

SOMERSAULT

MARCH 2015

VOL 38, No 2

SIGNALLING RECORD SOCIETY OF VICTORIA INC



SOCIETY CONTACT INFORMATION

Published by the Signalling Record Society Victoria Inc (A0024029F)

EDITOR: Andrew Waugh, 28 Amelia St McKinnon, VIC, 3204

Phone (03) 9578 2867 (AH), (03) 9348 5724 (BH), email andrew.waugh@gmail.com

PRESIDENT: David Langley, P.O. Box 8, Avenel, VIC, 3664, Phone (03) 5796 2337

SECRETARY and MEMBERSHIP OFFICER: Glenn Cumming,

Unit 1/4-6 Keogh St, Burwood, VIC 3125. Phone (03) 9808 0649 (AH)

NSW CONTACT: Bob Taaffe, 63 Hillcrest Rd, Tolmans Hill, TAS, 7007, Phone: (03) 6223 6126

QUEENSLAND CONTACT: Phil Barker

PO Box 326, Samford, QLD, 4520, Phone: (07) 3289 7177, email: signal-1@bigpond.com

Unless articles use copyrighted information, articles may be reprinted without prior permission but acknowledgment is required. Opinions expressed in articles appearing in SOMERSAULT or supplements are not necessarily those of the S.R.S.V. (Inc.)

MINUTES OF MEETING HELD FRIDAY 20 FEBRUARY 2015, SURREY HILLS NEIGHBOURHOOD CENTRE, 1 BEDFORD AVENUE, SURREY HILLS

Present: – Wilfrid Brook, Glenn Cumming, Graeme Cleak, John Dennis, Graeme Dunn, Steven Dunne, Michael Formaini, Ray Gomerski, Chris Gordon, Judy Gordon, Andrew Gostling, Bill Johnston, David Jones, Keith Lambert, Andrew McLean, Alex Ratcliffe, Colin Rutledge, Brian Sherry, Peter Silva, David Stosser and Andrew Waugh.

Apologies: – Brett Cleak, Chris King, David Langley, Steve Malpass, Tom Murray and Andrew Wheatland.

Visitors: – Bruce Dunne.

In the absence of the President, the Vice – President, Mr. Bill Johnston, took the chair & opened the meeting at 20:06 hours.

Minutes of the November 2014 Meeting: – Accepted as published. Brian Sherry / Wilfrid Brook. Carried.

Business Arising: – Nil.

Correspondence: – Letter to Surrey Hills Neighbourhood Centre with a date for the February 2015 meeting.

The venue hire agreement for the meeting room was received from Surrey Hills Neighbourhood Centre.

The completed venue hire agreement for the meeting room was returned to Surrey Hills Neighbourhood Centre. Glenn Cumming / David Stosser. Carried.

Reports: – Glenn Cumming reported to the meeting the recent passing of SRSV Member Greg O'Flynn of Warrnambool. The SRSV was represented at the funeral. Greg had been a Member of the SRSV since the formation in 1975.

A report was received regarding the leased archives rooms at Seymour. Victrack has been requested to undertake some repairs to the rooms including having the electricity re-connected. Plans for the renewal of floor coverings and the installation of some displays were discussed.

A report was received that Peter Silva was in discussions with the new President of the ARHS Victorian Division re the future of the Market Street Signal Bridge.

General Business: – Keith Lambert provided details about various works in the Metropolitan District. A summary of the discussion follows: –

- Grade separation works at Blackburn Road, Blackburn, Main Road, St. Albans and Burke Road, Gardiner were discussed. Occupations for these works will take place over the next few months.
- The signal box at St Albans is scheduled to be abolished in late March / early April 2015.
- Additional stabling sidings will be constructed at Calder Park.
- Plans for new signal and interlocking arrangements for the train maintenance area at Newport were described.
- Future occupations at Ringwood were described.

(Front cover) This rusty lattice mast is the Up Home from Deniliquin at Barnes. It probably dates from March 1926 when Home signals were provided at the junction of the Balranald line which was then under construction. In October 1996 the conventional electric light and spectacle plate were replaced by green and red reflective discs covered by a blinder. In the left foreground can be seen the concrete base of an equipment case with a rail pole behind. These undoubtedly housed the power supply for the former electric light. Photo Andrew Waugh

Andrew Waugh discussed a recent report of the ATSB investigation into the derailment of a freight train at Union Reefs in the Northern Territory.

Andrew Waugh tabled copies of new books from the UK on the subject of railway signalling on the Lancashire and Yorkshire Railway.

David Stosser noted a change in train describer arrangements at Oakleigh and that Audible Track Warners (detonators) were no longer kept on site at Oakleigh.

Michael Formaini discussed a recent collision in the United Kingdom where a HST125 set collided with a signal that had collapsed across the rail line due to corrosion at the base of the signal post.

Alex Ratcliffe reported that the former signal box at Ringwood had been relocated to the front of the railway station.

Colin Rutledge reported that the RRL Lines were now scheduled to open for traffic on Sunday 21 June 2015, a delay of seven weeks. The media was reporting that the delay was due to a shortage of rolling stock. However, concerns about the reliability of the axle counter equipment were also having an impact. The counting heads of the axle counters had recently been changed.

The pros and cons of track circuits versus axle counters were discussed.

Colin Rutledge described plans for track and signal alterations at North Geelong "C" Box. The signal box is scheduled to be abolished in October 2015.

Colin Rutledge described plans for power signalling at the junction at Toolamba. It is planned to commission this project in 2015 using key switches at the site for control. Remote control from Centrol will be provided in 2016.

Options for the upgrade works for the Mildura Line following the announcement by the State Government were discussed.

Alex Ratcliffe reported on the removal of grain wagons from the Ararat – Maryborough Line for scrapping.

Colin Rutledge described a collision between two passenger trains, 30 kilometres North of Zurich in Switzerland earlier today.

Andrew Waugh described a recent level crossing collision between a train and a motor vehicle in New York State, USA.

Chris Gordon reported that the Broad Gauge steel train now originates from South Dynon. The steel yard on the site of the former Canal Yard is now being prepared for sale to property developers with the track about to be lifted.

Syllabus Item: - The Vice – President introduced himself to present the Syllabus Item.

Bill presented a DVD from the UK titled "Rail Signalling in Anglia: Ely to Norwich".

This video featured all nine mechanical signal boxes between Ely – Norwich, also known as the Breckland Line. The video was filmed in 2010 and the re – signalling of the line was completed in December 2012.

The presentation was enjoyed by those present and Bill was thanked for making the DVD available.

Meeting closed at 22:45 hours.

The next meeting will be on Friday 20 March, 2015 at the Surrey Hills Neighbourhood Centre, Bedford Avenue, Surrey Hill, commencing at 20:00 hours (8.00pm).

MINUTES OF 2014 ANNUAL GENERAL MEETING HELD FRIDAY 20 MARCH 2014, SURREY HILLS NEIGHBOURHOOD CENTRE, 1 BEDFORD AVENUE, SURREY HILLS

Present: – Ken Ashman, Wilfrid Brook, Brett Cleak, Glenn Cumming, John Dennis, Graeme Dunn, Steven Dunne, Vance Findlay, Michael Formaini, Ray Gomerski, Chris Gordon, Judy Gordon, Bill Johnston, David Jones, Chris King, Keith Lambert, David Langley, Steve Malpass, Andrew McLean, Laurie Savage, Brian Sherry, Rod Smith, David Stosser and Andrew Wheatland.

Apologies: – Jon Churchward, Michael Menzies, Tom Murray, Greg O'Flynn, Peter Silva, Andrew Waugh and Bob Whitehead.

The President, Mr. David Langley, took the chair & opened the 2014 Annual General Meeting @ 20:08 hours.

Minutes of the March 2013 and May 2013 Annual General Meeting: – Accepted as published. Bill Johnston / Michael Formaini. Carried.

Business Arising: – Nil.

President's Report: – The President, David Langley, presented the President's Report to the meeting.

It is with pleasure again that I present this report. 2013 was a year like many others, six meetings well attended and a tour late in the year also well attended. The February meeting seems to have become a mini-tour opportunity and 2013 was no exception with members gathering at the Diamond Valley Railway on Saturday 17th February (which was the Friday night meeting delayed until Saturday afternoon) where four very pleasant hours was spent inspecting the signalling on this marvellous miniature railway. Our thanks go to the SRSV members who are also DVR members for making the afternoon most enjoyable.

