal checkrail of the right hand switch assembly there could be no checking through the heel, closure rail and V-crossing.

Therefore, Type BW3 with the internal checkrail extending to the heel was developed to overcome this problem. In conjunction with additional bar-type checkrails it provided continuous checking through the entire length of the turnout. Turnout number 10 is shown in Figure 20.



**Figure 20 – Type BW3 at Turnout Number 10**

#### **5. Switch Operation Issues**

As soon as the design drawings reached an intelligible stage, they were discussed with TransAdelaide's signaling engineers and technicians.

The immediate concern raised was whether or not existing switch machines could successfully operate with a throw of only 26mm.

For switch actuation, there proved to be ample scope for lost motion in the conventional ex-SAR/AN design of front stretcher bar bracket. However, for detection and locking, the McKenzie and Holland M70 Mk2 switch machines to be used could not be adjusted to detect or lock with throws of less than about 75mm.

Experiments were made with some modified detector rods and locking bars and it was demonstrated that the greatly reduced throw could be accommodated.

Whilst the operating equipment could be suitably modified, the need for each of the two blades to close accurately in two positions, against both checkrail and stockrail, had, and still has, the potential to cause difficulty. Accepting that normal manufacturing tolerances could be used up in the switch manufacture it

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has been found necessary to ensure that switch assemblies are available in closely matched pairs with the same checkrail and blade clearances. Even so, care is required during installation to ensure that both blades rest firmly on their respective baseplates because if one stands clear of the baseplate its throw is reduced.

## **6. Proving the Design**

### **6.1 Trial Blade and Prototype Switch Assembly**

During development of the design, TransAdelaide had arranged for the Transfield Services Points and Crossings Shop at Islington to machine a blade with the aim of proving that the required shape could be produced in practice and facilitating assessment of the likely durability of the blade.

This was followed immediately by manufacture of prototype assemblies for a pair of BW2 switches. The dialogue maintained between designer and manufacturer during this phase played a vital part in the development of the design.

### **6.2 Initial Testing**

After shop assembly, the prototype assemblies were dismantled, transported to a suitable area in Adelaide Yard and re-assembled in readiness for some test runs with a bogie from one of the H Class trams. The test procedure was relatively crude and involved the bogie being towed through the switch by a road vehicle. A load cell was included in the rig to obtain an estimate of the maximum force obtained in the towrope. Different amounts of lateral component of the towing force were achieved by marking out a series of different trajectories for the tow vehicle.

The results were very imprecise but in spite of obviously high L/V ratios pertaining there was no indication that the bogie might derail. Passage through the switches appeared to be smooth and secure and sufficient reassurance was gained from the test to support a decision to proceed with some test runs over the switches in track at the rear of the Glengowrie depot.

### **6.3 Tests in Track**

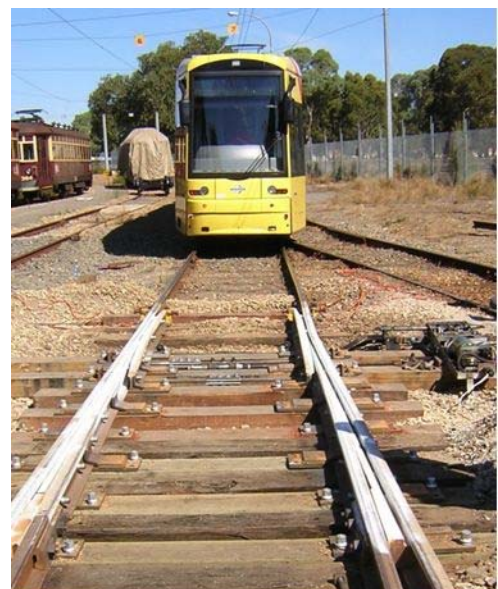
A suitable turnout was selected at the rear of the Glengowrie depot and the prototype switches were installed, complete with switch machine.



**Figure 21 – Prototype BW2**



**Figure 22 – Prototype from Heel End**



**Figure 23 – Prototype Temporarily in Track at Glengowrie**

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**Figure 24 – Prototype after Some Test Runs**



**Figure 25 – Turnout 9A after One Year of Operation**

## 6.4 Type Approval Process

Because of the novelty of the design and before it could be accepted for installation in the main line, it needed to be formally assessed and approved by the Rail Regulator. To support an application to the Regulator, TransAdelaide commissioned a third party validation of the design by Fred Mau of Booz Allen Hamilton and conducted a comprehensive risk assessment.

