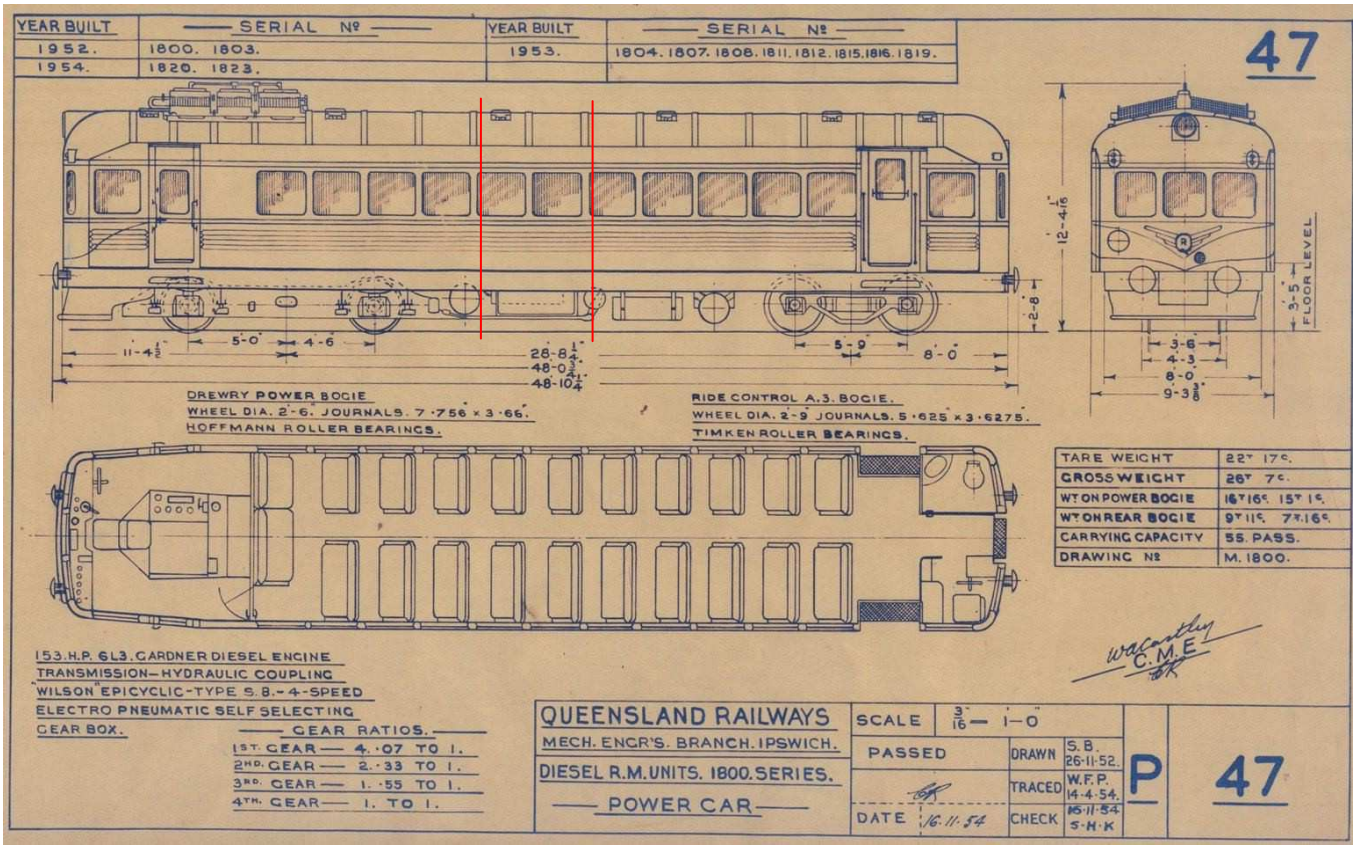
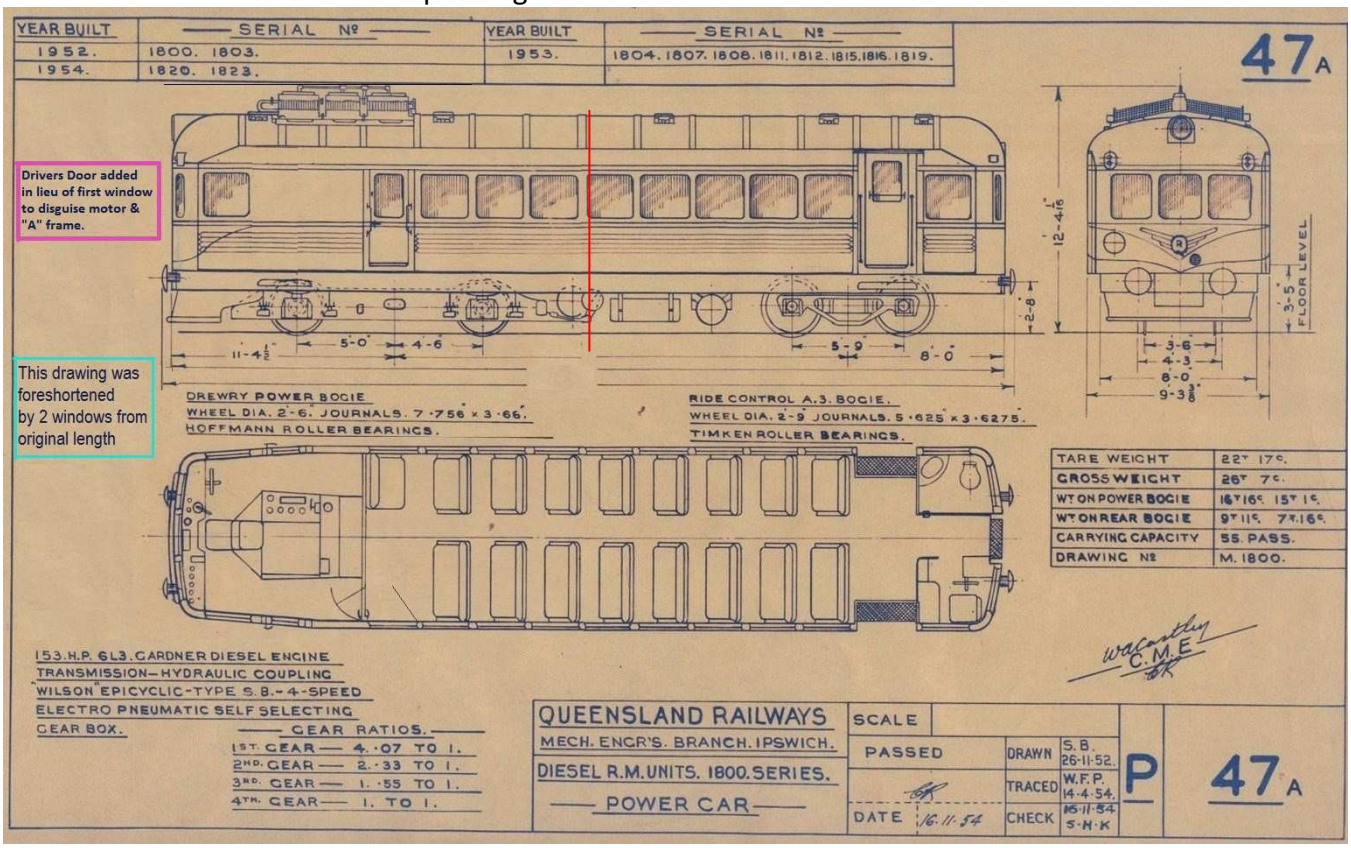
The BTR, 1800 Class Rail Motor – shortened.



This drawing by QR Ipswich is acknowledged and was the starting point for the BTR drawings used for the model. The front taper in PLAN (left here) at 1/24th scale reduces from 118mm down to 104mm but that feature was not incorporated in the model. The 118mm width would have created clearance difficulties on friend's layouts as well as on the BTR. Similarly, the overall body length at 621mm needed to be reduced for the model to accommodate G scale track curves on the BTR. So for this model I chose to cut & closed 2 window bays.

The driver's door shifted to first passenger window to hide motor block "A" frame.



Modified drawing of the model, driver's door shifted and two middle windows have been removed.

The BTR, 1800 Class Rail Motor – shortened.

Completed 1800 class railcar (minus bogies) mounted on NSWGR well wagon in preparation for delivery to Queensland.

This is the configuration that was sought for the BTR model but with the driver's door shifted to right.

