



the CALL BOARD

OFFICIAL NEWSHEET
OF THE

MELBOURNE MODEL RAILWAY SOCIETY Inc.
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Xstrata locomotives XRN006+XRN005+XRN002 with an empty coal train on the down coal road approach Metford station (near Maitland NSW) on 10 February 2011, with Endeavour set LE2854+TE2804 running parallel on the down main line.

The XRN class are model C44aci locomotives built by UGL Rail at their Broadmeadow, NSW factory. Thirty locomotives were ordered by Xstrata along with 300 coal hoppers to haul the output from their mines in the Hunter Valley to Newcastle for export. Following a merger between Glencore and Xstrata in 2013, the locomotives received Glencore branding. In 2016, the locomotives moved to Genesee & Wyoming Australia's ownership following GWA's purchase of Glencore Rail.

The Endeavour railcars were built by ABB Transportation in Dandenong, and came into service in 1994 to replace older railcars and some loco hauled stock. They work short haul services on the Hunter Valley, Main West, Illawarra and Southern Highlands lines. They are mechanically identical to the Xplorer railcars which work regional rail services in NSW.

Image – David Patrick – Knowledge Sharing – Members Photos – 18 November 2016

Office Bearers

President:	Warwick Brisbane
Secretary:	David Patrick
Treasurer:	Geoff Crow
Membership Officer:	David Patrick
Electrical Engineer:	Ben Smith
Way & Works Engineer:	Ben Smith
Mechanical Engineer:	Warwick Brisbane
Club Rooms:	Old Parcels Office Auburn Railway Station Victoria Road Auburn
Telephone:	0429 957 481
Web Address:	www.mmrs.org.au
Web Master:	Mark Johnson
Call Board Production:	John Ford
Meetings:	Friday evenings at 7:30 pm Committee Meetings 1 st Tuesday of the month (Refer to our website for our calendar of events)

Your President, Warwick Brisbane required minor surgery recently. Cataracts have been removed from both eyes with the first procedure in the second week of February followed by the clearance of the other eye a week later. Warwick has advised that all is well with much clearer, brighter and colourful vision. He is back driving again and is looking forward to his return to the Friday running nights.

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WHAT'S HAPPENING

FROM THE SECRETARY

Pre-Christmas Dinner 2016

The annual dinner was held at the Auburn Hotel on Friday 2 December, and as you can see from the photo, was well attended!



From left:

John Ford
Phil Green
David Patrick
David Mehlman
Warwick Brisbane
Aaron Inglis
Peter Riggall
Justin Scott
Mark Coulter
Danny Cronin
Geoff Crow

Peter Simons

We have been advised that former member Peter Simons passed away on 13 January. Peter had been a member for about 8 years, and was the coal train expert.

Peter generously left his collection of trains to MMRS, and Geoff and I collected 7 storage boxes of items from Sumner House where he was living, and brought them to the clubrooms for storage until the legal matters relating to his estate are sorted out. There is a selection of Australian, British and American trains, some scenery items, and motor vehicles.

We cannot use any of the items until probate is granted and the estate is formally distributed, so the boxes are sealed, and I ask that you leave them undisturbed until I advise further.

Sandown exhibition

The Sandown exhibition will be held again this year from 11th to 13th March, and we will be attending with the two modules of Geoff's and Peter's *Naradhan* layout which were exhibited at Caulfield last August. We need volunteers to man the stand and also to help with the set up and dismantling, so please let me know when you will be available.

Running nights

Following the Christmas break, running nights have returned to their regular schedule, varying between timetables 3 and 4 monthly, with theme nights on the first Friday, and Knowledge Sharing sessions on the third Friday. Any suggestions for theme nights and volunteers to present Knowledge Sharing are welcome!

David Patrick
Secretary

TECHNICAL ARTICLE

Project Naradhan

The previous article covered the construction of the module baseboard and its floor stand. This article will cover how we tackled the laying of the track work.