The detailed risk assessment covered the design, manufacture, installation and ongoing operation and maintenance of the switches and had input from all involved parties. Part of this process included the development of an Inspection and Test Plan and a Maintenance Plan.

A Construction, Operation and Commissioning Plan for the installation of the prototype switches at Switch Number 9A connecting the wye junction tracks into the depot, was approved and installation took place over the weekend of April 17-19, 2006.

Subsequent Construction, Operation and Commissioning Plans were submitted and approved progressively. Switches 8 and 8A, forming the crossover west of Glengowrie were installed in September, 2006 and Switch 10 was installed in November.

## 7. Performance

The turnouts have been in use for just under a year in the case of turnout 9A, just over 6 months for 8 and 8A and about 4 months for number 10. This has been without them being involved in any derailments. Therefore, indications are that the primary objective of improved safety of operation has been achieved by the new design.

Further monitoring and assessment is required to be assured that this derailment-free record can be sustained. Wear patterns need to be observed under a variety of conditions. In their new condition, the switch assemblies have symmetrical geometry and the flanges of the Flexity trams are also quite symmetrical in the unworn condition. Over time, the wear patterns will reduce the symmetry of both wheels and switch assemblies to varying degrees, depending on the wheel maintenance regime and the different operating patterns to which the turnouts are subjected.

These wear patterns and their effect on reliability will impact on the longer term maintenance requirements of the switches. The switchblades are much less accessible than conventional ones and removal and replacement of blades will therefore be much more difficult. The related problem of limited space between the blades, stockrails and checkrails means that some of the fastening bolts are special items and some spares of these may need to be kept in store. It is likely that some complete switch assemblies will be kept as spares.

During installation, set-up of the switch machine and actuation, detection and locking equipment has been more time-consuming for each switch assembly than for conventional switches and this is likely to be the case in future installations. However, in service, there seems to

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be no indication that significantly more effort is required to maintain reliable operation.

## **8. Code of Practice**

The tram system comes under Volume Three (CP3) of TransAdelaide's Code of Practice and a draft has been prepared for Part 13: Points and Crossings extending it to cover the full range of switch assemblies, including the BW types.

## **9. Conclusion**

This paper covers the switches from evolution of the initial concept through to installation of four pairs of switch assemblies to the new design. The primary goal was to improve safety by preventing derailments and the indications so far are that this goal has been achieved.

Over the past few years there have been several major projects with overlapping demands for very limited resources for the design, manufacture and installation of new switch and crossing work. This has led to longer than usual lead times and therefore, the switch upgrade project has proceeded at a slower pace than was originally hoped. Nine more turnouts on the existing mainline are planned to be upgraded with Type BW switches and the design will also be used to provide an additional track near South Terrace in conjunction with the currently proceeding extension of the line to North Terrace. At this early stage of implementation of the switch upgrade project, it is difficult to determine if the design will be economically successful but to date there are no alarm bells ringing.

Traditionally, railways, including tramways, have shown reluctance to depart from proven designs for perway componentry. This attitude could be expected to be reinforced under the current regime of safety regulation, which requires a process of type approval before introducing any new components or equipment. In this environment, railway administrations could be forgiven for greater reluctance to entertain much innovation in their perway. Therefore, TransAdelaide should be commended for its willingness to pursue and embrace a design such as the BW switches. It should be noted too that the Regulator's cooperation in dealing with the type approval submissions made that part of the process less onerous than it could have been.

Some acknowledgements of the parts played by others involved in the project have been made earlier in the paper. The author is grateful for their cooperation and contributions to the design aspects of the project and to TransAdelaide for their continued confidence in their staff and consultants.

## **Chairman's Chatter – Duncan McLeod**

Imagine what life would be like for South Australians if we had to hold a NSW licence to drive across the Hay Plains. Or register our vehicles in Victoria for a trip to Horsham. Or fit special equipment onto the vehicle before traveling beyond Marla.

Effectively, this is what happens in the rail industry. Despite years of rhetoric and claims of progress, many of the disadvantages and inefficiencies of state based regulation remain.

