The Forest Creek Files #5

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Trackwork

Those who came to the meeting at my place in April would be aware that I expressed some misgivings about the steepness of the slope of the branch line from Forest Creek up to the small station at Paxton. The grade was 2.5% but with a short steeper pinch halfway up, and although this might not be considered excessive it did require double heading of moderate length trains, which I didn't really want.

A further drawback of the upper level was that I had laid most of the track on baseboards and these did not permit enough scope for topographic relief.

It was pointed out that if I wasn't happy with it I should bite the bullet and change it now rather than leave it as a niggling annoyance that would be much harder to rectify in the future.

I therefore redesigned the gradient to a constant 1.4% that I assumed would be well within the capability of all the locomotives. This reduced the height of Paxton by about 70mm, so the track beyond that point had to rise further in order to cross over the lower level at the other end of Forest Creek. To achieve another 100mm of height the grade beyond Paxton dropped slightly to 1.3%.

With the design finalised, up came the track and down came the baseboards and framework, once again leaving the walls pockmarked with more dead screw holes. In fact I was able to take the curved part down in three sections which made it easier to reinstall. The result looks much better and all the locos can negotiate the slope with ease.

While doing this work I took the opportunity to change the point mechanisms at the Paxton loop from manual wire-in-tube to servos, mainly because the point control knob at the down end of the loop involved the operator leaning a fair way across the layout. The three point switches are now grouped together on the fascia.

There was one other problem. When doing the original track laying I made a complete dog's breakfast of the wiring of the droppers. You'd think it would be easy to attach red wires to one rail and black to the other, but Murphy (or maybe it was McGillicuddy) wasn't going to let me get away with it that easily. What with a 180° change of direction, commencing wiring in more than one place, and plain inattention, I managed to end up with about four reversals of polarity in 15m or so! I fixed some of them but sections where I didn't have to re-lay the track were left untouched. There are thus several places known only to me where red wires are cunningly soldered to black wires to trap the unwary.

With that big job out of the way I laid the remainder of Forest Creek yard (**Photo 1**), installing seven more points and their servos along the way. The underside of the baseboard is starting to look a bit crowded (**Photo 2**). The Peco turntable with the remodelled bridge (see Issue #129) also went in but is a bit springy because it needs to be removable until I scenic the pit and surrounds.

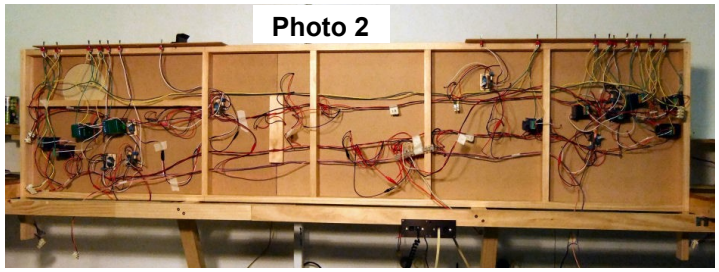


Photo 2

Having run some trains on the layout and also receiving feedback from members at the April meeting, it became apparent that another crossover was needed between the main lines at Forest Creek, so this was duly constructed. However it must be said that inserting points into existing trackwork is not the easiest thing to do and it was a slow and messy job.

A start has been made on the first peninsula. The main issue here is ensuring that it is stable and doesn't wobble from side to side. Apart from attaching the legs to the floor with dynabolts, the only other thing I can do is to try to make the supporting structures completely rigid. I achieved this by two different methods.

On two sets of supports I screwed a sheet of 19 mm green tongue particle board to the vertical and horizontal members—this seemed to do the job adequately. The support at the end of the peninsula received a different treatment—I used two steel cross braces in an X pattern with, importantly, a bolt through the middle of the X to stabilise it (**Photo 3**).