The five remaining meetings were held at the Surrey Hills Neighbourhood Centre where much discussion ensued and entertainment arranged by Bill Johnston was enjoyed.

Our magazine "Somersault" again appeared six times through the year and is now in its 37th year as I read this to you. Quite a credible achievement and enormous appreciation has to be extended to Andrew for keeping the content interesting and informative. Those who now have over 200 issues in their collection now own a valuable source of historical information. As for future content, all I can say is please give generously.

My thanks for another successful year go to our committee – Vice President Bill Johnston, Secretary Glenn Cumming, Treasurer Peter Silva, and committee men Wilfrid Brook and Steve Malpass for all the work that has progressed through the year thus enabling our little society to see another year out.

Again I thank Keith Lambert and all the staff at Metro who so kindly permit us to visit locations not normally available to the general public and this year was no exception with our timely visit to Kensington, the Flemington Racecourse line and Essendon which are all slated to disappear in the resignalling expected early in 2014. Please pass on my thanks to those concerned, we are very grateful.

Finally I wish to thank the members of the society for turning up to meetings, to tours and for providing all the little bits of information concerning our specialist interest that is not normally available in the main stream information highway. Thank you for your support and I move this report.

David Langley, President. David Langley / Rod Smith. Carried.

Treasurer's Report: – In the absence of the Treasurer, Peter Silva, the presentation of the Treasurer's Report for the year ended 31 December 2013 was deferred.

Auditor's Report: – In the absence of The Auditor, Jon Churchward, the presentation of the Auditor's Report was deferred.

Tours Report: – The Tours Officer, Glenn Cumming, presented his report.

I am pleased to report that one signal box tour was conducted during 2013.

The tour for the year was the annual Showday Tour / Cupday Tour etc, this year held on Saturday 14th September 2013.

The locations visited this year were Kensington, Epsom Road "H" Cabin, Showgrounds Junction, Rostrum, Flemington Racecourse and Essendon. A variety of vintage signalling equipment was seen and the signalmen at Kensington and Essendon signal boxes were friendly and co-operative. The other locations were unattended at the time of our visit.

As was to be expected, this tour was well attended and this justified the effort required to arrange this tour. Thirty-three members and friends participated.

Thanks must go to the people who contributed advice and assisted with the organising of the tour this year. Thanks also to all members & friends who participated & helped to ensure the success of the tour.

Special thanks must go to the officers of the various railway operating & engineering companies who allow the SRSV to visit areas not normally open to the general public. Their assistance is very much appreciated. Without their co-operation, SRSV tours would not occur. This year, the SRSV appreciated the co-operation and assistance of Trevor Wyatt and Keith Lambert at Metro Trains Melbourne. My thanks to these gentlemen for their assistance.

The Tours Officer always welcomes suggestions & comments regarding the conduct of SRSV tours, especially ideas for future tours.

Glenn Cumming, Tours Officer. Glenn Cumming / Andrew Wheatland. Carried.

Membership Report: – The Membership Officer, Glenn Cumming, tabled the Membership Report.

Type	2013	2012	Movement
V	70	70	–
K	30	32	-2
N	1	1	–
KL	2	2	–
VH	3	3	–
Total	106	108	-2

Analysis of Movement: Additions: – Sean Kelly (V); Non – Renewals: – Tom Deveney (K), Sandy Ireland (V); Final Departures: – Ian Cameron (K)

Glenn Cumming, Membership Officer. Glenn Cumming / Laurie Savage. Carried.

Editorial Report: – In the absence of the Editor, Andrew Waugh, the President tabled the Editor's Report for 2013.

I would like to first thank everyone who contributed to the production of "Somersault" this year.

I receive great support from various members supplying information about current schemes and who proof read material and suggest improvements.

Six issues of "Somersault" were prepared for publication this year, but some issues were a little late. Generally the delays were due to a lack of time but it would be helpful if members contributed more material for publication.

I would like to make the usual plea for more feature articles – even short ones. These can be historical, or cover modern techniques and practices.

Andrew Waugh, Editor. David Langley / Steve Malpass. Carried.

Contributions to "Somersault" were discussed. SRSV President David Langley urged all SRSV Members to assist the Editor wherever possible.

Archives Report: – No report was received.

Market Street Report: – Bill Johnston presented the Market Street Project Report for 2013.

The Market Street Project continues to make slow progress.

With the restoration of the arm carriers now complete, no further work took place.

The project is now waiting for a formal assessment by a Civil Engineer of the structural integrity of the main truss. We are waiting for the ARHS Victorian Division to make a decision on this matter.

Bill Johnston, Market Street Sub – Committee, Bill Johnston / Chris King. Carried.

Elections: – The Vice-President, Bill Johnston, chaired the meeting for the election of the new Committee.

No written nominations were received.

The following verbal nominations were received at the meeting: –

President: – David Langley, nominated by David Stosser and seconded by Brian Sherry.

Vice President: – Bill Johnston, nominated by Laurie Savage and seconded by Andrew McLean.

Secretary: – Glenn Cumming, nominated by Vance Findlay and seconded by David Stosser.

Treasurer: – Peter Silva, nominated by Bill Johnston and seconded by Graeme Dunn.

Committeeman: – Wilfrid Brook nominated by Bill Johnston and seconded by Andrew Wheatland.

Committeeman: – David Stosser nominated by Rod Smith and seconded by Michael Formaini.

There being no further nominations, all nominees were declared duly elected to the position.

General Business: – Appointment of Auditor. This appointment was referred to the Committee.

Rod Smith asked about access to the Archives Rooms at Seymour. The future of the rooms was discussed.

Meeting adjourned @ 20:25 hours.

The March 2014 Annual General Meeting was followed by the March 2014 Ordinary Meeting.

MINUTES OF RESUMED 2014 AGM HELD FRIDAY 16 MAY 2014, SURREY HILLS NEIGHBOURHOOD CENTRE, 1 BEDFORD AVENUE, SURREY HILLS

Present: – Noel Bamford, Wilfrid Brook, Glenn Cumming, Graeme Dunn, Michael Formaini, Ray Gomerski, Chris Gordon, Judy Gordon, Bill Johnston, Chris King, Keith Lambert, David Langley, Andrew McLean, Tom Murray, Alex Ratcliffe, Laurie Savage, Brian Sherry, Rod Smith, Andrew Wheatland and Ray Williams.

Apologies: – Jon Churchward, Brett Cleak, Steven Dunne, Steve Malpass, Greg O'Flynn, Trevor Penn, Peter Silva, Stuart Turnbull and Bob Whitehead.

The President, Mr. David Langley, took the chair & opened the resumption of the 2014 Annual General Meeting @ 20:11 hours.

Treasurer's Report: – In the absence of the Treasurer, Peter Silva, the presentation of the Treasurer's Report for the year ended 31 December 2013 was deferred.

Auditor's Report: – In the absence of The Auditor, Jon Churchward, the presentation of the Auditor's Report was deferred.

General Business: – Nil.

Meeting adjourned @ 20:12 hours.

The May 2014 Annual General Meeting was followed by the May 2014 Ordinary Meeting.

MINUTES OF RESUMED 2014 AGM HELD FRIDAY 18 JULY 2014, SURREY HILLS NEIGHBOURHOOD CENTRE, 1 BEDFORD AVENUE, SURREY HILLS

Present: – Wilfrid Brook, Brett Cleak, Graeme Cleak, Glenn Cumming, John Dennis, Graeme Dunn, Vance Findlay, Michael Formaini, Ray Gomerski, Chris Gordon, Judy Gordon, Bill Johnston, David Jones, Keith Lambert, David Langley, Andrew McLean, Michael Menzies, Tom Murray, Alex Ratcliffe, Colin Rutledge, Brian Sherry, Rod Smith, David Stosser, Andrew Waugh and Andrew Wheatland.

Apologies: – Jon Churchward, Steven Dunne, Steve Malpass, Greg O'Flynn, Laurie Savage and Peter Silva.

The President, Mr. David Langley, took the chair & opened the resumption of the 2014 Annual General Meeting @ 20:08 hours.

Treasurer's Report: – In the absence of the Treasurer, Peter Silva, the presentation of the Treasurer's Report for the year ended 31 December 2013 was deferred.

Auditor's Report: – In the absence of The Auditor, Jon Churchward, the presentation of the Auditor's Report was deferred.

General Business: – Nil.

Meeting adjourned @ 20:09 hours.