Take the most trivial of examples. Getting everybody to agree on the same coloured high visibility clothing was heralded as a major breakthrough about 12 years ago. But even now, in 2007, it is specified that the pattern of reflective stripes to be worn in Victoria differs from that required in New South Wales. In Victoria, the stripes are supposed to be horizontal and vertical, in NSW they are to have an X pattern on the back.

A track safety awareness certificate in Victoria is issued for one year and requires a colour-blindness test; the same (but of course separate) certification for NSW is valid for five years and does not require a colour-blindness test.

Situations such as these are not confined to minor issues; they permeate the industry. For example, rolling stock must be accredited in each jurisdiction, and may end up being authorised to run at different speeds in different States.

Perhaps all this is finally going to change. The Council of Australian Governments (COAG) agreed last December, with much fanfare, that State and Territory Governments will adopt uniform national rail safety regulations. But here's the rub. Success is dependent on the States and Territories each passing the necessary legislation and introducing uniform regulations. Already we have seen one State do its own thing, by promulgating regulations that are not fully consistent with the national model.

Unfortunately its very easy to get confused when a statement of intent, all dressed up with hype and spin, sounds so much like an announcement of change that we are led to believe that some improvement has actually been implemented. This is not yet the case, so we continue to wait with bated breath. And uniform regulation will do little to ease the burden of having to deal separately with multiple regulators – six in the case the interstate network.

Although most rail passenger operators run trains only within their home State, the majority of freight operators on non-specialised networks, cross State borders. To have just one interstate registration, like our cousins in

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the road transport industry, would be a great step forward in eliminating bureaucracy and effort, effort that could be directed into more productive activities.

We have uniform traffic rules (albeit with some minor and at times puzzling local variations). Maritime safety is managed nationally, as is the aviation industry. Why must rail remain so inefficiently different?

## The Observation Post – Max Michell

There are long-term proposals in Victoria to create a new port at Westernport (the bay in which Philip Island dwells for you bikers out there) near Hastings. This place already has a dedicated port associated with the steel coil plant once owned by BHP and now part of the Bluescope empire. Freight trains to the steel plant run via the suburban electrified Frankston line and over the steeply graded non electrified line beyond there. There are usually no more than two freight trains each way per day.

Part of the conceptual port development could involve container facilities. Rail access to the port is a prime issue. There is a proposal to build a new line from near Dandenong (30 km east of Melbourne on the main Eastern line) through a sandy hobby farm and market garden area to the port, which might include standard gauge. Although such a link is a long way off, the inevitable 'nimby' stuff has surfaced with some fairly strong words – such as in the following item from the suburban 'Oakleigh Monash/Springvale Dandenong Leader' newspapers -

### Fear over freight trains

Melinda Marshall  
7 March 2007

*A lobby group fears **scores** of extra freight trains could **hurtle** through Greater Dandenong each day under port development plans.*

*The group also says the **trains could carry nuclear material** under speculation Western Port could be the future site of a nuclear power plant.*

*Western Port Action Group opposes development of the Port of Hastings, which will increase freight traffic on southeast roads and rail lines.*

*"We're talking **40 freight trains every day**, possibly **double stacked and 1.2km long**," said spokeswoman and Hampton Park resident Lynette Keleher.*

*"Just imagine the **air pollution, noise pollution, houses near the tracks might crack. Traffic would be held up.**"*

*"Do you know how long it can take for a freight train to pass?"*

*The group also believes a proposed inland port at Lyndhurst station could bring a **further 80 freight trains a day** through Dandenong from the Port of Melbourne.*

*Port of Hastings Corporation chief executive Ralph Kenyon said the developed port was expected to generate a maximum of 16 extra freight train movements a day.*

*The Dandenong line takes 11 freight trains each week day.*

*Mr Kenyon said the extra trains were likely to be split between the Dandenong line and the Frankston line. Many of the trains may terminate at the Lyndhurst inland port rather than continuing through Dandenong.*

*He said the trains could be between 600m and 1.2km long, but double-decker trains were unlikely because the metropolitan network could not support them. The developers of the proposed Lyndhurst inland port, Salta Westgate Group, could not be reached for comment.*

*Speculation over Western Port's nuclear future began with a January report by research centre, the Australia Institute that named the region as potentially ideal for a nuclear power plant.*

*Mr Kenyon said the corporation opposed the siting of a nuclear plant there. "It's a no to a nuclear power plant as part of our port development and it's a no to the port handling nuclear products."*

I have highlighted some of the more dramatic claims attributed to Western Port Action Group (WPAG) in regard to the possible new rail line. Just look at the language – scores / hurtle / nuclear / 40 every day / double stack / 1.2 km long / air pollution / noise pollution / houses crack / (road) traffic held up. This is all very inflammatory language, but how much substance is there in reality.