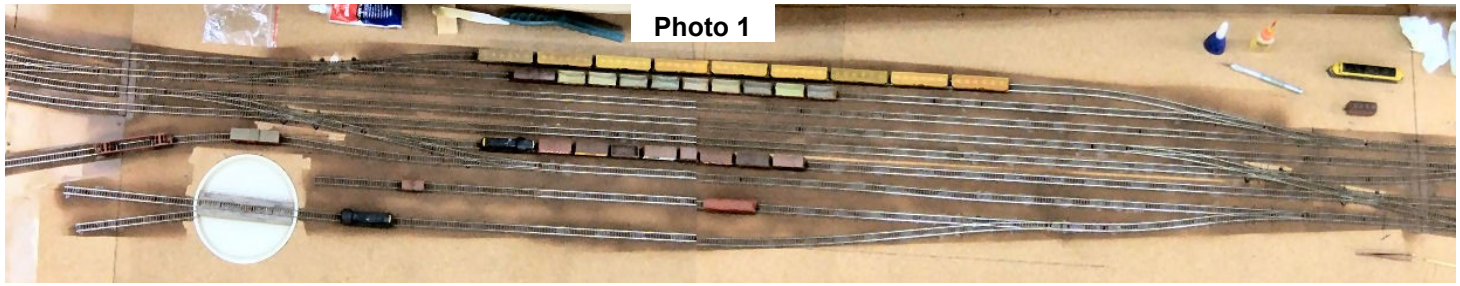


Photo 1

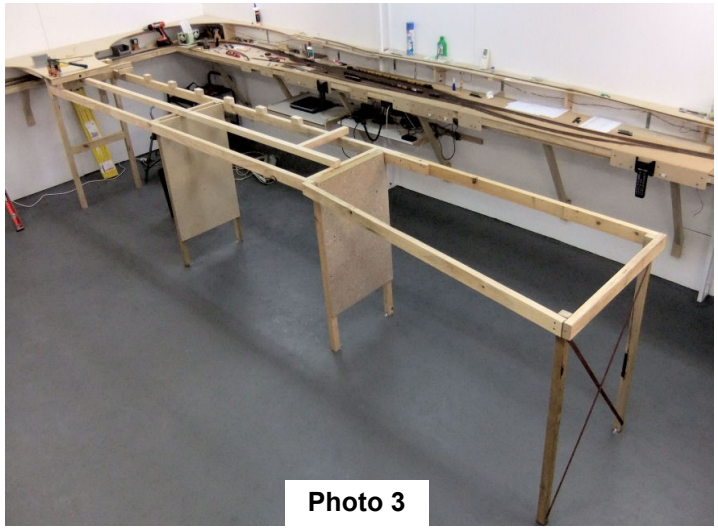


Photo 3

The peninsula is pretty rigid now with only the heaviest bump causing any movement.

Rail Motor

I have lusted after a DERM for a long time but never got around to doing anything about it. So I was pleasantly surprised to find a handsome looking ready-to-run model displayed at a bring-and-buy stand at the N Scale Convention. It is a polyurethane casting from a master made using the 3D printing process by Rob Popovski and Colin Bolin, and if the quality of this model is anything to go by, this new technique must have a very big future indeed. Colin had only six available at the time so I snapped up the first one. They can now be ordered through Aust-N-Rail at http://www.aust-n-rail.com.au/index.htm

The DERM is built on a Tomytec mechanism and runs very smoothly on DC with plenty of power. Electrical pick-up is available through all eight wheels, although traction tyres are fitted to two of them, so I suppose it's really six wheel pick-up.

As nice as the model is, I felt it could be further improved with a few modifications to make it really stand out in a crowd. I also wanted to install a decoder to run it on my layout—and I wanted working headlights.

Roof

The secondary radiator mounted on the roof above the driving cab at the motor end of the DERM has been rendered in a rather subdued fashion on the model. As it is a distinctive and eye-catching feature, especially when viewed from above as most models are, I wanted it to be as prominent as it is on the prototype.

Scaling off various pictures found on Mark Bau's and Norm Bray's websites, the radiator is a little over 9 mm in both length and width. Longitudinal grooves are fairly prominent so I used a piece of Evergreen passenger car siding and emphasised the grooves by filing gently along them with one edge of a small triangular file. The curve was made by folding the styrene around a file handle and holding it under very hot water.