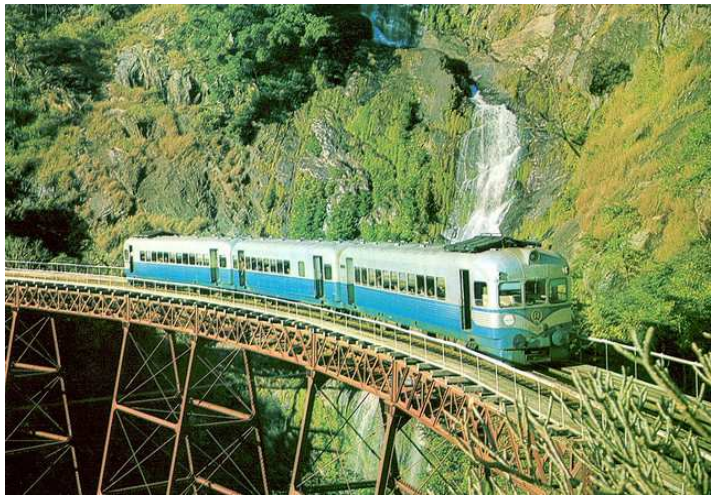


The rear end door and windows were proportioned based on these photos.


Proportioning the front was awkward and yet vital to the appearance of the model.

The BTR, 1800 Class Rail Motor – shortened.

The 1800 Class ends are actually “kinked” at the window mullions to appear as if there is a gentle curve.
The roof line ‘forehead’ above the windows is actually built on a curve.



Early version Colour, pale Blue

The vehicle on display at Rosewood. This photo is well lit by sunlight and shows best, the undercarriage detail.

Similarly it shows the interior engine cowling ‘box’ in the drivers compartment.

The BTR, 1800 Class Rail Motor – shortened.

Later version Colour, darker Blue.

Rear end detail and some undercarriage details.

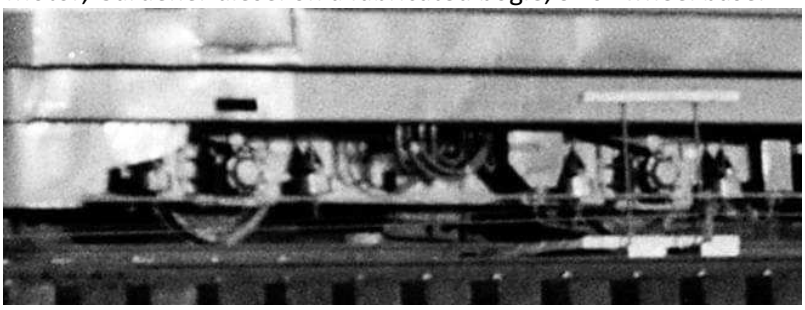
Gulflander “Red” at Normanton as a trailer car.

The Drive Bogie

The BTR, 1800 Class Rail Motor – shortened.

The Drewry drive bogie from an 1800 Class Rail Motor, Gardener diesel on a fabricated bogie, 9'-6" wheel base.

Close Up of the Journal, Springs and Sand Box.



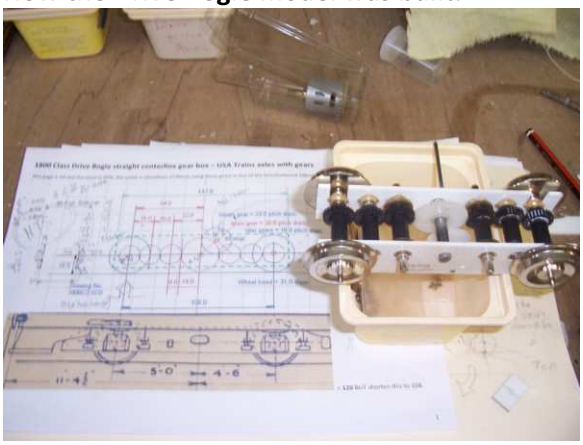
Only part of the bogie "shows" beneath the Solebar/Fascia board.

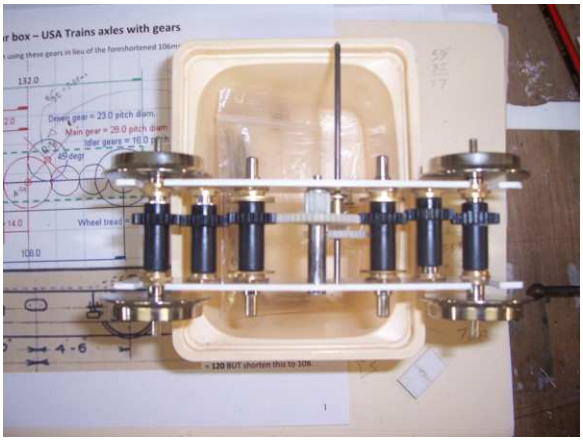
The first item modeled was the Drive Bogie. Once that was found to be running well then the remainder of the model was begun. The Idler Bogie was modeled next, then the footplate was tested to ensure that bogie swivel did not fowl with the under floor cowling.

The model of the Drive Bogie as "run-in".

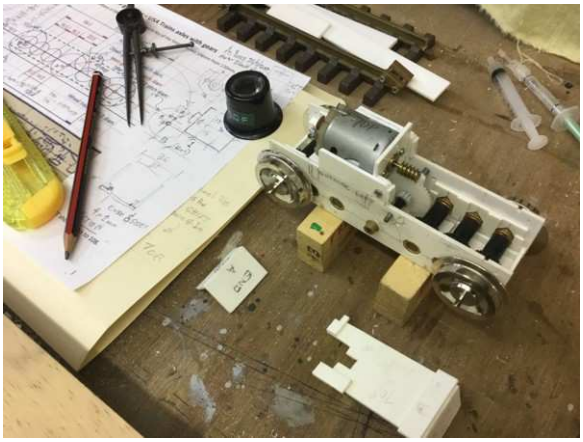
The model of the Idler Bogie in 3.0mm styrene.

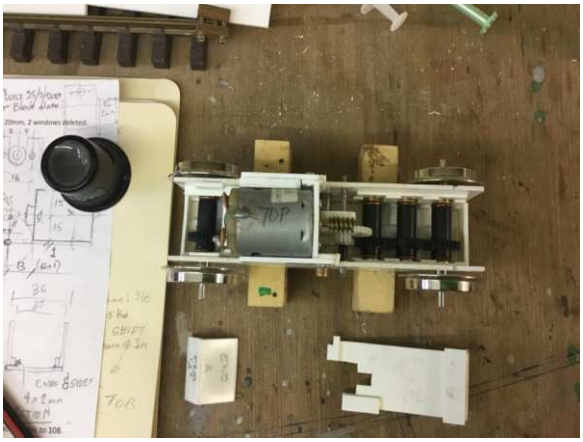
How the Drive Bogie model was built.





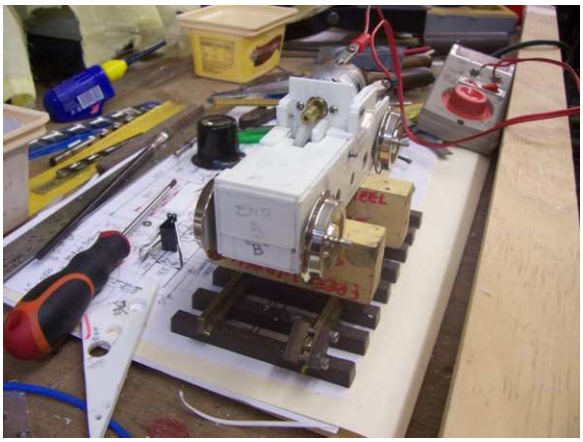
USA Trains wheels, axles and gears plus worm & wheel and reduction gear to attain ideal running speed.





The BTR, 1800 Class Rail Motor – shortened.

The 12 volt motor has been mounted, bushings and spacers adjusted, it is ready to run in.



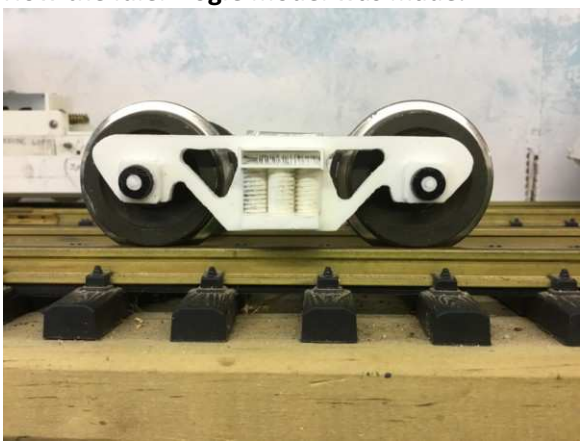
Running In

"A" Frame on 9mm plywood footplate (floor).