Foundation Layer Design

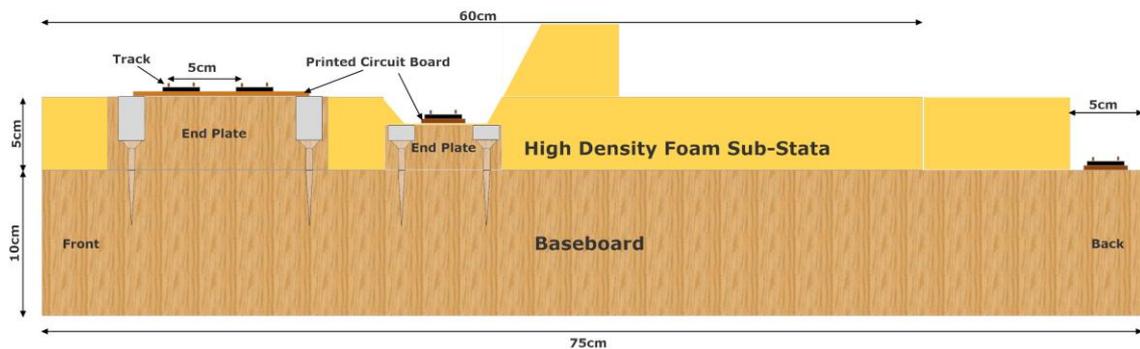
Some time was spent considering if the track should be fixed directly onto the baseboard, on cork or on some other sub strata.

In the end, we decided that the baseboard should have a high-density foam layer on which to place the track work. The thinking behind this was to allow the scenic contours to be carved out of the foam to create the landscape over which the railway travelled. Additional foam can be glued on top of the base layer to create rises and the foam base layer can be cut into to create cuttings and valleys.

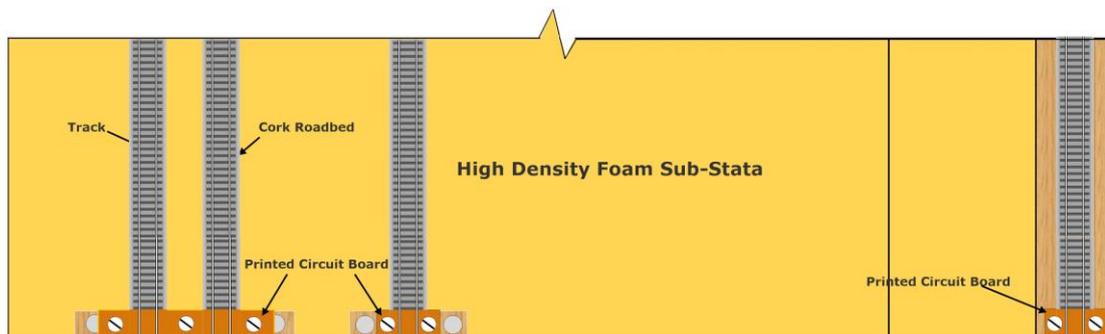
Once the foam layer is in place, the track is laid on standard 3mm cork matting cut to the track and point shapes.

The construction is illustrated below:

End Elevation



Plan



We have used Knauf Insulation 1200 x 600 x 50mm XPS Multi-Use Foam Board available from Bunnings at around \$21 per sheet. To fit the 180cm x 75cm baseboard, two foam panels are needed.