The July 2014 Annual General Meeting was followed by the July 2014 Ordinary Meeting.

MINUTES OF RESUMED 2014 AGM HELD FRIDAY 19 SEPTEMBER 2014, SURREY HILLS NEIGHBOURHOOD CENTRE, 1 BEDFORD AVENUE, SURREY HILLS

Present: – Glenn Cumming, John Dennis, Michael Formaini, Ray Gomerski, Chris Gordon, Judy Gordon, David Jones, Keith Lambert, David Langley, Steve Malpass, Andrew McLean, Michael Menzies, Alex Ratcliffe, Colin Rutledge, Laurie Savage, Brian Sherry, Peter Silva and Andrew Wheatland.

Apologies: – Wilfrid Brook, Jon Churchward, Brett Cleak, Steven Dunne, Bill Johnston, Greg O'Flynn, David Stosser and Bob Whitehead.

The President, Mr. David Langley, took the chair & opened the resumption of the 2014 Annual General Meeting @ 20:03 hours.

Treasurer's Report: – The Treasurer, Peter Silva, presented the Treasurer's Report for the year ended 31 December 2013. The SRSV recorded a small deficit for the year.

Peter spoke to the statements and explained the details of the statements and noted variations when compared with the previous year. The decrease in interest received was noted.

Motion: That the Treasurer's report is received and adopted. Peter Silva / Alex Ratcliffe. Carried.

There were no questions and no further discussion.

Auditor's Report: – In the absence of The Auditor, Jon Churchward, the Secretary tabled the Auditor's Report.

Motion: That the Auditor's Report be accepted. Peter Silva / Colin Rutledge. Carried.

There were no questions and no further discussion.

General Business: – Nil.

Meeting closed @ 20:10 hours.

The September 2014 Annual General Meeting was followed by the September 2014 Ordinary Meeting.

SIGNALLING ALTERATIONS

The following alterations were published in WN 49/14 to WN 5/15 and ETRB A circulars. The alterations have been edited to conserve space. Dates in parenthesis are the dates of publication, which may not be the date of the alterations.

03.12.2014 Camperdown (TON 319/14, WN 49)
On Wednesday, 3.12., No 3 Road (198.311 km – 198.720 km) was booked out of service.

04.12.2014 Dunolly (SW 227/14, WN 49)
On Thursday, 4.12., post commissioning updates to the local signalling were made. These will affect operation when attended. No changes will be made to the unattended operation.

- 07.12.2014 Mordialloc – Aspendale (SW 373/14, WN 2)**
On Sunday, 7.12., the pedestrian boom barriers on the Up side of Station St (28.407 km) were replaced by pedestrian gates (magnetically latched type). Amend Diagram 25/11 (Cheltenham – Chelsea).
- 08.12.2014 Flinders Street (SW 383/14, WN 4)**
Homes 746 & 756 were converted to LED.
- 08.12.2014 Lethbridge (SW 226/14, WN49)**
On Monday, 8.12., and Tuesday, 9.12., line side mirrors will be tested at Lower Plains Rd (102.626 km). The mirrors will be removed at the completion of the testing.
- (09.12.2014) Book of Rules, Section 36 (SW 232/14, WN 49)**
Book of Rules, Section 36 (RFR Rules) was reissued. The main alteration is in the altered axle counter reset procedures at South Kensington (Rules 6.9 and 6.10). SW 160/14 is cancelled.
- (09.12.2014) Centrol (TON 317/14, WN 49)**
The allocation of rooms in Centrol is as follows:
 1 RRL Zone 2 (Spencer St Platform 15/16 – Spion Kop & Melbourne Yard)
 2 Melbourne – Ballarat – Ararat, North Geelong – Maryborough – Yelta, Dunolly – Inglewood – Robinvale, Korong Vale – Mittyack, Ararat – Maryborough – Moolort, Ouyen - Panitya (24 hours)
 4 Melbourne – Bairnsdale (including Latrobe Valley RFR panel), Murtoa – Hopetoun, Dimboola – Yaaapeet (24 hours)
 5 Melbourne – Warrnambool, Murtoa – Hopetoun, Dimboola – Yaaapeet (24 hours)
 6 Melbourne – Bendigo – Deniliquin, Barnes – Moulamein, Bendigo – Piangil, Eaglehawk – Inglewood (24 hours)
 7 RRL Zone 3 (South Kensington – Deer Park Jn – Manor Jn)
 10 Melbourne – Tocumwal, Toolamba – Echuca, Shepparton – Dookie, Newport – Brooklyn (West Line) - Sunshine
- (09.12.2014) South Kensington (SW 229/14, WN 49)**
Operating Procedure 13 (South Kensington) was reissued to reflect the transfer of control and altered axle counter reset procedures. SW 81/14 is cancelled.
- (09.12.2014) South Kensington – Sunshine RRL Lines (SW 230/14, WN 49)**
Operating Procedure 13A (South Kensington – South Kensington RRL lines) was reissued to reflect the transfer of control and altered axle counter reset procedures. SW 89/14 is cancelled.
- (09.12.2014) Sunshine (SW 231/14, WN 49)**
Operating Procedure 13B (Sunshine and GEB Sidings) was reissued to reflect the altered track arrangements in SW 93/14. SW 82/14 is cancelled.
- (09.12.2014) Tandarra (SW 233/14, WN 49)**
The rodded derails at both ends of the siding have been replaced by rodded derails and wheel crowders. Amend Diagram 64/13 (Tandarra – Mitiamo).
- (09.12.2014) Nagambie – Toolamba (SW 228/14, WN 49)**
Signalling Diagram 80/14 (Nagambie – Toolamba) replaced 6/10 as in service.
- 09.12.2014 Flinders Street (SW 383/14, WN 4)**
On Tuesday, 9.12., Homes 934, 948, & 948P were converted to LED.
- 10.12.2014 Flinders Street (SW 383/14, WN 4)**
On Wednesday, 10.12., TPWS was provided at Homes 746, 756, 933, 943, 948, and 950.
- 12.12.2014 Melbourne Yard – Arrivals Yard (SW 237/14, WN 50)**
On Friday, 12.12., the lockout zones in the Arrival Yard were brought into service.
 A panel in a locked cabinet was provided in the Arrival Yard. This panel shows the track layout and has four lockable switches – one for each of Tracks 1 to 4.
 When it is necessary to lock out a track, the field worker must contact the RRL Zone 2 Controller and request that the siding be locked out. Prior to granting permission, the Train Controller must check that no train has already been signalled into the siding, no train is required to enter or leave the siding while it will be locked out, and that the siding has not already been locked out. If permission is granted, the Train Controller will reverse the lockout control lever on the VDU for the appropriate road. The green 'N' indicator on the VDU will be extinguished and the 'R' indicator will flash yellow. In the field the yellow 'lockout offered' light will flash yellow. The field worker can then remove the independent padlock clip and this will cause the red button to pop up. The lockable switch can then be turned to the '2 o'clock' position. This will cause the 'R' indicator on the Train Controller's VDU and the 'Lockout' indicator on the field panel to display a steady red. The flashing yellow lights will be extinguished. The field worker must then push the red button down, reapply the padlock clip, and apply a padlock to the clip. This secures the

lockable switch. Up to six padlocks can be applied to the padlock clip if more than one person is working in or around the track.