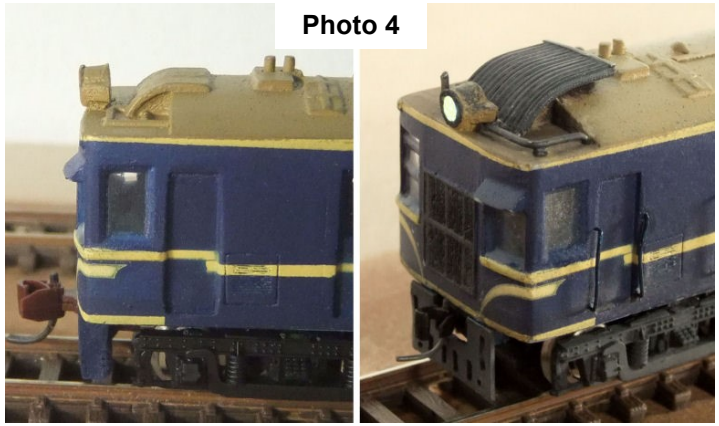
After painting it with Tamiya XF-69 Nato Black (a greyish sort of black I use for all black parts of locos) I glued it to the existing structure. This helped to raise it clear of the roof as on the prototype. There is an L-shaped radiator hose beside the radiator that is fairly obvious. It stands a few inches clear of the roof but has been cast in low relief on the model and is thus pretty inconspicuous. I removed the casting and made the hose from 0.5 mm fuse wire painted dull black.

Another feature of the prototype is the cylindrical silencer with two short exhaust pipes that sits in a shallow transverse channel behind the radiator. The model has the exhaust pipes but they are attached to a raised flat rectangular section, not in a channel—not quite the same as the real thing but, to be honest, I just couldn't be bothered remodelling it.

The cabin heater flue sticks up in front of the radiator beside the light. Mine is made from a short piece of 0.6 mm steel wire and left unpainted as it appears in several photographs.

Photo 4 compares the original roof with the remodelled one.

Photo 4



Finally, there is a narrow flat rib running down the middle of the roof, for which I used a 5 thou styrene strip about 0.7 mm wide.

Handrails and grabirons

These were fashioned from my trusty 8 amp fusewire using Spirit Design's *The Wedge*. The six doors require a handrail 6.5 mm long on either side, and the footstep recesses up the right hand side near the motor each have a grabiron, plus another on the roof. They were all cemented in place with superglue applied from inside the body, and later painted with Humbrol #15 Midnight Blue.

Decoder installation

On removing the shell and the two semi-circular weights clipped inside, it is apparent that the electrical arrangement is very simple. A long conductor runs down each side of the chassis and is connected to the wheel pick-ups. Two sprung conductor arms connected to the motor brushes press on these. It is just then a matter of bending

these two springy arms upwards to separate them from the main conductors and shortening them by a few mm. The weight at that end needs to be shortened at the inboard end by about 3 mm to clear the upturned tabs. Both weights were painted matt black as they are visible through the windows.

I installed a TCS Z2 decoder which is about the smallest on the market. It is stuck to the top of the motor with Blu-Tack, but this required gouging an area roughly 18 x 7 mm out of the centre of the roof to a depth of about 0.6 mm to accommodate it. There is no danger of damage to the roof as it is nearly 4 mm thick.

The decoder leads solder very easily to the conductors. The installed decoder is shown in **Photo 5**, with the light leads hanging loose.