Testing clearances on 3'-0" radius curve.

End 'throw' and mid length 'throw' are checked.

How the Idler Bogie model was made.

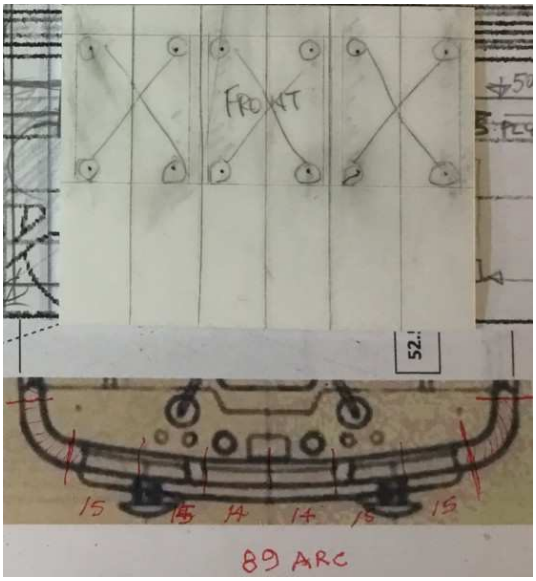


Side Frames were fretted from 3mm styrene,

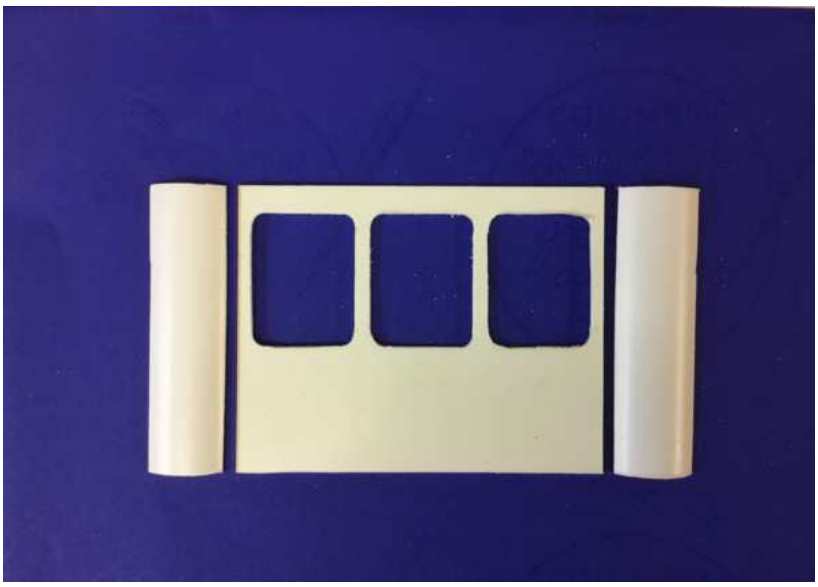
Bolster is 2.5mm Aluminium, bushings are bronze.

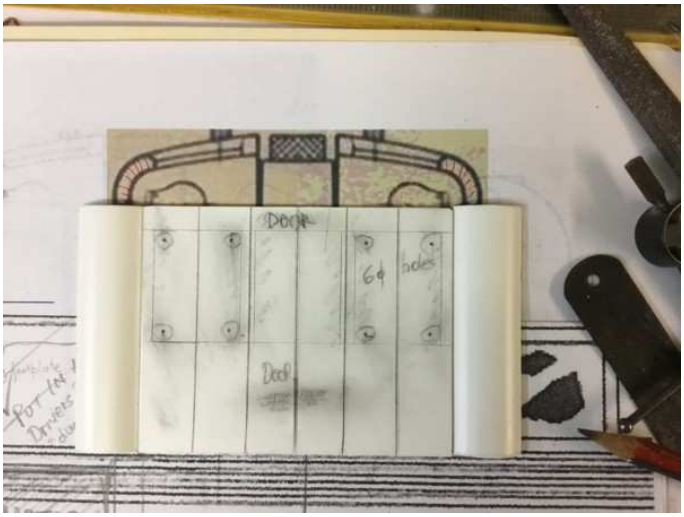
The BTR, 1800 Class Rail Motor – shortened.

How the body shell was built.

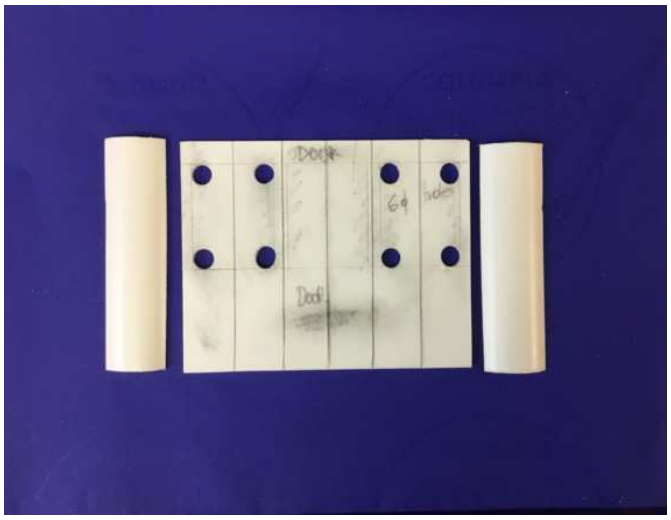


Front End set out ready for drilling & fretting.


Front End ready to induce curvature.



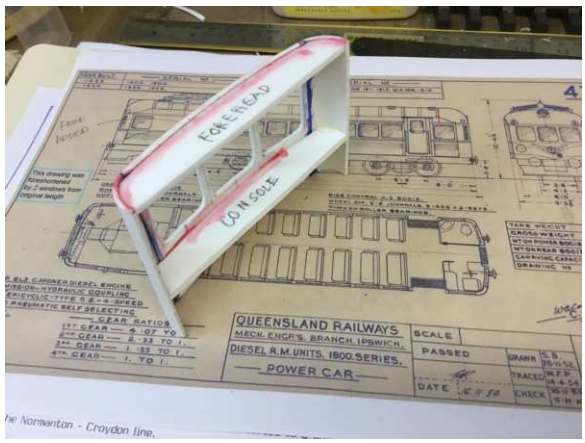
Back End set out ready for drill and fret.



Back end ready to fret windows.

The vertical scribed gutters are used later to partially 'break' the sheet and induce a curvature.
The corner ARCS were slit from 25mm O.D. Plumbers PVC pipe.

The compound curved front and back end walls.

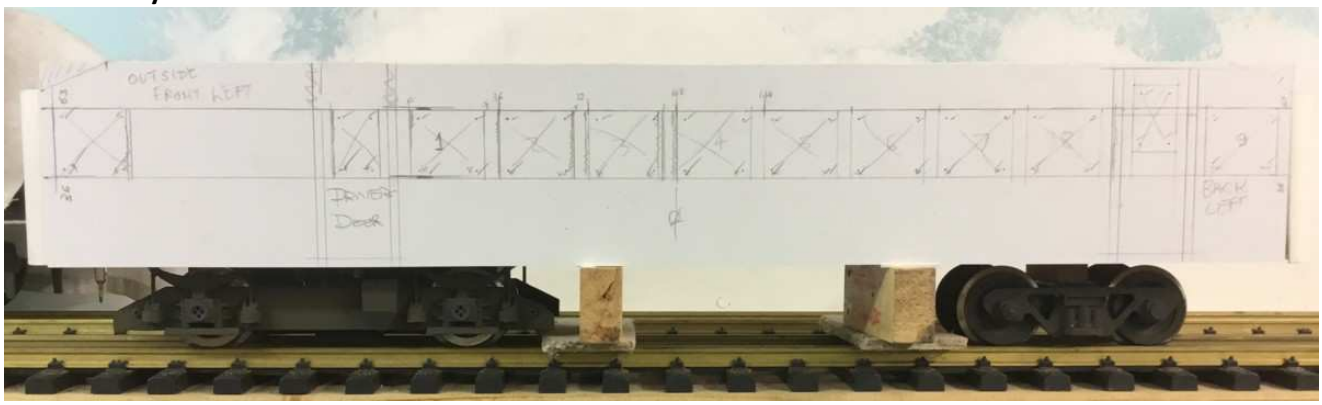


Front end wall, curved and stiffened with profile cut console & forehead pieces.