- 15.12.2014 Echuca - Ellicet Rd (SW 238/14, WN 50)**
On Monday, 15.12., hand gates were provided across the roadway at Ellicet Rd (243.473 km). The existing passive road signage has been retained. These gates are secured across the roadway by padlocks with the keys held by the land owner, track maintenance personnel, and local service providers. Prior to crossing the line with stock or heavy machinery, the road user must obtain train running information from Train Control. Diagram 130/14 (Rochester – Echuca) replaced 86/13.
- (16.12.2014) Manor Junction (SW 240/14, WN 50)**
Commencing forthwith, Wests Road (39.469 km) has been temporarily closed to road traffic. The boom barriers have been secured down and the flashing lights switched off.
- 21.12.2014 Manor Junction (SW 245/14, WN 1)**
On Sunday, 21.12., Wests Road (39.469) was reopened to road traffic. SW 240/14 is cancelled.
- 21.12.2014 Dandenong (SW 362/14, WN 4)**
On Sunday, 21.12., the TPWS(TSS) at Down Homes DNG706, DNG716, and DNG726 were modified and returned to service. The UPS was removed from the TPWS at all these signals.
- (06.01.2015) Mildura Cement Siding (SW 241/14, WN 1)**
Commencing forthwith, the keyswitch at the Down end points of the Mildura Cement Siding controlling Benetook Ave was temporarily placed out of service. When trains shunting the siding are required to enter the roadway, the level crossing protection equipment must be controlled using the test switch.
- (06.01.2015) Tandara (SW 244/14, WN 1)**
Commencing forthwith, the Down end points were secured normal.
- (06.01.2015) Seymour (TON 349/14, WN 1)**
The Seymour signal box hours are as follows:
Monday..... 0250 hours – 2400 hours
Tuesday – Friday0000 hours – 0120 hours & 0250 hours – 2400 hours
Saturday.....0000 hours – 0120 hours & 0600 hours – 2400 hours
Sunday0000 hours – 0130 hours & 0600 hours – 2330 hours
The signal box is staffed by V/Line Network Department Services employees on two shifts, seven days a week.
- (06.01.2015) Warragul – Yarragon (SW 242/14, WN 1)**
Signalling Diagram 128/14 (Warragul – Yarragon) replaced 24/12. The amendments include the yard rationalisation at Warragul (SW 181/13) and the construction of a road underpass at 100.168 km.
- 14.01.2015 Pakenham – Traralgon (TON 15/15, WN 3)**
Commencing Wednesday, 14.1., until approximately Friday, 6.2., V/Line MPM Signalling Projects will be renewing the active level crossing protection equipment at Coleman St (98.547 km), Sandy Creek Rd (112.600 km), Ashby St (119.945 km), and Waterloo Rd (121.288 km).
- 17.01.2015 Bentleigh (SW 32/15, SWP 2/15, WN 3)**
Between Saturday, 10.1., and Saturday, 17.1., the existing pedestrian emergency gates at Centre Rd were equipped with magnetic latches. The ‘Another train coming’ and ‘red man’ indicators were removed. Caulfield Group Operating Procedures 4 (Bentleigh – Installation of illuminated ‘red pedestrian’ and ‘another train coming’ sign at Centre Rd - SW 193/06) and 4A (Bentleigh – Trial of new type of pedestrian crossing emergency exit gates at Centre Rd – SW 323/06) were cancelled.
- 19.01.2015 Newport Workshops (SW 34/15, WN 3)**
On Monday, 19.1., the CCW lever on the points leading to No 1 Track (Test Track) was replaced by a WSa lever. Amend Diagram 39/11 (Newport Workshops – North Yard).
- (27.01.2015) Dandenong (SW 49/15, WN 4)**
Diagram 47/14 (Dandenong) replaced 85/13 to show the commissioning of TPWS.
- 27.01.2015 Camperdown (SW 11/15, TON 39/15, WN 5)**
On Tuesday, 27.1., No 3 Road was booked back into service as a maintenance siding. No 3 Road was made a dead end with access only available from the Up end.
A small point lever replaced the WSa lever on the Up end points leading from No 2 to No 3 Rd and these are rodded to a derail/crowder in No 3 Rd. These points are normally secured by a point clip for No 2 Road. A baulk was provided at the Down end of No 3 Rd. The Down end points leading from No 2 to No 3 Rd have been secured for No 2 Road. The hand operated derails at the Up and Down ends of No 3 Rd have been removed.
Amend Diagram 44/13 (Camperdown – Terang). TON 319/14 is cancelled.

End£

LETTERS TO THE EDITOR

Philip G Miller writes:

As an Area Controller (now classified as Train Controller 4) at Metrol since the Signal Control Panels opened on 26 December 1983, I wish to comment on other relevant information to your excellent articles.

In my view Metrol was a significant advance over previous Signalling systems installed by the VR in so much as it was the next logical leap in Train Control. When commissioned, it was the largest computer controlled signalling centre in the world and for most of the 1980s there were groups of usually foreign Signalling Engineers, senior Railway Managers and interstate politicians who were regularly trooped through for the Tour.

Trade Union and Staffing

I was one of a number of Signalmen involved from the Trade Union side. The Signalmen were covered by the Traffic, Permanent Way and Signalling Award (TPWS) and were represented in Victoria by the Australian Railways Union, Victorian Branch. (Since the 1993 amalgamation, the Rail Tram and Bus Union, RTBU.)

From a Signalman's Section perspective the ARU commenced negotiations re the MTCC Project (Metropolitan Train Control Centre) as Metrol was originally known as in 1975. We were fortunate that Graeme Bertrand, our ARU Organizer, was a former Flinders Street "A" Box Special Class Signalman, and the ARU State President Joe Poultney, a Suburban Electric Train Guard, so that the technical aspects and there impacts were easily understood.

The VR Departmental Industrial Representative was Laurie Harkin, a former Control Train Controller and ATOF (Australian Transport Officers Federation, since the 1992 amalgamation the Australian Services Union, ASU) Train Control Representative. Final Industrial Agreements covering Metrol were agreed in December 1983.

Ironically what was finally agreed was what the ARU had initially asked for in 1975!

Initially, the VR intended to staff Metrol Regulators (later known as Area Controllers, now Metrol Train Controller 4) exclusively from the Station Masters (Salaried Officers Award) grade which would have resulted in the Special Class Signalmen being made redundant. Needless to say the Signalmen's Section and the ARU were not at all keen on that proposal. Subsequently an Agreement was reached that the Regulator / Area Controller grade was to be drawn exclusively from the Special Class Signalman grade.

I understood that as of around April 1984, Metrol had cost \$16 Million and had paid for itself within 3 years. Referring to the staffing levels in the January issue page 9, in 1975 on a weekday early and late shift Flinders St "A" Box had 4 Signalmen and a Block Recorder, Flinders St "B" Box had 2 Signalmen and a Block Recorder, Flinders St "C" had 3 Signalmen and a Block Recorder, Flinders St "D" Box had a Signalman and a Block Recorder, Flinders St "E" Box had 2

Signalmen and a Block Recorder, Spencer St No.2 had 2 Signalmen and a Block Recorder for a total of 14 Signalmen + 6 Block Recorders per Shift, with a total Signalling staff of 68, excluding EDO and Annual Leave provisions which were covered by Group Leave and Relieving Staff, compared to 32 Area Controllers which included an Annual Leave Rotation. Therefore the commissioning of Metrol removed 36 Signalling positions.

Referring to "industrial difficulties" on November issue page 111, the bulk of Area Controller training took place in 1983 and usually 3 or 4 Signalmen were given a two week Initial Training Course followed by a Refresher Course for the earlier trainees.

The Metrol Training Officer was Peter Mace who was formerly Senior Special Class In charge Signalman at Flinders St "A" Box. Peter trained both the Signalmen and the Block and Signal Inspectors (later Safe Working Inspectors), the latter of whom also assisted with the Simulator Training.

As initial training was directed at existing Special Class Signalmen who expressed an interest (and most did) it was expected that the newest appointed (and therefore junior) Special Class Signalmen would be transferred elsewhere. In practice the incoming Area Controllers were a cross section in both age and experience of the existing Special Class appointees.

There were a number of Signalmen who were initially keen to go to Metrol, but for varying reasons found that the new workplace did not suit, some who were initially reluctant to go found that they really did enjoy the new environment, and some were happy to go to another Signal Box in lieu of working at Metrol. In this regard the Block and Signal Inspectors who assisted Peter Mace with the Simulator training put a lot of effort into getting the trainees competent in using the new Metrol Operating System. Their combined efforts ensured that Metrol got off to a relatively good start.

Also bear in mind that at this time the VR was coping with a serious staff shortage, where many grades were regularly working 12 and 13 shift fortnights to cover the shortfalls. This affected and delayed the training requirements. Most weekends were also affected by engineering works within the Richmond to North Melbourne area, and Systems Testing took place on alternative week ends if and when Signal Engineering staffs were available.

Signal Maintenance at Metrol

Metrol had 3 Resident Engineers, Paul Gartner, Ian Shields and Harry Ching. Paul had originally worked at the British Royal Navy's Admiralty Underwater Weapons Establishment (AUWE) at Portland, England; whilst Harry had been an Engineer for the Hong Kong Metro. Prior to that, he worked for Cathay Pacific maintaining their Flight Simulators. Ian Shields was a VR Apprentice.

The Signal Supervisor was Ralph Gardiner and the Principle Circuit Testing Supervisor, later Principle Signal Systems Supervisor was Graeme Collins. Although we had on-going contact with the Shift Signal Maintenance Technicians it was the Resident Engineers and Graeme Collins who would also come up to explain how particular parts of the System would operate or to query the Area Controllers about the details of particular faults.