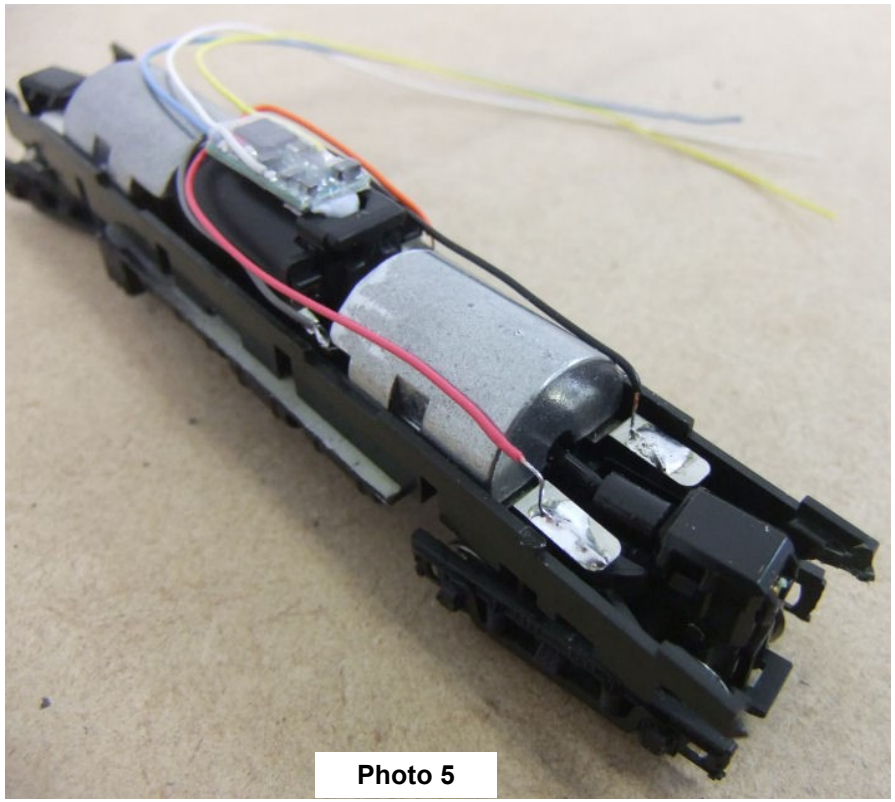


Photo 5

At this stage the DERM can be placed on the track and the decoder programmed with its new number, and a test run made to ensure all is well. By the way it doesn't matter which side you solder the decoder leads to—if it runs the wrong way just increase the value of CV29 by one.

Headlights

I think I've said before that I love lights on motive power. In the absence of sound, headlights help to bring locomotives to life. As soon as I saw the DERM it was always going to have working headlights. But the headlights on a DERM are very different to those on a diesel loco due to their standing proud of the roof. This was a challenge and required a bit of thought.

I could see two options—a 3 mm LED inside the body with an optic fibre to the exterior light, or a tiny LED in the light housing itself. Although the first option would permit easy removal of the body because there would be no physical connection between chassis and shell, I discarded it because (i) I didn't really want two relatively large light sources inside the body; (ii) the fibre would probably need to be at least 0.5 mm diameter which would make it difficult to conceal and sharp bends could be a problem, (iii) I wasn't sure what sort of lens to make at the light, as it looked like it would be too big to make from an optic fibre.

I decided to go with option two, partly because I had some nano LEDs on hand. These have leads that are only 0.125 mm in diameter and I hoped that I could drill holes direct from the light socket into the body to take them. In fact, what I hoped even before that was that I could drill out the light sockets!

My nano LEDs were bought from DCC Concepts and are 1.6 mm long by 0.8 mm wide. Their colour is called protowhite which is meant to be suitable for the steam and early diesel era, but they appear too white for a DERM so I gave them a coat of lacquer, also supplied by DCC Concepts.

The first light I did was at the motor end. I drilled out the silver painted centre of the light housing with a 1.5 mm drill to a depth of about 1.5 mm (the light housing is about 2.5 mm deep). Next I drilled a 0.35 mm hole at as steep an angle as possible downwards through the bottom rear of the light housing into the top of the roof. This hole can be taken right through to the inside if properly directed, but mine daylighted just behind the light, so I drilled a 0.35 mm hole vertically through the roof at that point. The wires had to be threaded individually through the first hole, pulled up, then threaded through the second hole. This was not easy. When painted, the tiny wires would be almost invisible, but as it turned out they are almost totally concealed by the radiator. **Photos 6 and 7** (next page) show the LED wires inserted into the hole, and the LED nestled in the light socket.

I did a better job on the other light as the angled hole went right through the roof without daylighting. I thus took the opportunity to open it out to 0.5 mm to facilitate threading the wires—they went through easily.

Before going further I thought it would be a good idea to test the LEDs to ensure they were functioning. Using a piece of PCB breadboard I made up a test board with five different resistors—470Ω, 1KΩ, 2.4KΩ, 4.8KΩ and 10KΩ. With some leads hooked up to a 9V battery both lights worked fine, but then I did a bit of fiddling and one of the LEDs suddenly decided to stop working. No matter