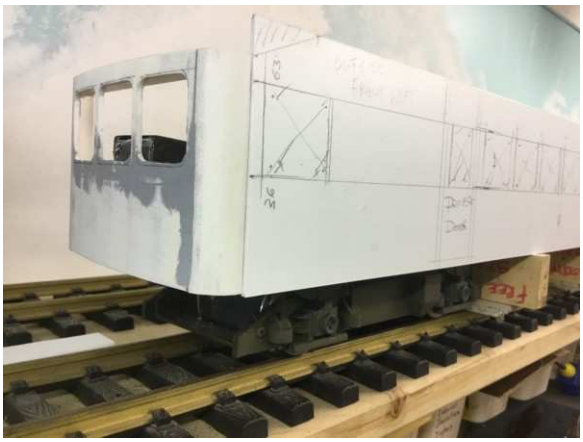
The BTR, 1800 Class Rail Motor – shortened.

Back end wall, curved and stiffened with profile cut sill & forehead pieces.

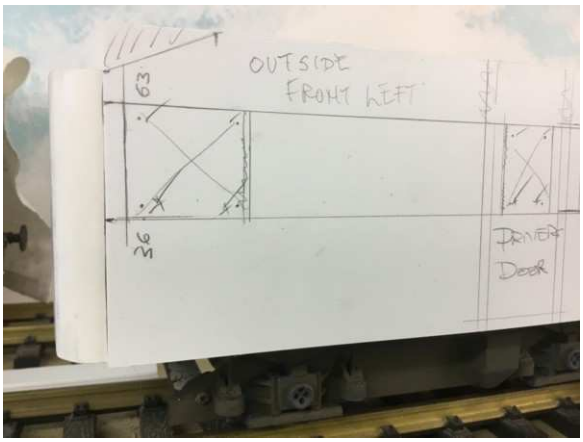
How the body shell Sides were made.



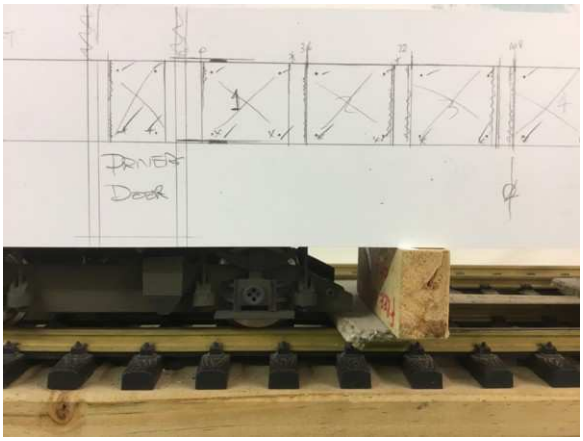
Marked out in pencil on 2mm styrene, checked twice, hole centers popped and checked then 'ticked' as OK.



Front Left corner, trial fit to check alignment.



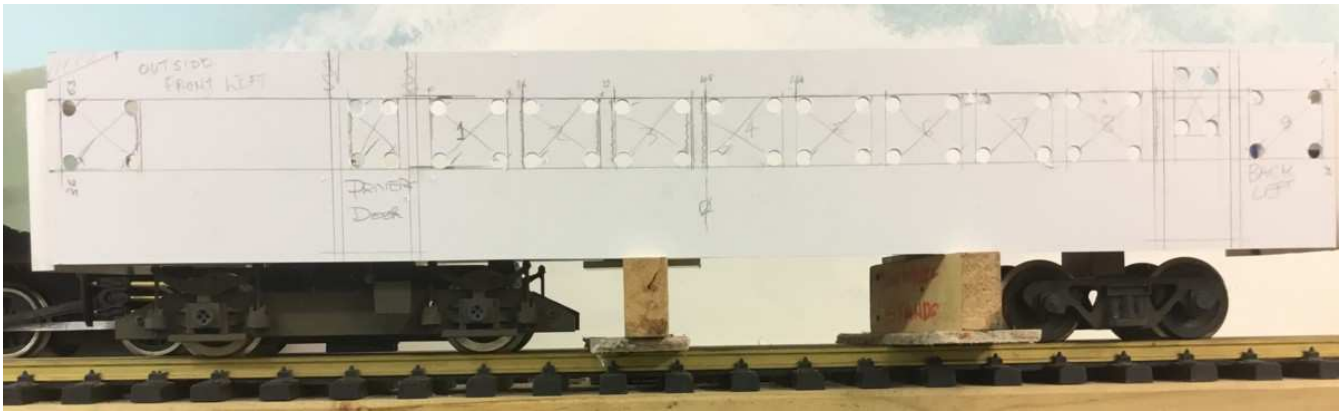
6mm diameter holes form the corners of window cutouts.



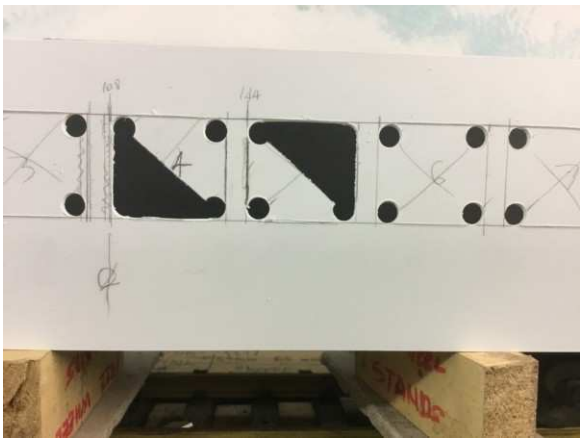
Drivers Door replaces what was a window location.

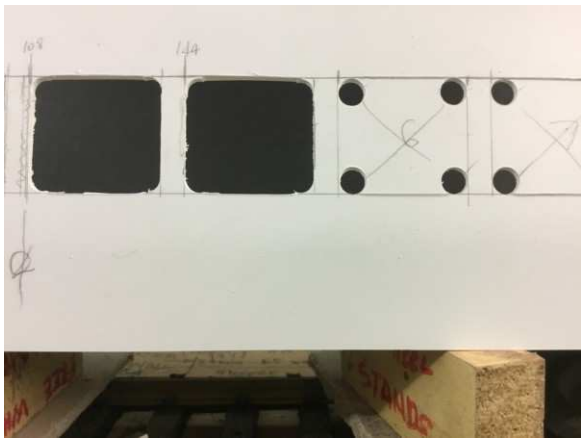
Rear End wall trial fit to left side wall.

The BTR, 1800 Class Rail Motor – shortened.

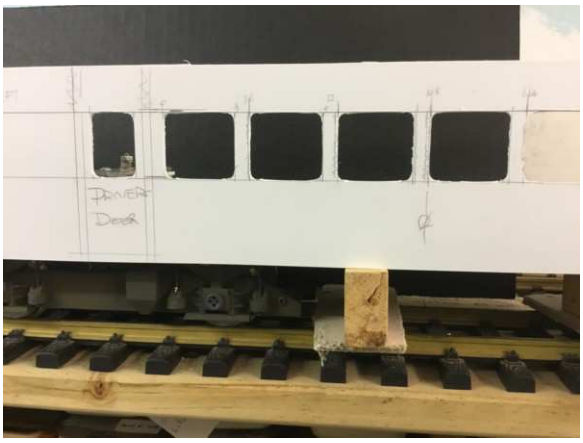


Holes drilled, 0.75 diameter pilot hole, then 6.0mm corner holes, accuracy is paramount here.

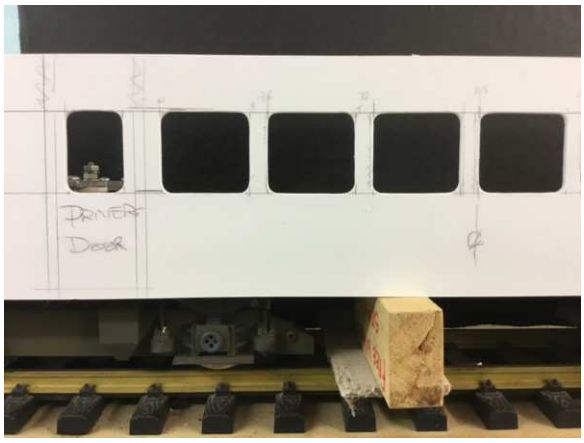




Horizontal lines scribed deep, verticals fretted, diagonals fretted to 'breakout' triangles along scribed horizontals.