In my view it was, and is, the ongoing attendance of the Signals Engineering staff that ensure that Metrol operates with the minimum of technical delays to train services.

System C

Referring to the January issue page 14 System C was introduced to control both the Clifton Hill (Clifton Hill Panel) and South Kensington (Western Panel) interlockings. The Clifton Hill System C went from North Richmond to Rushall (Epping Line) and Westgarth (Hurstbridge Line), including Victoria Park, which was and is normally switched out and is switched in by Metrol on an as required basis.

The Western System C was the South Kensington Interlocking from the Down side of Moonee Ponds Creek Junction. System C consisted of two mainframe computers on line plus two mainframes on hot standby.

This enabled the Caulfield Panel (less the St. Kilda and Port Melbourne lines which had been converted to Light Rail) to be concentrated on System B whilst System A now covered the Burnley and Northern Panels.

System C was constructed by the Metrol Signal Maintenance Technicians (SMTs) as an in-house Project. Referring to the January issue page 9 Metrol SMTs also maintained and repaired the Plug In Printed Circuit Boards (PCBs) in house, as this was found to be far quicker and a lot cheaper than relying on outside contractors.

Commissioning and Train Running

When we were advised of the intention to switch over to Metrol in December 1983, it was anticipated that teething troubles would persist for up to 6 months. Whilst it is true that the first few days were hectic, daily train running was vastly better than it had been during the infamous testing week ends when delays were sometimes measured in hours!

The bulk of the delays occurred in January and declined significantly thereafter with a few persistent and hard to trace faults were resolved by April. It needs to be recognized that many hard to trace faults relied on a specific series of events to occur at the one time for the fault to be detected. As the faults were discovered and fixed the remaining faults proved to be harder and harder to detect, but overall the change over definitely went a lot better, and fault rectification was a lot quicker than first anticipated.

It also needs to be recognized that the Working Time Table still retained provision for MURLA engineering works between North Melbourne and

Richmond. This included a provision for a 3 minute catch up time between Richmond and Flinders St and 5 minutes between North Melbourne and Flinders St. Additionally the WTT Docking and Shunting time allowances were based on the mechanical interlocking times which were found to be too tight for an electric relay interlocked system.

For example if you were docking a train from the Oakleigh Sidings (between the Up Caulfield Local and the Down Caulfield Through Lines) to Platform 5 and then shunting from Platform 6 back to the Oakleigh Sidings, then as the Dock cleared the crossover points into Platform 5, these points could be normalized and with the Platform 6 shunt signal given the shunt train would start to move prior to the Dock coming to a stand on Platform 5. With Metrol's Route Relay Locking however the dock into 5 had to be detected to have stopped, arrived and timed out prior to releasing the route locking to allow for the shunt off Platform 6. This time delay may only be 20 to 30 seconds but when there are a number of closely spaced docks and shunts those additional 20 seconds can quickly accumulate to minutes and on-going delays.

The MURLA works allowances were built into the WTT to accommodate the on-going Underground Loop engineering works, which on a day to day basis were unpredictable as to their effect upon the individual train services. Hence the reason trains waited to arrive on time into Flinders St station in the Morning Peak services. Despite the fact that this extra time allowance was advertised on stations with the Wednesday Headlines posters explaining the effects of the ongoing MURLA works, the public and the Press kept complaining about late running and delayed train services.

The JZA715

The mainframe computers were Digital Equipment of the USA Model 1170 which drove the RPO6 Software Systems drives which were at the heart of the Metrol system. This equipment predates the massive memory systems that computers currently use.

The JZA 715 was the Remote Control Telemetry System for the Metrol Signal Control Panels which were (and still are) an Entrance-Exit system (NX is a 1936 trademark of General Railway Signal Co., of the USA whose British Empire licensee was Metropolitan – Vickers, hence Metro-Vick / GRS) which exchanged telemetry data with the JZA 700 Field stations which in turn collect and transmits data to the in-field interlocking. Even though the Interlocking was (and still is) field based, the JZA 715 also had a software based interlocking table overlaid which ensured that certain potential route and other routing restrictions were recognized by the system.

There were initially two Systems, A and B which each had a pair of mainframes on-line, with another pair of mainframes in hot standby mode. The Train Reporting System / TRS also had a pair of mainframes on-line with another pair on hot standby. Additionally, the Time Table System / TTS had its own standalone

mainframe, for a total of 13, later 17 mainframes. In the mid 1980s additional mainframes were purchased second hand from a Boston dealer's warehouse as by this time the Model 1170 variant that Metrol used was out of production.

Emergency Back Up Signal Panels

Whilst it is true that Emergency Back Up Panels were installed (or in the case of Flinders St "E" Box where the existing Signal Control Panel was modified) with the view to switching over to them in the event of a serious failure, to the best of my knowledge only the Emergency Panel at Clifton Hill Station was used and then only on a few occasions (once by me).

Sometime in the mid 1980s there was a serious loss of air pressure affecting the air points at "E" Box (also known as FEX) where the decision to switch across was seriously considered. However it soon became apparent to the SMTs that this was not going to happen as there had been a series of subtle software and hardware upgrades over the intervening years which effectively ruled that option out.

Subsequent upgrades have made provision for a switchover to a Disaster Recovery Site, which is frequently tested on pre-arranged week ends, so if we really do have a disaster there now is a viable Plan B.

Panel operation

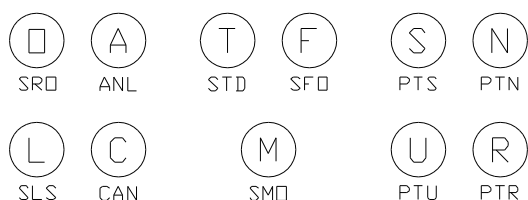
The mode of operation for the Metrol NX is (1) hold down entrance button (2) hold down exit button (3) release exit button whilst still holding down entrance button (4) hold down operate button whilst still holding down entrance button (5) release operate button (6) release entrance button (7) selected route should call and set up from entrance button to first green signal indication in rear of exit button, or actual exit button object dependent on the particular route established.

The calling route is indicated by flashing triangles above the initiated signals from entrance to exit, route will run, yellow overlocks will appear on affected points, green / yellow route line as appropriate will appear and signals will clear from entrance point to exit point.

I understand that the system will check and prove the route and then clear from the entrance progressively to the exit. In a BR style SSI whilst the route will call from the entrance to the exit it will clear from the exit back to the entrance point.

Three letter commands

Referring to the January issue page 11 the three letter commands as panel operating buttons were actually grouped in a 4-3-4 pattern per diagram below.



Below each single letter button was the three letter code to which it referred, and each three letter code represented a three word function. As part of our training by Peter Mace we memorized the buttons by a made up name, (that Swedish gentleman), OLCAFT MURNS where each letter represented the button letter. Hence -:

- O, Operate SRO Set Route
- A, ANL Annul Stored Route
- L, SLS Set Low Speed
- C, CAN Cancel
- T, Set Train Descriptor Automatic Routeing, TDAR, (later TLS, Train Leading System)
- F, SFO Set Fleeting Operation (of a Controlled Signal)
- M, SMO Set Manual Operation (of a Controlled Signal)
- S, PTS Points to Sleeve.
- N, PTN Points To Normal
- U, PTU Points To Unsleeve
- R, PTR Points to Reverse

The other Commands that were on labelled keyboard buttons were SRO, CAN, RQP (Request Picture), RDN (Roll Down Page), RUP (Roll Up Page). The RDN and RUP commands were for accessing data on text screens, whilst the other four commands related to Train Numbers:

- TNE Train Number Erase (followed by the Train Number).
- TNI Train Number Insert (followed by the Signal Number and the Train Number).
- TNM Train Number Move (followed by Signal number and the Train Number).
- TNR Train Number Reverse (followed by the Train Number).

Switching over panels

There was also a provision to switch control of a Signal Control Panel (SCP) to an adjacent SCP. This was intended primarily for the Night Shift. In the event that a SCP was switched to another SCP, then the switched SCP functions could only be initiated by the keyboard only. This facility was withdrawn after one Area Controller, now deceased, switched all of the adjacent SCPs to one SCP so that the whole Metrol Signal Control area could be operated via the keyboard. Unfortunately when it came time to relinquish control back to the respective Panels the switch back refused to work! In the end the SMTs had to drop the system and reboot it to enable individual control to be restored. As a result the switch over facility was withdrawn.