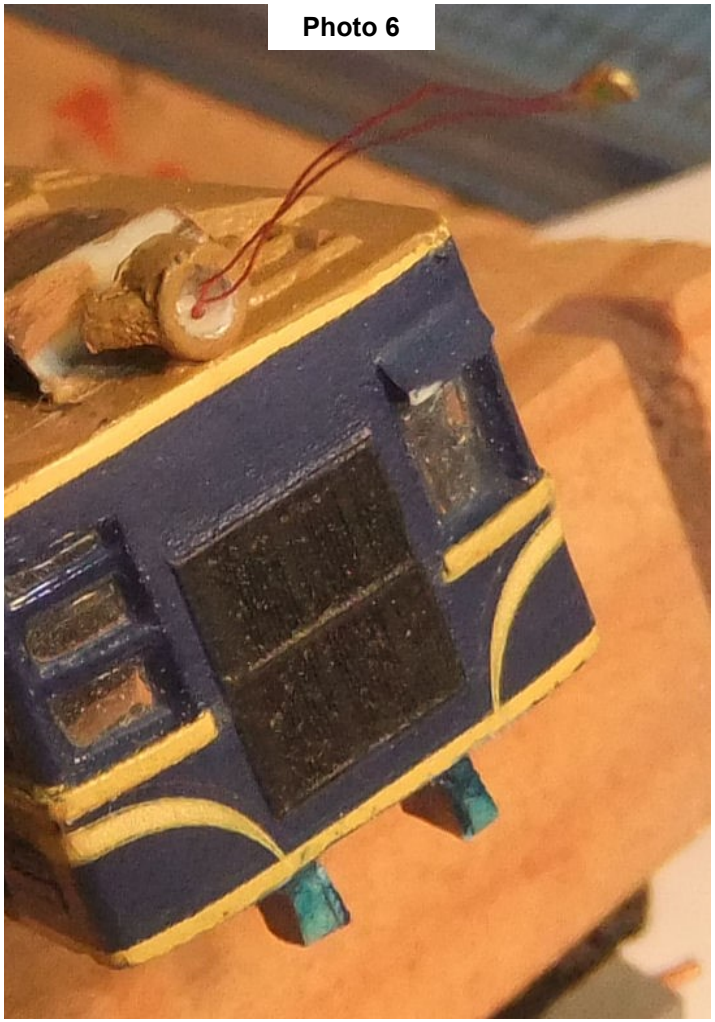


Photo 6

what I did it would not illuminate. I can only surmise that it must have touched a battery lead without going through a resistor and was cooked. Anyway I found another one and it tested OK. Fortunately it was the LED at the non-motor end that died and was therefore fairly easy to remove and reinstall a new one.

The LEDs were way too bright on the smallest resistor but looked about right with 4800 ohm in the circuit. This needed two resistors of 2.4KΩ each but when I came to putting them in I decided I wanted to use only one resistor to reduce crowding, so put in a 10KΩ instead, which was physically much smaller. Although a little less intense than the other, I think it is suitable for a DERM as I don't imagine their lights were super bright.

I initially had a bit of a problem removing the lacquer insulation from the fine LED leads and tinning them, but when I cranked the soldering iron up to 400° it went like a breeze. (For those who haven't used this sort of wire, removal of the insulation and tinning are done in one step simply by running the wire back and forth through a blob of solder on the tip of the iron.)

The leads on the LEDs are fairly long so I clipped a bit off the decoder leads. Unfortunately all the wires are going to be visible through the windows so they'll need to be painted black.

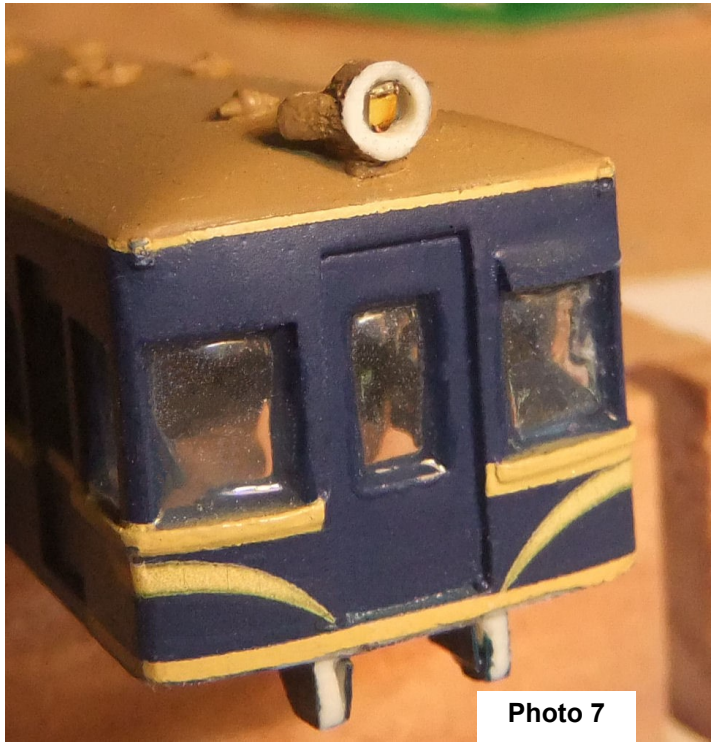


Photo 7

Before doing any soldering I checked to make sure I knew which was the cathode wire on each LED and that the white decoder wire was going to the front light and the yellow one to the rear. Fine. Soldered the two cathode wires together and then put the 10KΩ resistor between them and the blue decoder wire, and tested the lights. Fine. Soldered LED wires to the white and yellow leads and tested on the track without putting the shell on. The lights shone at the wrong ends. Not fine. Turned the shell around and it was fine again.