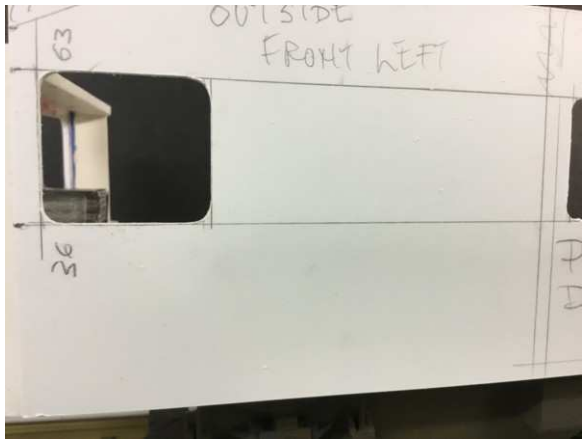


Rough finish after 'breakout' needs lots of filing.



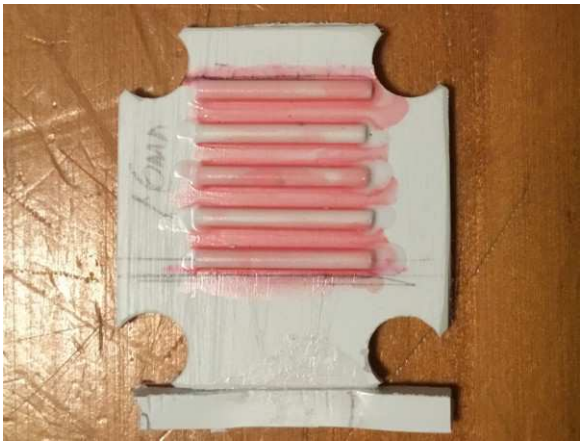
Windows sanded ready to add side Corrugations.

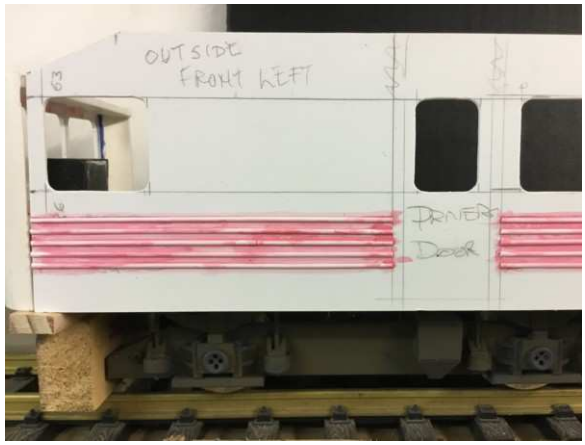
Photo of a check of alignment at corner joint.



Window cutouts are dressed ready for finishing.

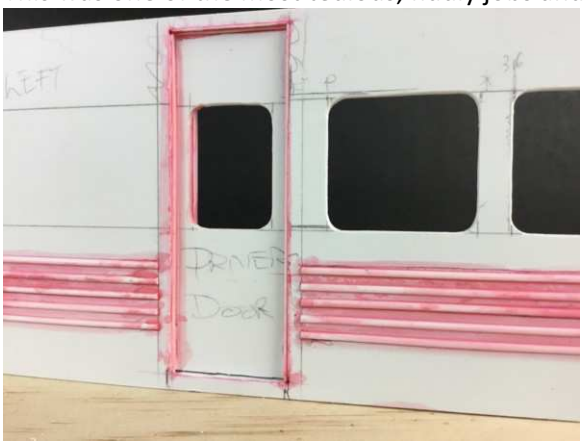
The BTR, 1800 Class Rail Motor – shortened.





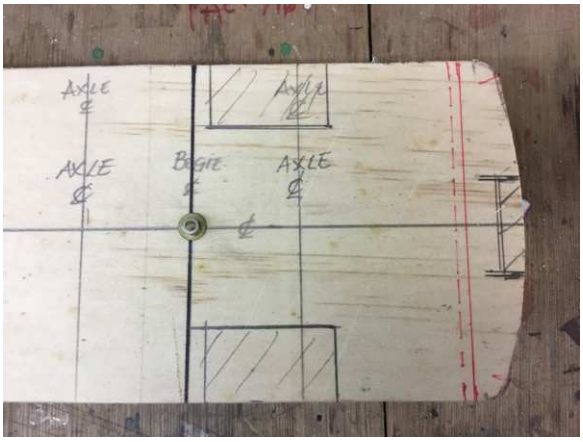
This is a test sample of sidewall with the 5 corrugations affixed.
The red colour is MEK with a red dye added which indicates if full capillary action flow has been achieved.
The sidewall corrugations were made by laying 1.5mm x 0.75mm half circle strips 2.0mm apart.
That "D" profile is made by Evergreen Scale Models and is their Part No. 241.

This was one of the most tedious, fiddly jobs and yet very rewarding when completed.



Drivers door was cut around and recessed back.

The back doors were boxed in and stiffened.



Cut-outs in footplate for boxed in back doors.

Sides & back end trial fit to footplate.

The BTR, 1800 Class Rail Motor – shortened.

Front end & Sides trial fit.

Considerable stiffening inside back door cut-outs.

Now ready to start roof assembly. To keep centre of gravity low, roof is to be Balsa construction.

How the Roof sub-assembly was made.

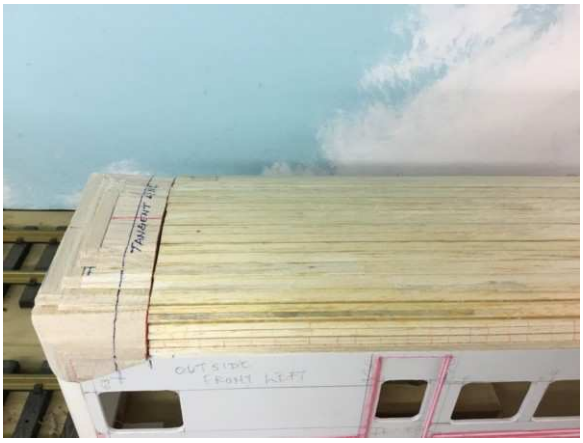
Balsa BLOCKS which are yet to be whittled away.

Profile cut cross section rafters

The BTR, 1800 Class Rail Motor – shortened.

The front end layers of balsa ready for shaping.


The back end balsa block prior to shaping.




A lot of shaping and sanding yet of the roof Brow / Forehead, mid roof is strips of balsa to be filled & sanded.

The sub floor Valance and 'Cow Catcher' were made and attached.

The BTR, 1800 Class Rail Motor – shortened.

While the drawing shows the “cow catcher” as sloping the various vehicles built had the cow catcher with a vertical face. It is seen here that the side cowling following the cow catcher appears shorter on this model than on the prototypes. This is due to shortening the whole rail motor and fudging the bogie centers to compensate appearance.

Back to sanding and shaping of roof end blocks

Lots of whittling, sculpting, patching and sanding.

Next the balsa will be primed then fine sanded.

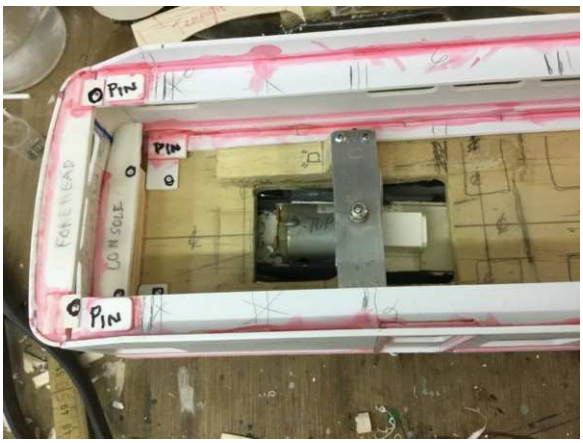
The BTR, 1800 Class Rail Motor – shortened.

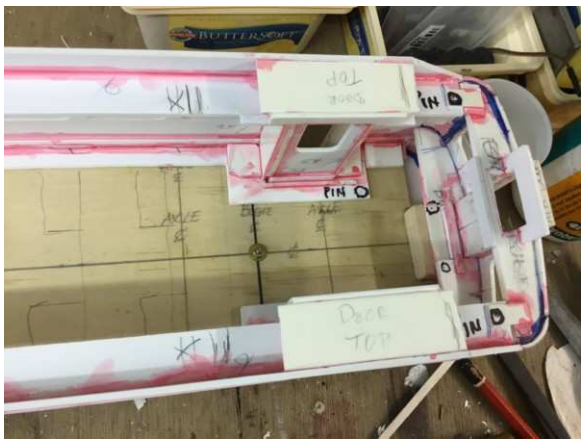
Roof curves are finished after numerous cycles of primer, filling, sanding, primer etc etc.