Weekly reboots

The system was usually rebooted every Sunday morning. This was to allow for a clean out and a reloading of the new week's timetable.

METROL

(Continued from Vol 38 No 1)

The establishment of Metrol and the operation of the JZA715 System were examined in the previous two parts of this article. In this part, the history of Metrol and the JZA715 Systems since commissioning will be examined. A number of themes will emerge. The first is the difficulty in replacing the now obsolete hardware/software. The second was the problems of capacity constraints (both controlled objects, and the maximum number of trains that could be handled at any one time).

Original capacity

An undated, but probably c1980, Ericsson JZA715 brochure states the capacity of each System was 4000 controlled objects, 1200 trains in the running plan, and 60 trains in running in the controlled area.

Reduction in control – St Kilda and Port Melbourne lines

The first significant alteration to the Metrol controlled area was actually a reduction when the Port Melbourne and St Kilda lines were closed for conversion to light rail. This resulted in the drastic simplification of the trackwork at the western end of Flinders Street Platforms 10 and 11.

The St Kilda line was closed first on 1 August 1987. However, the line continued to be used by broad gauge work trains for some time under siding conditions while it was rehabilitated. Eventually the line was taken out of use for gauge conversion, and on 30 September 1987 the St Kilda line outside the Arrival Home (Home 944) was abolished.

The Port Melbourne line was closed on 11 October 1987. Like the St Kilda line it continued to be used by works trains under siding conditions. The Port Melbourne line was baulked 50 metres beyond Platforms 10 & 11 on 24 December 1987. The remaining trackwork and signalling at the western end of Platforms 10 & 11 was not abolished until 18 August 1988. The current arrangement of tracks at the western end of No 10 Track was brought into service on 21 January 1991.

Extension of control – Clifton Hill

Although the stated intention from the beginning of the project was for Metrol to eventually control the entire suburban area, this never happened. Only three extensions to the area of control have actually been made.

The first extension was brought into service on 11 May 1992 when Metrol took control of the Clifton Hill/Westgarth interlockings. An SSI was provided to replace two mechanical signal boxes (Clifton Hill A and B) and a small relay interlocking that worked Westgarth. An emergency panel was provided at Clifton Hill to allow continued operation if the remote control from Metrol failed.

At Metrol, the Clifton Hill/Westgarth area was added to the Clifton Hill panel. The Clifton Hill Area Controller

was given oversight of the tracks outwards to Heidelberg and (probably) Bell. The new fringe boxes were Heidelberg and (probably) Epping.

It is possible that the necessary capacity in the JZA715 systems to work Clifton Hill/Westgarth was that freed up by the closure of the St Kilda and Port Melbourne line.

Incidentally, Metrol controlled the Victoria Park interlocking from commissioning in 1983. The control panel was altered around 1981 to add a 5P keyswitch to allow remote control from Metrol. Operation of Victoria Park was unusual as it is not included on the panel. Instead it is necessary to use enter the route setting commands via the keyboard.

Extension of control – North Melbourne/South Kensington

The major extension of the controlled area was in 1994 when the North Melbourne and South Kensington signal boxes were taken over.

The McKenzie and Holland power frame at South Kensington had not been touched by the Metrol project, however, by the early '90s, the state of the wiring in the relay room was causing serious concern. The power frame was consequently replaced by an SSI on 13 July 1992 which was worked by a small panel located in the corner of the signalbox. At this time a keyswitch was provided to transfer control to Metrol but this was not brought into use. A similar keyswitch was provided at North Melbourne signal box on 19 February 1994 but, again, not immediately brought into use.

Control of both the North Melbourne and South Kensington interlockings was eventually transferred to Metrol on 30 July 1994.

The North Melbourne and South Kensington areas are worked from a new 'Western' panel which replaced the Sandringham panel. With the closure of the St Kilda and Port Melbourne lines in 1987, and then the closure of the Jolimont Running Depot and the adjacent goods yard in 1993, little had been left for the Sandringham Area Controller to do. The opportunity was taken to combine the Sandringham panel with the Caulfield panel. The Western panel then replaced the Sandringham panel in the control room.

It appears that the capacity to operate the North Melbourne/South Kensington area was provided by constructing a third JZA715 system, known as System C. In 1986, shortly before the system was fully commissioned, it was noted that providing additional capacity to operate the whole Metropolitan area on the existing computers would require alterations to the system software with its associated risks and high costs. An alternative was to simply add additional dual computer systems to support the outer areas. This second alternative was under active consideration in 1986, but it was not adopted at this time.

The Weekly Notice gave instructions as to what would happen at both boxes in the event of a failure of the remote control system. At both locations routes already set would remain set for the passage of one train. At North Melbourne, a signal maintenance technician and a field operations co-ordinator had to attend the signal box (or relay room?) and manually set up through routes and fleet the signals. In the case of South Kensington, the system would automatically set up through routes when the remote control failed.

Panel designs and Metrol

The provision of Metrol, incidentally, had an interesting effect on panel designs in Victoria according to Ackland.

As already described, the Metrol system directly implemented the NX route setting logic, translating this to a series of calls on individual points and signals. The underlying relay interlockings consequently did not need to be provided with relay based route setting logic which reduced their cost. As the intention was to transfer control of the metropolitan interlockings to Metrol, new relay interlockings were not provided with route setting logic and their associated control panels were simple unilever panels. This was the case for even relatively complex computer controlled interlockings such as Dandenong (1995) and Ringwood (1999). The one exception was Epping (1989). As Epping provided local control of the stabling yards it was never intended to control this from Metrol and a route setting system SSI was provided. This policy was not changed until the commissioning of the Sydenham (Watergardens) interlocking in 2001.

Federation Square and the closure of Jolimont rail yard

Since electrification the operational heart of the Melbourne suburban system had been the Jolimont Yard, which included the Jolimont Running Depot and Workshop on its southern side. The yard occupied a large area adjacent to the city centre and from the 1920s there were periodic proposals to roof and/or redevelop this land.

The first portion of the yard to be actually closed was the Jolimont Train Running Depot. This closed in 1993 to allow expansion of the adjacent Tennis Centre. The train running depot was replaced by new facilities at Newport, Bayswater, and Epping. This had little direct effect on Metrol. However, this initial project showed that it was possible for the railways to parlay the valuable inner city land into new facilities. This approach was to be exploited by the PTC later in the decade when the government decided to construct Federation Square over the portion of Jolimont yard between Swanston St and Russell St.

Construction of Federation Square would require alterations to the tracks to allow construction of the foundations. The original plan was to make minimal track changes, and leave the Jolimont railway largely unchanged. The PTC, however, presented the entire removal of the yards as an alternative option to the Government. The railways not only gained new modern stabling sidings (at Burnley, Camberwell, Westall, and North Melbourne), but the life-expired track, overhead, and signalling between Swanston St and Richmond

Junction was completely renewed. This option was approved by the Government in October 1996.

Whatever option was chosen by the government, construction of Federation Square would require the demolition of all rail buildings between Swanston St and Russell St, including the Metrol building. Funds were consequently provided for the replacement of Metrol and its 'aging computer systems.' Even at this early date, the State Treasury had already rejected a number of proposals to replace the JZA715 system on a number of occasions.

One complication with the project to replace Metrol was the hard deadline imposed by Federation Square. To allow the square to be opened as part of the celebration of the centenary of Australian federation (1 January 2001), the Metrol building had to be vacated in December 1999. The contract for the replacement for the JZA715 system was only let in June 1997, and the remaining time was too short to commission a new system. A two stage approach was consequently adopted. The contractors were required to build a replica of the existing JZA715 in an interim Metrol, to be ready when the Metrol building had to be vacated. A year or so later this replica would be replaced by the new train control system. Unfortunately, things did not go according to plan.