But I wanted the shell the other way round so desoldered the wires and reattached them. Fine. It was time to fit the shell to the body. After painting all the wires black I attempted to do this but all was not fine as the body refused to sit snugly on the chassis. Why? Because the body was on back to front—the battery boxes should be at the motor end. Removed the shell and managed to dislodge the one-piece casting of tanks and boxes on one side. Even less fine. Desoldered and resoldered again, the wires becoming progressively shorter with each operation, thus making it more and more fiddly. Then onto the test track where the lights finally synchronised with the travel direction. Fine.

However there was one final glitch—one of the couplers fouled the bogie frame by the tiniest amount. I had to do a bit of micro surgery on both coupler and bogie to obtain clearance. Once that was done she ran like a bird.

I noticed the lights were much whiter than on the other locos so painted some diluted Tamiya yellow over them whilst the DERM was idling on the track. It has more or less done the trick. I also decided to fill the light sockets with araldite in the hope that this would give a yellowish cast and also to make them look more like proper lights. Although the LEDs are thus entombed they are still visible due to the transparency of the araldite.

Cowcatcher and couplers

On the model as bought the cowcatchers are cast on and measure about 2.5 mm thick (over a foot in real terms) and look decidedly clumsy compared to the real ones made from plate steel (**Photo 8**). The

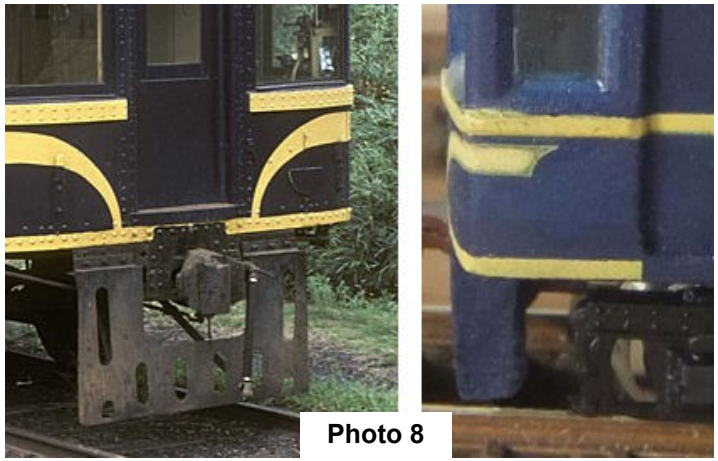


Photo 8

couplers look larger than normal even though they are MicroTrains 1015s, which we know are way oversize. Z scale couplers are much closer to scale but just the thought of replacing every one of them in your roster is enough to make you want a cup of tea, a Bex and a good lie down. Nevertheless I took one look at the DERM and decided that Z scale couplers would be required with the thinner cowcatchers. Fortunately the couplers are only screwed in and therefore easily replaceable.

After removing the couplers, saw off the lower part of each cowcatcher level with the bottom of the triangular brackets that support them from the rear. Then make longitudinal saw cuts alongside the outer edges of the brackets, down to the base of the body. Now make horizontal cuts to remove each piece, so that just the triangular sections remain (**Photo 9**). Be careful not to place any stress on these otherwise they will snap off due to the brittleness of polyurethane. I did and one did, but fortunately it stayed on the bench so I glued it

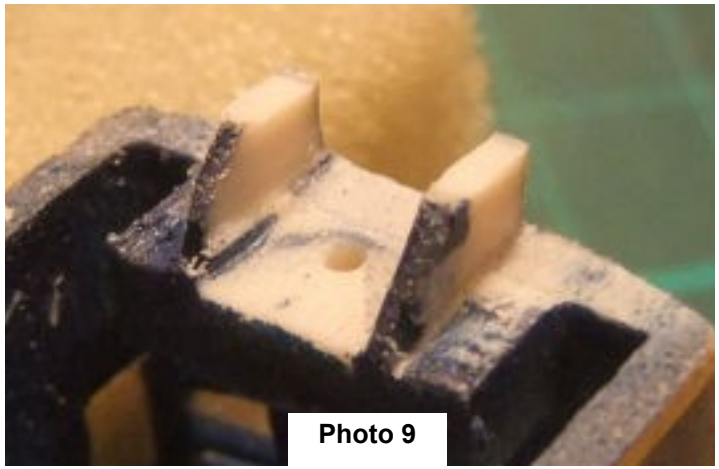


Photo 9

back on.