Headlight now in place, more filler, sanding and primer.

Locating pins presently hold sides to ends and floor.

The four corners are ready to be glued together then joints will be puttied and sanded preparatory to painting.



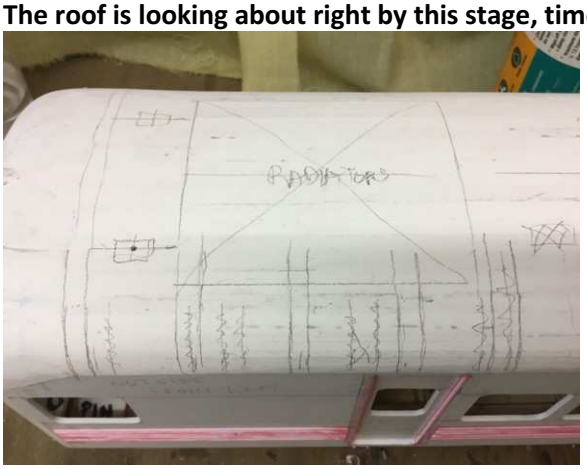


Locating pins temporarily hold the sides & ends in place prior to final corner glueing.

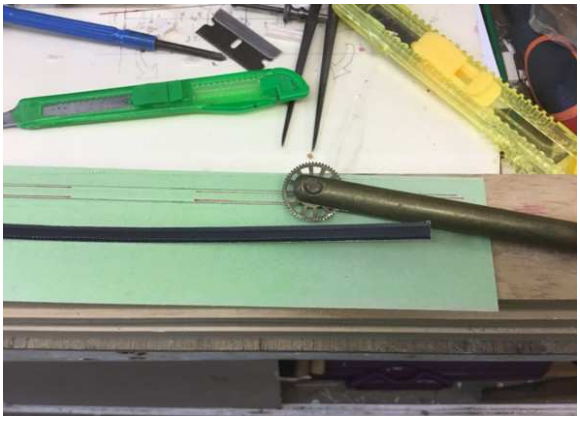
Before committing to sides to ends glueing, lots more trial fitting and planning for access and dis-assembly when maintenance is to be done in future.

The BTR, 1800 Class Rail Motor – shortened.

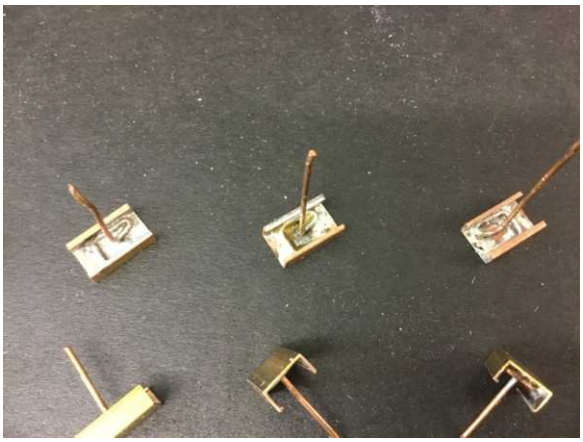
The roof is looking about right by this stage, time to fit roof vents and plate lap rivet seams.

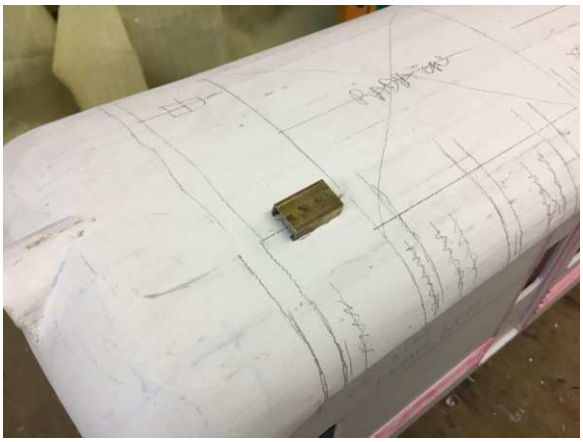


Pencil marks denote the locations of rivet seam paper overlays, holes are ready for the roof vents.

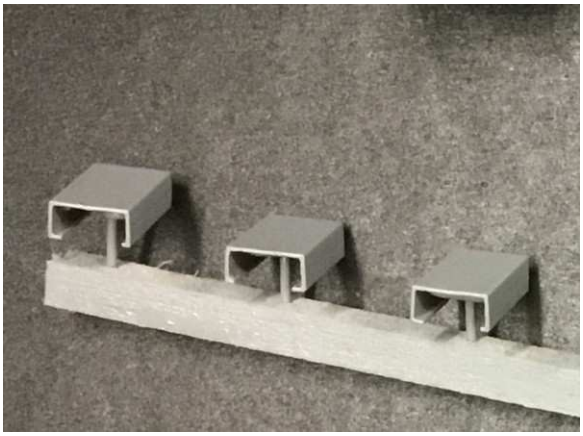


An old clock gear was used to emboss faux rivets into stout paper strips that are glued over the roof arc.





The roof vents were cut from brass RHS 5/16” x 5/32” then copper wire ‘pins’ were soldered into inside.

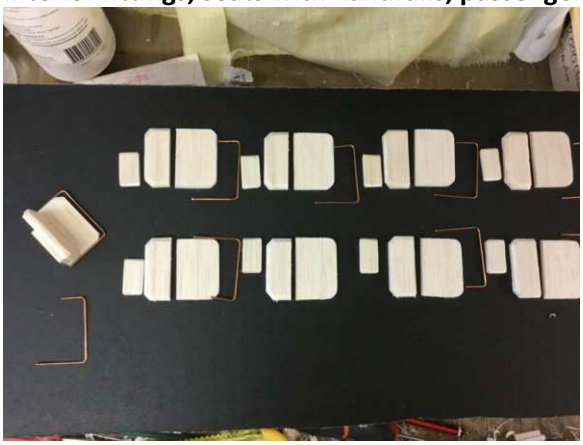


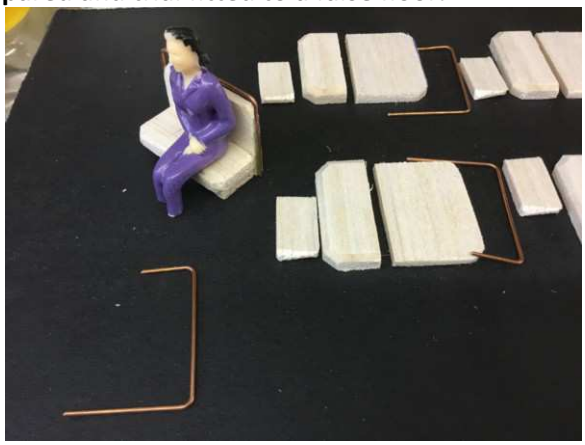
Vents primed ready to fit on roof.

Roof rivet lap strips being glued across arc.

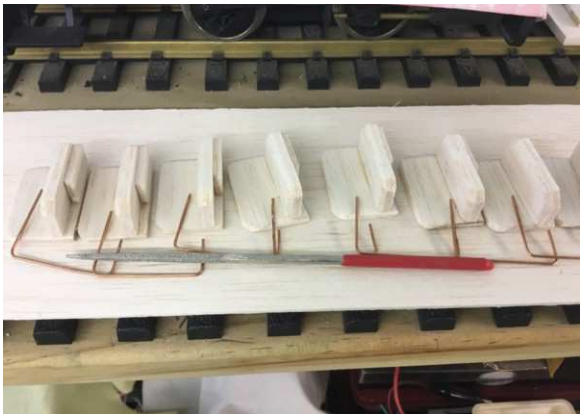
The BTR, 1800 Class Rail Motor – shortened.

Interior fittings, seats with handrails, passengers etc were prepared and trial fitted to a false floor.



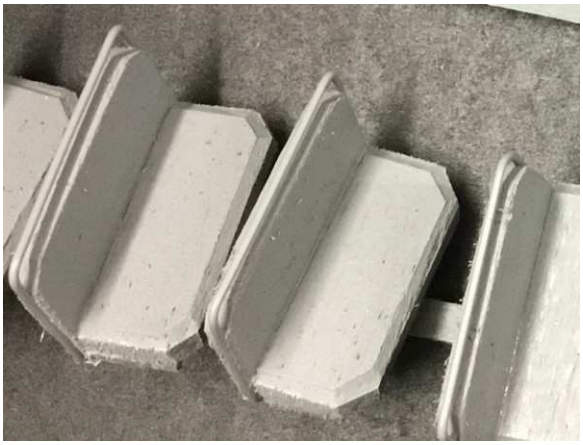


Seats are balsa, handrails are 0.9mm copper wire bent to fit neatly over seat backs, sub-assemblies ready for glue.