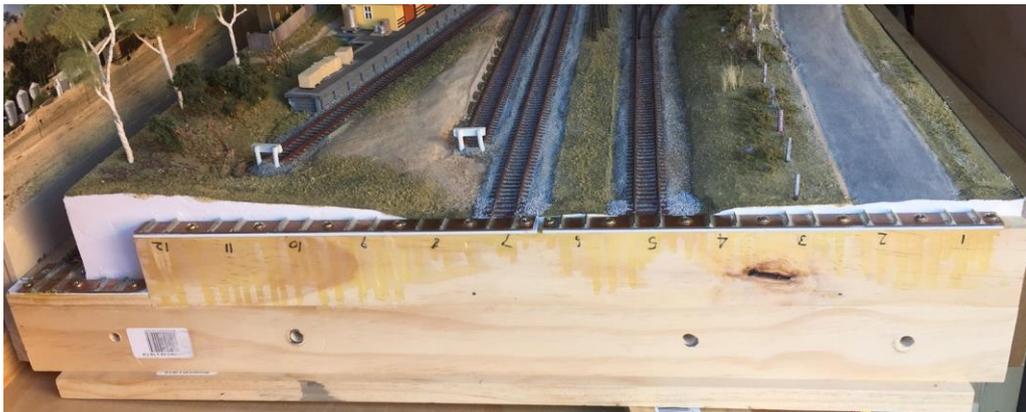
We also decided to stop the foam 5cm from the back of the baseboard to allow for a track to be installed on the baseboard that will be hidden from the front by the foam.

Since our design is an end-to-end layout, we can incorporate a link to the track at the back by an incline from the other tracks and then reverse the train along the back to reappear at the other end of the layout and vice versa. We are also investigating an exit from the back track into a fiddle yard complex for storing different trains.

Module Track End Plates

To provide a standard module to module interface, track entry points are allocated at 5cm centres across the module enabling 12 entry/exits on the foundation layer and 2 entry/exits on the back-track level. In the track design, one or more of these positions are chosen for the track location.

To ensure an accurate placement for these tracks, a jig has been constructed that temporarily fixes to the baseboard end. The jig is shown below.



The jig bolts to the module end and gives an accurate position for any available entry/exit track.

The purpose of the track end plate is to provide a solid fixing position for tracks that cross from one module to another. Fixing to the foam layer alone would not provide a reliable joint for track end points as there is a high risk of damage to the soft foam during assembly and dis-assembly of adjoining modules.

For the chosen track location(s) screw and glue a piece of dressed pine 50mm wide (or whatever the foam depth is at the crossing point) by a length to support the required number of adjacent tracks by 19mm thick. Fix a piece of printed circuit board to the top ensuring that the copper side is uppermost. Its thickness is approximately 3mm but some slight adjustment to the cork roadbed leading up to the end plate might be necessary. The purpose of the printed circuit board is to solder the track ends at the location given by the jig so that there is no lateral movement of the tracks when mating two modules together and, provided that the jig is used for both modules, an accurate lining up of the tracks.

Foundation Layer Construction

It is important to ensure that Track End Plates, Foam and Tracks that are at the ends of the module are vertical in line with the end of the baseboard so that when two modules are mated, the gap at the railhead for each track passing over the join is less than 1mm.

Cut enough foam panels to cover the baseboard using a sharp knife or long “snap off” craft knife. Cut out end plate locations so that the foam reaches the end of the module baseboard. The foam insulation has to be glued to the baseboard using an appropriate adhesive such as Selleys Kwik Grip contact adhesive (but select the one that’s for use on foam).

Once the foam Foundation Layer is bonded to the baseboard, the task of laying the roadbed can begin.

We designed the track plan for each module using AnyRail™ software using the Peco HO Streamline Code 100 track library. It is not necessary to completely design the layout in order to develop specific modules since the standard entry/exit positions are all that are required to match from one module to the next. It makes sense, however, to have in mind what the whole layout will look like and what districts, industries and train activities will be included. Once we had agreed on the module plan it was zoomed up to 1:1 and track entry/exit positions set to the correct location. All radii, inclines and track connections were verified before printing it out (with the “ignore blank pages” option set).

The resulting 50-60 A4 pages were then assembled into a complete plan (each page has a row and page number reference) using Sellotape.

The paper plan is then laid onto the module and the layout traced onto the foam (by using panel pins pushed through the paper into the foam at appropriate intervals).

Remove the plan and cut 3mm cork matting for the roadbed to follow the track locations. Glue this onto the foam with an appropriate adhesive and wait for it to bond.