Because Z scale couplers are thinner than N scale, they need to be lowered a fraction. Glue a piece of 10 thou styrene into the coupler pocket, having first drilled an oversize hole in it approximately where the coupler screw will go. Glue small pieces of 20 thou styrene onto the inner sides of the triangular sections to fill the gaps either side of the coupler. **Photo 10** shows these additions.

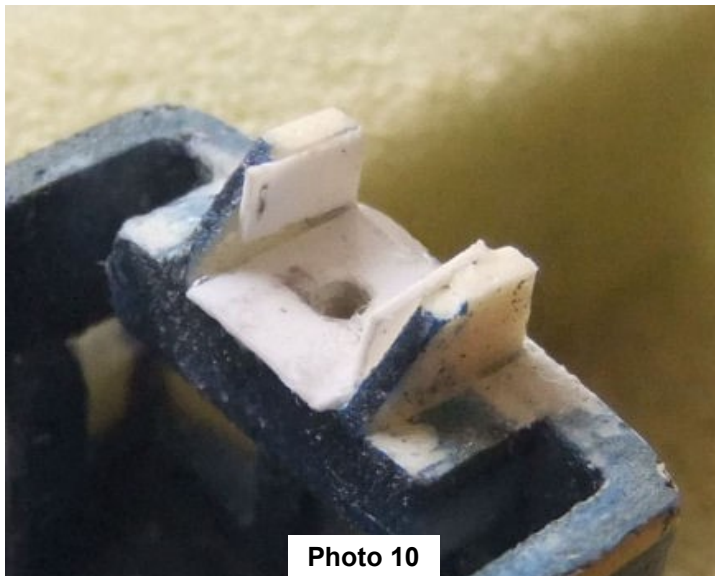
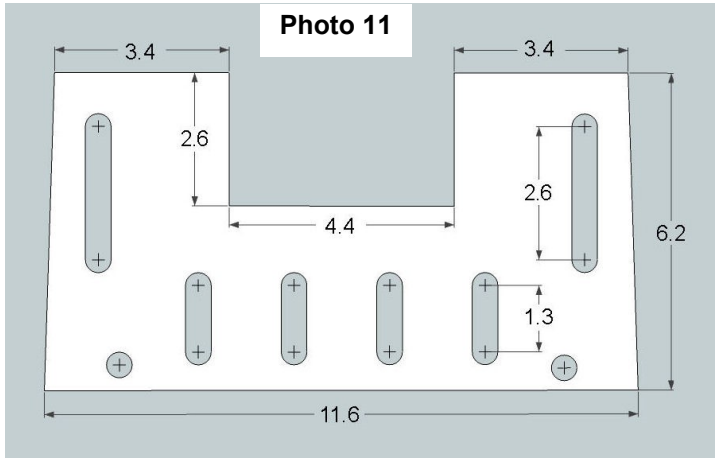


Photo 10

I made the new cowcatchers out of 20 thou styrene. This is equivalent to 3" thick in real terms but any thinner would be pretty flimsy. The main dimensions are shown in **Photo 11**. All the slots are 0.5 mm wide. I found the best way to make them

Photo 11



was to drill 0.5 mm holes at the points marked by crosses and then cut very carefully down each side. Yes, it's very fiddly but worth it I think. The locations of the crosses are best obtained by scaling off the drawing (the inclusion of all dimensions would have crowded it too much). I spent quite a lot of time cleaning up all the cuts—they looked pretty bad under a magnifying glass or in a blown up photo, such as **Photo 12**.