The Port of Hastings CEO, Ralph Kenyon, is reported with facts that partly rebut the worse excesses of the 'nimby' claims with some reasoned comments – a maximum of 16 trains per day between 600 and 1200 metres long split between the Frankston and Dandenong line, no double stack, no nuclear – and so on. Despite this the whole import of the news item is one of fear and loathing, and it is this impression that will carry into the readership of the item. Repeat the claims often enough and it will become 'common knowledge' in Melbourne's eastern suburbs that rape and pillage is about to descend upon them.

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

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Not all that long ago there would have been a scramble to have a railway line built to any and every town and settlement. The railway meant efficient and fast transport and was seen to be an economic lifeline for most. There were even places where railways were authorised to enable the land to be opened up for the first time – the egg and chicken at work. Have a look at the 1880's Victorian 'Octopus Act' for a classic example.

There was nary a squeak around 40 years ago when the spur line to the cold rolling plant was built and in fact the development (in total) was seen to be a major employment generator and insurance for the survival of the Stony Point rail line. More recently when the near moribund line from Dandenong to Korumburra and beyond was electrified to Cranbourne and given a full time passenger service the only complaints were to do with competing claims for an intermediate station. Why then should there be such negative reaction in relation to a new rail line now?

For a start it is a freight proposal and as far as most people are concerned they have no idea what that means. The rail industry has so successfully removed itself from public consciousness that most have no concept of what is involved in a freight railway. When you look at the possible situation of 16 trains a day at an average 900 metres long, the alternative would be more than 1000 semi trailer movements per day. Is the lobby group seriously arguing for 1000 articulated truck movements a day more than now? I doubt it. What they are arguing for is in reality the simple 'not in my back yard' – we don't care what or where you put it, we don't want it here. An argument that is remarkably similar to the North Coast (NSW) dwellers who are sick of B-doubles and semis clogging up their highway and want them redirected to the New England Highway – nimby!

The nuclear comment by WPAG is symptomatic of a second problem – extension of the basic 'port' argument into an emotive and quite dishonest issue to do with nuclear on rail in the region. The absurdity of this argument is obvious – unless a nuclear facility, which has nothing to do with the new port or new rail line, is built in the area there will be no need for any nuclear transport of any sort. If however a facility is built then nuclear fuel will have to be brought to the area if not by rail then by road. How would you prefer your nuclear fuel to be moved, based on the statistical risk of these two modes? I thought so – a hurtling road train overturned and leaking nuclear in the middle of a Westfield shopping centre would be most undesirable (I am adopting the 'new' approach to lobbying here). The issue in the nuclear case of course has nothing to do with transport and everything to do with energy and research, so why not attack the problem, if there is a problem, at that level? By attacking the potential railway

on the grounds of 'nuclear', double stacking (un-achievable, but wouldn't that reduce the number of trains?), and traffic hold ups (but wouldn't there be 1000 less trucks than otherwise?) the WPAG is reducing the debate to low level primary school standard – an emotional level at which we should not be contemplating planning our futures.

Irrational posturing by any number of self interest groups, ranging from the NTC and its acolytes to small scale local groups often led by one or two manipulative individuals, is becoming endemic. The concept of 'no' is becoming the new norm and replaces the concepts of yes, vision, progress, win-win and the like. With the acceptance of the 10 second media grab has come the first grab (however rational or honest) is the best grab – make the news with the most outrageous claim and let good logic and commonsense try to overturn the initial impression. The depressing part of all this is that the media takes no interest in the value of these outbursts as long as they give good pictures or provide headlines for the next news. Where has good reporting and journalism gone you might well ask - and to which you will get almost total silence.