Before laying the actual track, track services need to be considered.

Track Services

Track services are:

1. Electrical droppers from each track section for DC/DCC power;
2. Point activation;
3. Uncouplers;
4. Occupancy Detectors;
5. Signals; and
6. Accessories (Lights, Turntables, road crossing gates ...).

With this design concept, getting services from the underside of the baseboard through the Foundation Layer to the track requires planning.

1: Electrical Droppers.

We are implementing this layout as a DCC only facility, consequently every piece of track requires dropper wires to be soldered to the tracks. Track sections are connected using insulated fish plates in common with DCC practice as well as allowing blocks to be defined at a later stage.

It is recommended that the droppers are soldered to the track before it is installed on the layout.

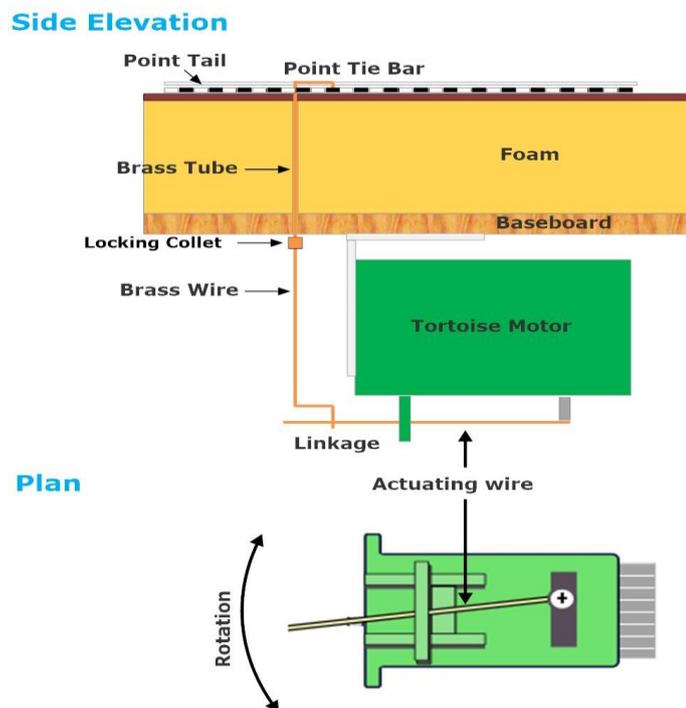
Drill a 6mm (or other required diameter) hole carefully through the foam and baseboard. Insert a similar diameter brass tube cut to the correct depth into the hole and secure it with super glue applied to the outside before insertion.

If a number of droppers are within a certain (arbitrary) radius, you can use a larger diameter tube to create a "service duct" for multiple droppers to use and cut grooves in the cork/foam to conceal any wires that run across the layout surface. This approach can simplify the underside wiring when connecting to the main DCC bus wires.

2: Point Activation.

As a DCC layout, all points (turnouts) are electrofrog meaning a third dropper wire from the frog needs to be included. The droppers are sent to the underside as described in 1 above.

We considered point activation using either solenoid motors or "Tortoise" motors. Solenoid motors were discounted as a prototypical feel for point activation was required.



Tortoise motors, however, are large heavy and noisy and in our more recent developments we are looking to use small servo motors typically used in model aircraft.

The two original Naradhan modules use Tortoise brand motors. These are mounted under the baseboard and the lever action required to activate the point is sent to the track level using brass wire and tubing as illustrated above.

Rotation of the Tortoise Motor actuating wire causes rotation in the linked vertical brass wire which in turn causes the point tie bar to move.

Tortoise motors are used on the Naradhan West and Naradhan East modules but we will use servo motors, which is far more compact and quiet compared with the Tortoise, on all new modules to be built. Servo motors can either be fitted directly to the point itself or installed under the baseboard and connected in a similar way as shown above.