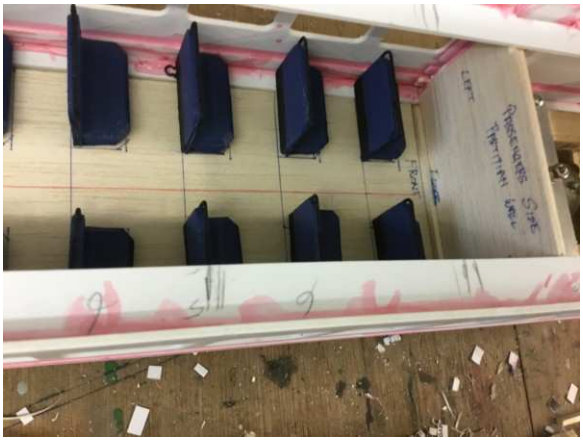
Process technique ensures consistent size and appearance.

Completed seats ready for paint & passengers.



Seats primed ready for painting.

Passengers & Seats painted ready to install.



Seats loosely fitted until glazing is trial fitted.

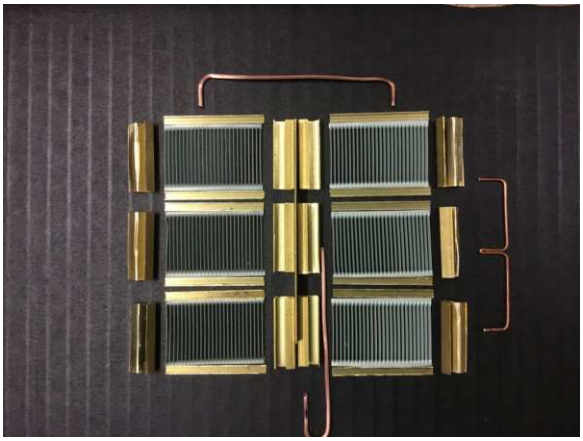
Partition wall between passengers and engine bay.

The BTR, 1800 Class Rail Motor – shortened.

Headlight and marker lights.

Front Marker Light housings, Red at top, White below. Rear Tail Lights are 3mm diameter Red LEDs.
Front Marker Lights are via Fibre Optic strand 1.6mm diameter distributed from hidden LED's in Forehead cavity.
Headlight is a 5mm diameter LED "Warm White" behind an opaque disk lens.

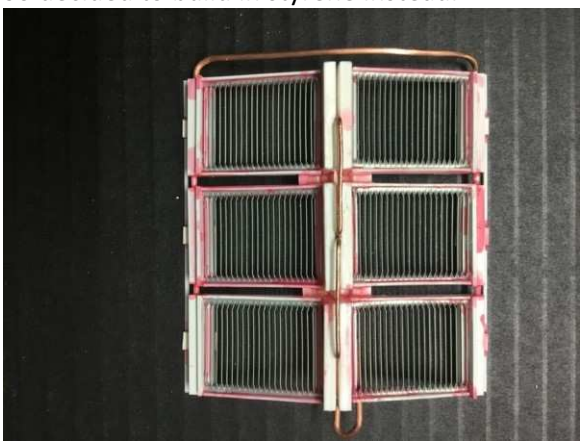
Radiators as a sub-assembly, fitted to roof as a finished unit.



Sketch scaled 1/24th & close-ups of Radiators assists in proportioning components ready for soldering together.

Unfortunately, all attempts at soldering the brass components ended up in a solder laden mess, so started again.

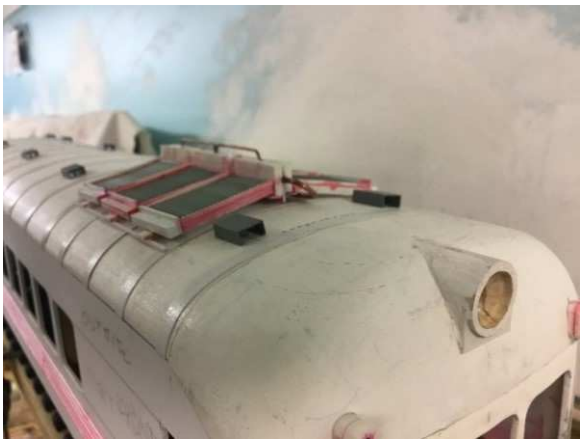
So decided to build in styrene instead.



The second attempt was far more successful in styrene, it is also cleaner, neater and more accurate.

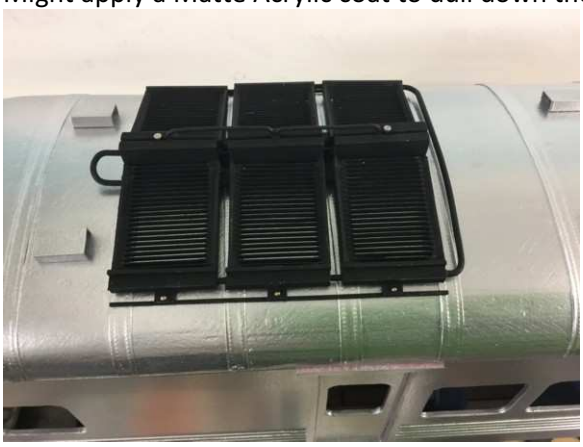
The BTR, 1800 Class Rail Motor – shortened.

Completed Radiator unit atop the roof



This styrene version is fragile compared to the planned brass version and yet it looks good.

Aluminium colour done, surprising how silver more than any other colour shows up the slightest imperfections. Might apply a Matte Acrylic coat to dull down the gloss finish.



Painted Radiator on painted roof.

Pins inserted to hold it in place.

Masked off ready for the Blue colour below window sills.

PVA glue used as a mask for curves & sweeps.

The BTR, 1800 Class Rail Motor – shortened.

Painting and finishing.

The front end, PVA mask is evident here and this is where finish means a lot, left it until last to take it easy, not sure what to expect when the masking is removed, fingers crossed!

Here we go, well some of the Aluminium colour came away too, will use a paint brush to touch up & tidy up.

All the glazing pieces were prepared a week ago. Now it is time to trial fit them. Just in case they need to be removed some time in the future, have planned to use a technique that avoids styrene cement or MEK. A tight fit that 'clips' into place and will not shake loose in service.

The BTR, 1800 Class Rail Motor – shortened.

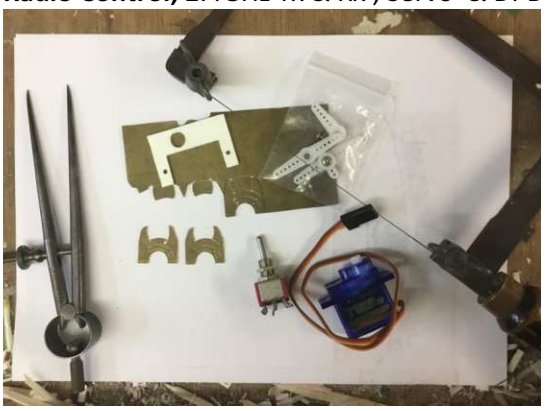
Yet to add undercarriage details; air tanks, fuel tank, compressor etc etc..

Ready to add Lights into bezels.

Some of the more fiddly work begins, wiring, glazing, paint touch ups, acrylic matte medium to dull down gloss.

The BTR, 1800 Class Rail Motor – shortened.

How the electronics were done.
When the Rail Motor is turned ON, the lights come ON and the motor running / IDLING sound is activated.
This means that - at a glance - we can see/hear if the unit is On or OFF.
Battery; is a LiPo 3S, 10.8 volts.
ESC – Electronic Speed Controller with BEC - Battery Eliminating Circuit is a 20Amp version for Brushed Motor.
Radio Control; 2.4GHz Tx & Rx , Servo & DPDT Centre Off switch for direction & Horn.