The \$11 million contract for the provision of the TMF and the replica Metrol was let to Adtranz Signal (Adtranz became Bombardier during the course of the contract). Adtranz Signal was, in fact, the successor company to Ericsson. Although it appears that Ericsson was successful in the signal business, particularly in northern Europe, this business was always a side activity to their main business of telephony. In 1989 Ericsson's rail and road signalling operations were sold to the Norwegian company Elektrisk Bureau A/S (EB) as a part of a larger deal which saw Ericsson purchase EB's telecommunications business. EB was a subsidiary of the ASEA Brown Boveri (ABB) group which owned around 63% of the company. EB became a full subsidiary of ABB in 1991 and the EB name was retired in favour of ABB in 1992. In 1996 ABB merged its rail equipment manufacturing sections, which included the former EB signalling section, with Daimler-Benz's similar operations to form ABB Daimler-Benz Transportation (commonly known by its brand name Adtranz). The joint venture was not, however, a financial success and in 1999 ABB required Daimler-Benz to buy out its 50% share. The company then became formally known as DaimlerChrysler Rail Systems. Some of the non-core components were then sold (it is noted that no buyers could be found for the signalling division). Eventually, in 2001 the company was sold to Bombardier Inc. After all these changes, it is interesting to note that in 2014 a number of major signalling products from Bombardier still begin with 'EB' (Ebilock, Ebiflow), and Bombardier still has a major signalling design facility in Sweden.

The interim Metrol and the replica JZA715

The interim Metrol was successfully implemented by Adtranz at Level 5, Transport House, at the Western end of Collins St. The original Metrol, and its JZA715 systems



One of the replica JZA715 Systems at the new Metrol in Transport House photographed in August 2004. The two PDP-11/84 computers are mounted in top of the second and fifth (half height) racks with the terminals on top. Note how the improving technology had not only reduced the size of the PDP-11 computers, but had also made obsolete the front panel switches and lights of the PDP-11/70. The first rack contains the hard disks for the right computer (a similar rack for the left computer can just be seen on the extreme left). The third rack appears to house the arbitration system – close examination of the original image shows the black boxes are lettered 'A' and 'L/R' with a 'L' light illuminated. The fourth rack contains the JZA700 office equipment for the telemetry lines. All told, it is likely that this is System A. Photo: Chris Gordon

were closed down at midnight, Friday 22 October 1999, and the new Metrol came on line at the same time.

When constructing the new Metrol, the following systems were replicated (i.e. the old software was used running on new hardware):

- Three train describer systems (i.e. the JZA715 Systems A, B, & C)
- Train Reporting System
- Train describer graphic screen conversion software
- Western docking sheet

The following components were replaced:

- Overview system (used by the Operations Controllers)
- Rapid recall system
- Communications systems and system interfaces
- CCTV system
- Signal control panels
- VDU display system

The following systems were relocated from the old Metrol to the new:

- Timetable preparation system
- Train Simulator system
- Train describer system model test bed
- Fleet management protocol

The new JZA715 Systems were replicas of the original system. For at least two of the Systems, the replicas used PDP-11/84 computers instead of PDP-11/70 computers. The PDP-11/84 was introduced in 1985/6, and was about

20% more powerful than a PDP-11/70. The PDP-11/84 computers ran the same software and could also support the UNIBUS cards. However, it must have been difficult to source these 'new' PDP computers. Unfortunately, Digital Equipment Corporation completely misread the changes that were occurring in the computer hardware industry in the '90s. The development of the microcomputer industry, particularly the IBM PC, resulted in such economies of scale that microprocessor hardware rapidly fell in price and increased in capability. By the mid '90s, systems based on PC technology were approaching the capacity of DEC's minicomputers but at a far cheaper price. DEC's market share and profitability consequently plummeted. Although DEC had re-implemented the PDP with new VLSI technology it could not compete. DEC ceased producing PDP computers in 1997, and sold the rights to the hardware and software to an Irish company Memtec. In 1999 DEC itself was taken over by the smaller US company Compaq. Given this timing it is, in fact, quite likely that the 'new' PDP-11/84 computers in the new Metrol were, in fact, secondhand. Of course, the replica systems were only intended to be an interim solution until the new Train Management Facility (TMF) was commissioned.



The replacement Western panel at Transport House in August 2004. It would be hard to pick the differences in the design and construction of the panel – the main distinguishing characteristic is that the panel is nice and shiny and not worn! (Photo Chris Gordon)

First replacement attempt – The TMF

The interim JZA715 systems were to be replaced by a new Train Management Facility (TMF). Developed by Adtranz, this was to be a customised version of the Ebicos system. The main TMF train control facility was to be at Transport House, with a second, smaller, disaster recovery site 'near Melbourne Central'. The new system was intended to control 70 interlockings, a maximum of 130 trains running at any one time, around 3,200 signals, 1,500 points, 4,500 track circuits, and 230 level crossings – clearly the entire Metropolitan network.

The key features of the new TMF were a much higher degree of automation in routing trains than with the JZA715 systems, and a much tighter integration between the main train control system and the supporting systems. The following description of the system was written in 2001:

TMF provides a single integrated operator interface allowing direct access to functionality such as network displays, train description and automated remote control facilities sufficient to monitor and automatically control all train movements within the metropolitan network plus voice communications including train radio, CCTV, fleet and crew management, building security, etc.

TMF provides a coordinated working relationship between the train operations, train crew rostering, fleet allocation and utilisation, and

timetable development areas. The system provides support for resolution of operating conflicts, arising from network or service disruptions, to restore or minimise the consequential impact on the service delivery.

The key benefits of the new system were to be reduced staff costs due to the automation of functions, improved service delivery, and the provision of better management information.

The TMF system was a customised version of EBICOS release 5.2. The system was largely written in the C programming language, with small amounts in the more modern languages C++ and Java. It would run under the Unix operating system on Compaq Alpha Servers¹. The EBICOS system was to be customised by integrating the following external systems:

- the various forms of electric and electronic interlockings used in Victoria (including the existing JZA700 Metrol transmission system),
- 60 PRIDE stations (this was to be bi-directional with real time train information being automatically sent to the PRIDE systems, with train positioning information from outer areas being sent back to the TMF),
- Train radio system.
- Voice communications systems (post phones, train control (Selcall), tunnel phones)

¹ This is another link to the original JZA715 system. As already mentioned, DEC had been taken over by Compaq in 1999. The Alpha server was originally a DEC product.

- POTS (Position of Train System)
- CMS (Control & Monitoring System), FMP (Fault Management Protocol), RAMS (Rail Access Management System) – note the ‘integration’ with these systems simply involved providing the ability to open a window to access the systems from the TMF screens, not an automatic exchange of data.
- CCTV monitoring systems
- Crew Rostering – the ability to import crew rostering information into the TMF
- IFMS (Infrastructure Fault Management System) – the transfer of signal fault information to the IFMS

To give some idea of the degree of integration with existing systems proposed in the TMF project, an interface was even to be provided to the building security system.

The automatic routing facility was to be considerably improved over the JZA715. Indeed, studies suggested that manual routing would only be required in 5% of all routes set by the system. This was to be achieved by including all train movements in the timetable, by providing the ability to dynamically modify the current day timetable (which would then automatically route the trains accordingly), and by providing the ability to dynamically edit the docking sheets. Automatic routing of trains would be improved by better emulation of the interlocking logic – this would allow greater freedom in selecting routes (the implication was that the JZA715 more limited model meant that it did not attempt to set routes even though they were actually free).

Conflict resolution was also to be improved as part of the automatic route setting. If the routes required by two trains conflicted (e.g. because one train was running late), the first method was by using junction management algorithms. This compared the two trains with the goal of minimising the ‘passenger weighted minutes’ delay. These algorithms were initially developed in Italy and refined in Denmark and Australia to suite Melbourne conditions. The second approach was to evaluate a range of service alterations (e.g. altering the stopping pattern) to reduce the resulting delay. Only a small number of options were allowed to be implemented automatically.

The TMF system was initially to be delivered in April 2001. It appears, however, that the base EBICOS product was still under development at this time. In June 2001 the Railway Gazette reported that development of the EBICOS product had been completed and a ‘test’ version of the software was to be deployed in Sweden that month. The magazine also noted that the system had already been sold to railways in Sweden, Portugal, India, and Australia. By December 2001 National Express, who had inherited responsibility for the Metrol upgrade after privatisation in August 1999, reported that the system would not be delivered until the 2003/4 financial year, and, even then, it might be delivered in two phases. A major cause of the delay was reported to be software programming issues. By February 2003 the TMF system still had not been delivered.

According to the Liberal Opposition Transport Spokesman, the Labour State government cancelled the project in mid 2003. It does not appear that any formal announcement was made at this time, still less was any

explanation given as to the reasons for the cancellation. An independent consultant was commissioned to deliver a report on the system and this was delivered to the government in November 2003. A presentation to the IRSE several years later stated that the report had identified the following issues with the project:

- The main benefit identified was the reduction of staff. This, however, required significant changes to business practices and complex automation.
- Parts of the work were not ideally suited to a control systems supplier
- The specification required functionality that was not economically feasible to construct
- There were project oversight and governance issues.