If fitted directly to the point, a cavity needs to be made in the foam to accommodate it. To aid any future maintenance, the point will need to be removable from the layout so it should not be glued into place.

3: Uncouplers.

The location of electromagnetic uncouplers shown below



will need to be identified and cavities cut into the foam to accommodate them. Wiring will be sent to the underside using the methods described in 1 above.

4: Occupancy Detectors.

The location of Occupancy Detectors will need to be identified and the DCC droppers for the track section located under the board. Using current sensing devices, it is only necessary for the occupancy detector to be wired into the appropriate dropper with no access required to the track surface.

5: Signals.

Signals have been built using a plug and socket arrangement. The socket is set into the foam and its wires taken to the underside as described above. The signal then simply plugs into it and can be taken out for maintenance purposes.

6: Accessories.

Accessories generally only require wiring so they can be dealt with as described above.

Given the number of wires required between the surface and the underside, the use of Service Ducts at strategic points will greatly simplify the underside wiring by avoiding the creation of spaghetti like looms.

Track Installation

With the cork road bed bonded to the foam and all the track infrastructure services completed, it is time to lay the track.

Place the layout Plan back on the module and position points where required. Temporarily fasten these in place using panel pins between the sleepers to hold them.

Cut track lengths to make the sections between the points and again hold in place with panel pins.

When all the track is in place remove the paper plan.

Starting with the tracks that enter/exit the module, fasten the jig to the module end. Completing each before moving on to the next, trim off the last 3 or 4 sleepers from the track to reveal just the rails. Apply adhesive to the cork roadbed for just this track section and position the track section where it needs to go (not forgetting to put the dropper wires through the ducting) making sure that the rails accurately meet the rails on the jig and then solder them to the printed circuit board on the track end plate. Repeat for each entry/exit track and wait for them to bond.

Working logically from these fixed tracks, install each track section and points, connecting it to the previous using insulated fish plates. Ensure that the joins are smooth and lined up correctly.

It is worth spending time laying the track accurately both at joints and also avoiding any undulations in the permanent way. It will improve smooth running of trains and correcting faults later will be difficult and probably create other problems.

Next!

The next article will cover the electrical wiring on the underside of the baseboard.

Exhibitions

The MMRS Naradhan layout will be on display at:

AMRA Sandown Train and Hobby Show again, from Saturday 11th through Monday 13th March 2017, Sandown Racecourse Gate 2, 591 - 659 Princes Highway Springvale South, enter via Princes Highway; and

Waverley Model Railway Club Exhibition from Saturday 10th through Monday 12th June 2017, Brandon Park Community Centre, 649 Ferntree Gully Road Glen Waverley where we hope to have two additional modules.

MELBOURNE MODEL RAILWAY SOCIETY

PROGRAMME MARCH / APRIL / MAY 2017

Tuesday

Friday

March 2017

7	Committee meeting
14	Clubrooms closed
21	Clubrooms closed
28	Clubrooms closed

March 2017

3	Timetable 4 running Theme: branch line trains change TT4 to TT3	DP
10	Timetable 3 running	MJ
17	Timetable 3 running. Knowledge sharing – Ben Smith photos	WB
24	Timetable 3 running	PR
31	Timetable 3 running	GC

April 2017

4	Committee meeting
11	Clubrooms closed
18	Clubrooms closed
25	Clubrooms closed

April 2017

7	Timetable 3 running Theme: NSW change TT3 to TT4	BS
14	Clubrooms closed	DP
21	Timetable 4 running. Knowledge sharing – Ben Smith photos	JF
28	Timetable 4 running	MJ

May 2017

2	Committee meeting
9	Clubrooms closed
16	Clubrooms closed
23	Clubrooms closed
30	Clubrooms closed

May 2017

5	Timetable 4 running Theme: Non VR locos (interstate or overseas locos) change TT4 to TT3	WB
12	Timetable 3 running	PR
19	Timetable 3 running. Knowledge sharing – Ben Smith photos	GC
26	Timetable 3 running	BS