The rail industry, in progressively separating itself from government and Ministerial interference (apart from one premier state), has also departed from the minds and awareness of the public at large. Somehow we need to get the concept of 'rail good' back into the collective thinking of the public, such that it informs their views when things get difficult. The good denizens of the North Coast might then argue that excessive numbers of B-doubles and semis should be reduced by aggressive investment in rail, rather than playing 'pass the parcel' between highways. Then and only then might we get to a point where land transport investment, pricing and planning in this country starts to become the 'best for the nation' program that AusLink in its current guise pretends to be.

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## Adelaide Comment – Stephen Townsend

As most people in Adelaide are aware, work on the extension of the Glenelg Tramline to North Terrace is now under way.



**Photo – View of Trackwork on North Terrace**

Much of the criticism of the extension has dissipated though there are a few still surfacing from time to time mainly based on cost or whether the extension is really required.

If there was a public transportation project that was well overdue, it is this one. That the majority of passengers on the Glenelg Tramline have had to walk the last 500 metres to their destination in the CBD in all types of weather for almost the past 50 years is a major bungle in public transportation planning that should never have happened. If there are any skeptics out there who still think that the extension is unwarranted, imagine the response and outcry that would occur if all bus users had to disembark a similar distance from the CBD and complete the last 500 metres on foot.

The cost of the project at approximately \$31 million appears high but when compared with other major SA transportation capital projects such as the Northern Expressway (\$550M), Bakewell Bridge (\$43.5M) and Port River Expressway (\$175M), it is really quite affordable. The tramline extension is sure to be a valuable transport asset that it is available for the use of all South Australians every day of the year.

One can hope that one day, similar vision and determination such as that employed for the tram will result in the train system being extended under the CBD so that the much larger numbers of train users can also get to their destination without having to change transport modes for the final 0.5 to 1.5 kms of their journey.

## MEETINGS FOR 2007

<b>Future Speakers/Dates/Topics</b>				
<u>Date</u>	<u>Speaker</u>	<u>Organisation</u>	<u>Topic</u>	<u>Venue</u>
3/5/2007	Larry Matters	ASTB	Lismore Victoria Level Crossing Accident	IEAust. Bagot Street North Adelaide
7/6/2007	Tim Ryan	ARTC	ARTC East Coast Upgrade	Adelaide Riviera, North Terrace Adelaide
5/7/2007	Alan Burns	Bombardier	The Future of Rail Transport in Adelaide	IEAust. Bagot Street North Adelaide
2/8/2007	Bert Easthope	Genesee & Wyoming Aust.	GWA Operations in SA	IEAust. Bagot Street North Adelaide
6/9/2007	TBA		TBA –Joint with IRSE	
4/10/2007	TBA		Adelaide Tramline Extensions	
1/11/2007	TBA		TBA	
27/11/2007		RTSA	AGM	
4-6/12/2007		ARA	AUSRAIL PLUS	Sydney

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## **KEY RTSA CHAPTER COMMITTEE CONTACTS**

Chairman	Duncan McLeod	08 8338 7919
Treasurer	Michael Forbes	08 8292 4114
Secretary	Daniel Martucci	08 8204 8213
N/L Despatch	Steve Torok	08 8264 2552
N/L Editor	Stephen Townsend	0400 135 481

Articles or editorial comment for Newsletter are very welcome. We have over 100 members locally some of whom will have stories, events or developments of interest that could be reported in Newsletter.

Part of the function of RTSA is to keep members in touch with what is going on in the industry and with each other and to that end we are only too happy to publish items of interest.

Send copy to the Editor, Stephen Townsend at [st771048@bigpond.net.au](mailto:st771048@bigpond.net.au) or fax to 08 8297 0992.

Electronic despatch of Newsletter is undertaken by Steve Torok – contact Steve on [steve@tge.com.au](mailto:steve@tge.com.au) if you have any problems receiving Newsletter electronically or in hard copy. Note that electronic subscribers will get their Newsletters and flyers as soon as the editorial work is done, while the hard copy mail will of course be some days slower.

For all other matters relating to RTSA SA Chapter contact Duncan McLeod (Chairman) at e-mail [dmcleod@aapt.net.au](mailto:dmcleod@aapt.net.au), or by phone on 08 8338 7919.

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