However, there was also one other major issue that would have almost certainly affected the decision to cancel the project. Delivering the TMF system was the responsibility of National Express, one of the two companies that had the franchises to operate the Melbourne suburban network. National Express had collapsed into administration on 23 December 2002 with debts of \$72 million to unsecured creditors. With the TMF project incomplete, the government would have had to take the project over, which would have made the government responsible for payment of the contract. In July 2003, around the time it appears the TMF project was cancelled, the State Government and National Express’ parent offered unsecured creditors \$30 million as a final payout². If Bombardier was an unsecured creditor, and had been paid out in full, paying out Bombardier would have led to pressure to pay out the other unsecured creditors in full.

Metrol stabilisation

With the cancellation of the TMF project in 2003 it was clear that the JZA715 system would remain operational for a significant period of time. Unfortunately, the interim system built in 1999 was only intended to be a temporary solution. Key issues identified in 2003 were:

- The need to accommodate additional load (i.e. greater service frequencies) until a replacement system could be commissioned.
- The risk of failures of the existing PDP-11/84 hardware. The Age of 2 July 2005 claimed that some spare parts to keep the Metrol systems operational had come from garage sales and second-hand shops.
- The danger of corrupting the JZA715 software images due to the antiquated storage media (open reel magnetic tapes and removable hard discs). The underlying issue here was that the PDP-11 computers could not drive more modern storage technologies.

It appears that Connex and the Department of Infrastructure regrouped after the failure of the TMF project in 2003 and commenced planning for a new Metrol replacement project. The new plan was divided four stages, with the second stage divided into two substages. Stage A, the first stage, was the stabilisation of the existing

² See the report in The Age for 5 July 2003 (<http://www.theage.com.au/articles/2003/07/04/1057179155234.html>)



A recent photograph of the Northern Loop panel after the commissioning of the RRL lines and the changes at Franklin St junction. Perhaps the biggest change in the working environment is the wall of monitors now provided compared with the four or five 19 inch monitors provided in 1983. The additional monitors primarily show the status of adjacent areas – in this case the Caulfield Loop, the country side of Southern Cross, and the RRL lines from Southern Cross to North Melbourne. These additional monitors are not driven by the JZA715 Systems. Instead, they are driven by an independent computer system (PICMAN) that captures data from the various computer based interlockings. Photo: Chris Gordon.

Metrol Systems and provision of a disaster recovery site using the existing technology.

The key problem in stabilising the JZA715 Systems was that neither Connex nor the Department of Infrastructure had any access to the source code of the JZA715 software, consequently no changes could be made to the software. This meant that the software had to run on Systems that were functionally identical to the original Systems – in particular, the Systems had to be PDP-11s. But PDP-11 computers were no longer being built.

The solution was a PDP-11 emulator – in this case a PDP-11 hardware co-processor called an Osprey. In essence the Osprey was a re-implementation of the PDP-11 central processing unit (CPU) and memory. This co-processor actually runs the JZA715 program. The Osprey co-processor is inserted into a Windows server. The server emulates the rest of the PDP-11 system – in particular the input/output systems such as disk storage. The server also contains an interface to a UNIBUS backplane and this allows some of the original UNIBUS cards to be retained (these were the cards that interfaced to the JZA700 transmission system to talk to the field interlockings, the interface to the arbitration system, and the link between the left and right computers). The result is a computer that, to the software, operates exactly the same as the original PDP-11/70, but is built using modern hardware.

In building the new Systems, the opportunity was taken to add a third computer to each system – this

formed a cold standby computer (i.e. a system that was normally turned off, but could be turned on to replace the 'left' or 'right' computers if they failed).

In addition to replacing the computers, the stabilisation project also replaced the arbitration system that selected which computer (left or right) was the master and which was the hot standby. The original arbitration system was life expired.

The timetable generation system also had to be migrated as it, too, ran on a PDP-11 system. Interestingly, because there was no real time constraints, a software based emulation of the PDP-11 could be used. The compiling of a timetable was about 60 times faster on the new system.

Each new system had about 2700 field objects connected and could handle about 32 trains at any one time.

It appears that the Metrol stabilisation project commenced around June 2004 and the Transport House site was 'practically' completed in June 2006.

At 11.40 am on 27 June 2005 an air conditioning water pipe burst at Transport House. Metrol was evacuated and the computers were shut down. Sixty six trains were cancelled during the shutdown, with another 20 cancelled after services resumed later that day. Immediately afterwards there was some criticism of the Government because there was no disaster recovery site for Metrol – particularly as the cancelled TMF project would have

provided this facility. Clearly by this time the original intention of staffing the panels in the former signal boxes had been abandoned. This is not surprising as there would be no-one qualified in operating the former panels, and there would have been no supervising Train Control.

Work commenced on the provision of a disaster recovery site shortly after June 2006. The disaster recovery site was commissioned in 2007, but another reference states that it was 'practically completed' in June 2008.

As an extension to the stabilisation project, the contractors were asked to increase the performance of the Systems to allow more trains to be handled, and minor extensions to the controlled area. This involved tuning the Osprey to achieve maximum performance (e.g. adding more memory), and it also involved re-implementing the interface to the display VDUs to improve its performance and reduce the load on the CPUs. It should be noted that, although the Osprey was faster than the original PDP-11 computers it was not possible to increase the execution speed due to timing assumptions in the software.

The second replacement attempt – TCMS

The emulation solution was only expected to have a lifespan of 10 years or so. Two days after Metrol had to be abandoned in June 2005 due to the bursting of the water pipe, the government released an Expression of Interest for a replacement Metrol system. The main issue identified was the growth in the number of trains on the system.

In the 2003 plan, Stage B1 was the provision of Train Control and Monitoring System (TCMS). This essentially was a replacement for the existing functionality in JZA715, with the addition of online crew rostering and fleet allocation. The \$27 million contract for this stage was awarded in March 2007 with commissioning planned (in 2008) for November 2010. The contract was won by Westinghouse Rail Systems Australia Ltd.

Stage B2 was the Operational Reporting Systems (performance reporting and customer information distribution). The process for selecting contractors for this stage was expected to begin in Feb and April 2008. Stage C was Rail Operations Management System (TMS, SMS & FMS). This was broadly covered by Rail Operations Management (ROMS) (timetable preparation, staff management, and fleet management), day of operation management, and post day transactions. A contract for

this system was awarded in February 2008 for the TMS and FMS. Stage D was Decision Support. As at 2008 this was an unfunded concept.

At the time of writing, the TCMS has been developed and installed. Operational testing has commenced, with the new systems taking responsibility for operation of the inner area for short periods. It has been reported that some teething issues have been identified. It should be remembered that the introduction of the JZA715 systems were not without problems. The JZA715 system has had an operational life of over 31 years – which represents very good value for software system developed in the late '70s.

Acknowledgements

I would like to thank a number of people that provided information about Metrol, particularly Philip Miller.

References

- [Ackland] Signalling Control Panels, Graeme Ackland, IRSE (Aust) Technical Meeting, 9-10.11.2001
- [Cumming] Planning and new developments of signalling and communications for the Melbourne Underground Rail Loop System and associated re-arrangement of the central Flinders Street – Spencer Street areas, R.G. Cumming & R.K. Turnham, IRSE (Aust)
- [Linde] Control and Supervision System for Railway Traffic, Otto Berg von Linde, Ericsson Review Vol 59 (1) 1982 p32-
- [DoI] Metrol Replacement Projects, Metrol, TCMS and the journey so far, Department of Infrastructure Public Transport Division, IRSE (Aust) 20 February 2008
- [Galler] Legacy Train Control System Stabilisation, Reinhard Galler & Karl Strangaric, Aspect 2012,
- [Gartner] Melbourne Metropolitan Train Control Centre, Stage 1 Completed, P Gartner, IRSE (Aust) Technical Meeting, 21.11.1986
- [Grady] Jolimont Rationalisation Project, Norm Grady, IRSE (Aust)
- [Sheldon] Communication aspects of Metrol (The Melbourne Metropolitan Train Control Centre), R Sheldon, IRSE (Aust) 12 March 1982
- [Symons] Train Management Facility Project, Beyond Train Control, Peter Symons, IRSE (Aust) Technical Meeting 9 November 2001.