After making sure the couplers fit properly, it's probably best to paint the cowcatchers now before attaching them permanently to the body to ensure

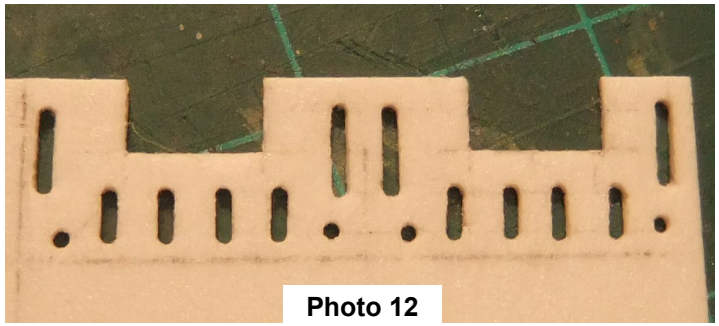


Photo 12

you don't get paint over the thin yellow stripe that runs along the bottom of the body. I first put on a coat of thinned Humbrol #15 Midnight Blue gloss enamel followed by a coat of Nato Black, so that just a tinge of blue showed through the black. The couplers can now be screwed in and the new cowcatchers glued in position.

Most photos of DERMs reveal them in fairly dirty condition, particularly on the front and rear panels. The yellow stripes become brown and anything black turns grey. The roof is usually quite a dark colour. Using Bragdon weathering powders, I therefore gave the roof of my model a dusting of black, and applied a good dose of ash to the front, rear and lower part of the sides and to the bogie frames. Some of the original paintwork got a bit battered during the modifications as did the handrails, but no more so than the real ones I think (**Photos 13 and 14**).

The unit is to be RM63 but must await numbering until I get the decals. Same goes for the horns. Other than that, it is ready for service.

Photo 13

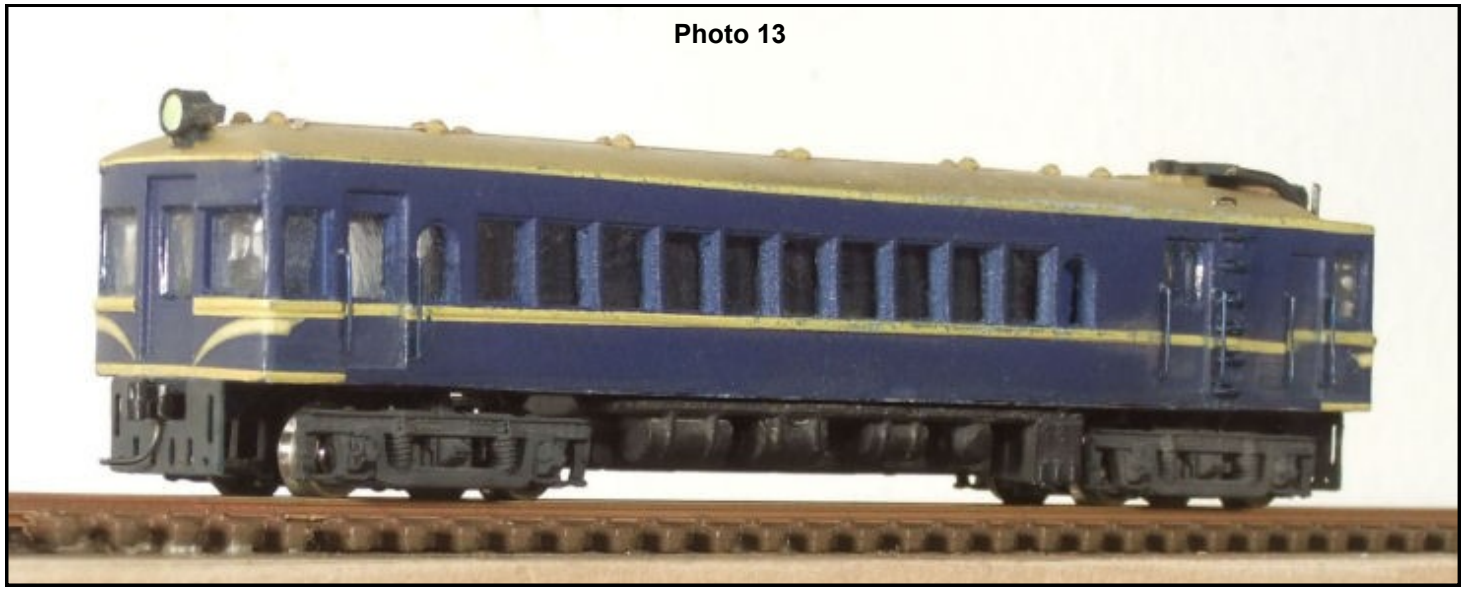


Photo 14