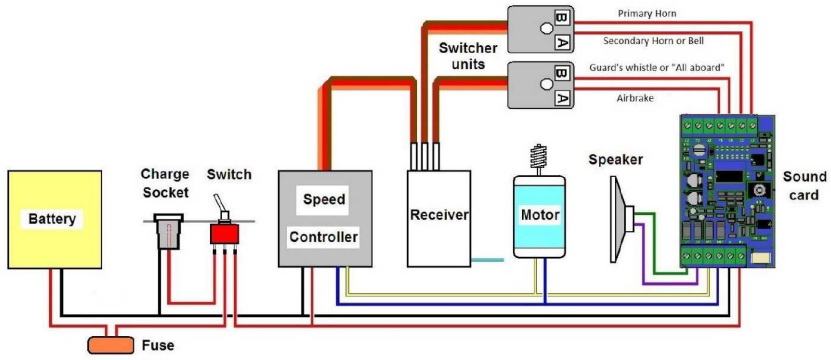


Brass CAM drilled & fretted.
2.0mm styrene plate holds Servo & DPDT switch rigidly to allow torque of Servo to flip the switch toggle arm to centre off or either direction.

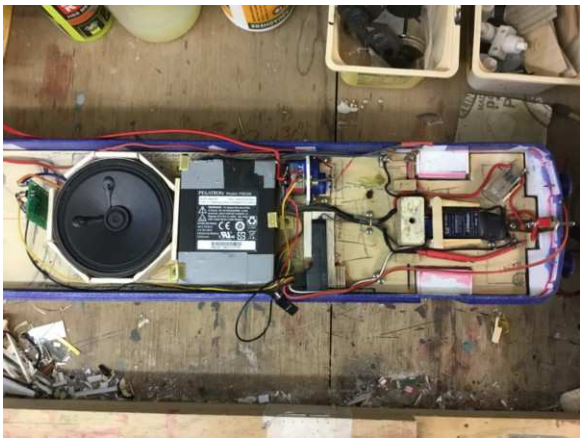
To activate the horn sound a wire is soldered to the cam. A 2nd wire to the switch body joins battery. As the switch toggle clicks past top dead centre it leaves the cam. However, holding the servo 'on' longer makes the cam 'contact' the metal toggle, close circuit, thus sound the horn in Forward or Reverse.

This Loco uses a **MyLocoSound** card diesel version in the Railcar mode (gear changes sound as accelerating).
The instructions that come with the MyLocoSound card include the diagram below.

The wiring diagram below shows a typical installation for common types of battery powered radio control systems.



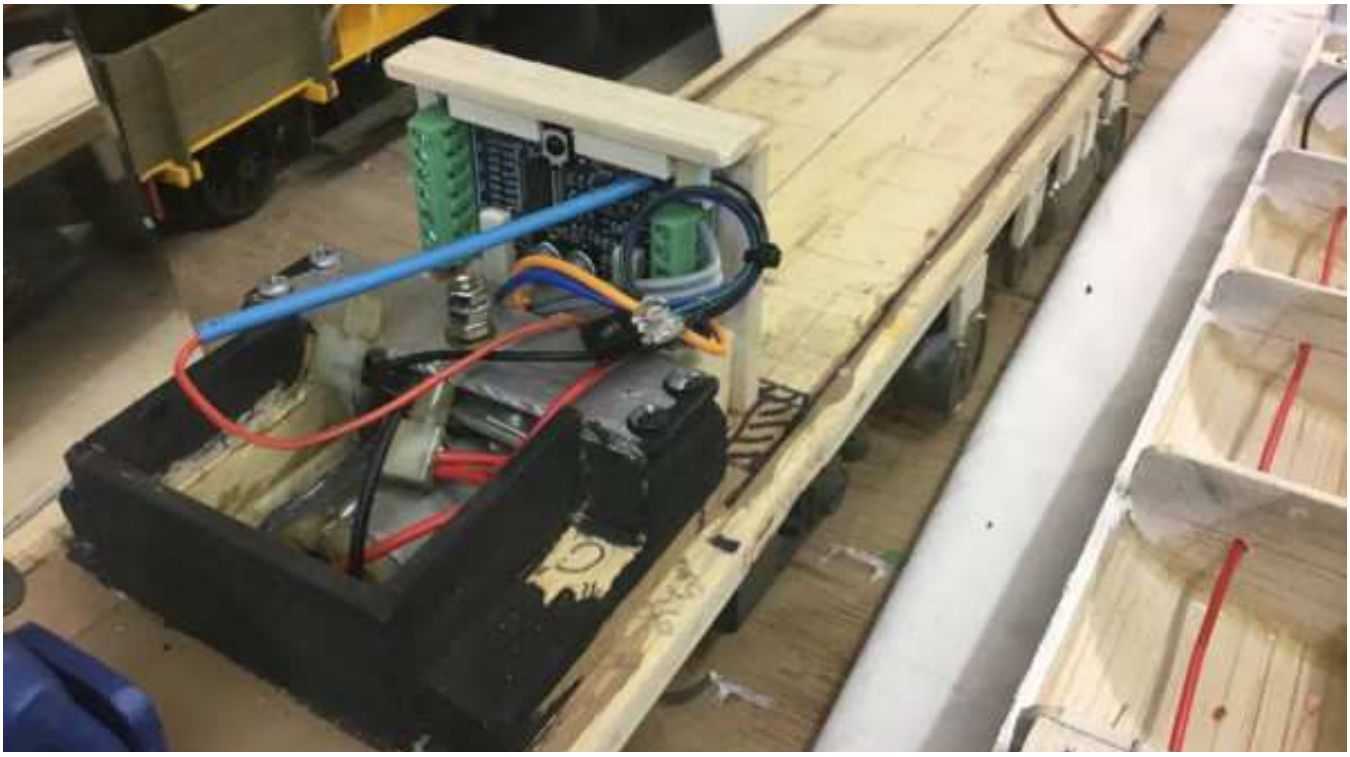
The loose set out of parts under the footplate. A 75mm diameter 8 ohm speaker. A 10.8 volt LiPo battery, ESC, Rx & Direction Servo & DPDT Switch. All clear of bogie swing.



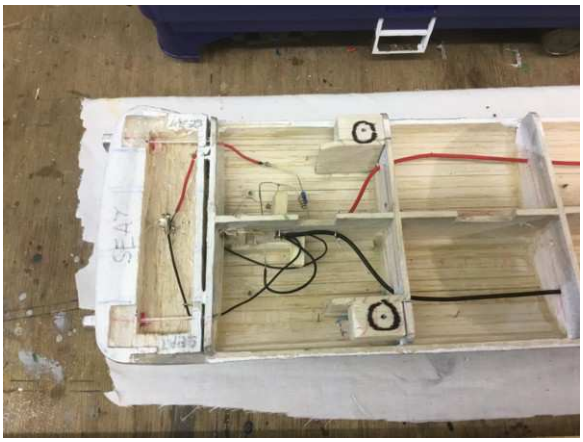
Set out of components fixed and hung from underside of floor.

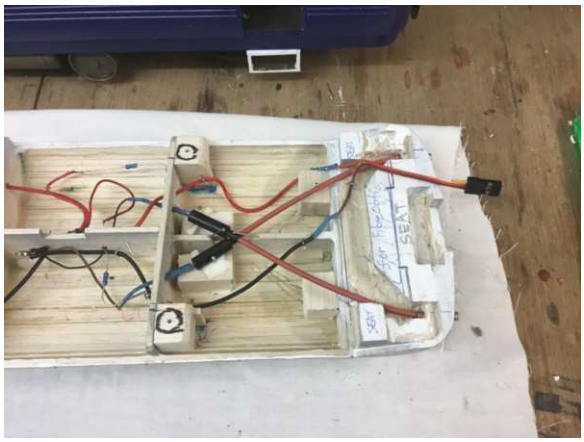
Binding the Rx to the Tx.

The BTR, 1800 Class Rail Motor – shortened.



The MyLocoSound card sits against the back wall of the Engine bay, the IR sensors are seen through windows. Setting up the numerous sounds or adjusting them after the model is assembled is done via a TV Remote Controller to the two IR sensors, one inside the drivers door, the other via the front drivers window. Sounds can be activated via the Tx or the TV remote controller.





Layout of lighting leads, LED's and Fibre Optic strands in tubing in roof cavity.

The Roof is screwed to the body shell first, then the seats on a false floor are inserted, the footplate is screwed to the body shell from the underside

The BTR, 1800 Class Rail Motor – shortened.

Completed model on test run indoors.

The BTR, 1800 Class Rail Motor – shortened.

Undercarriage details weathered with track grime.

See a short VIDEO of a run outdoors on the BTR at https://youtu.be/cvMTdSPcjfk