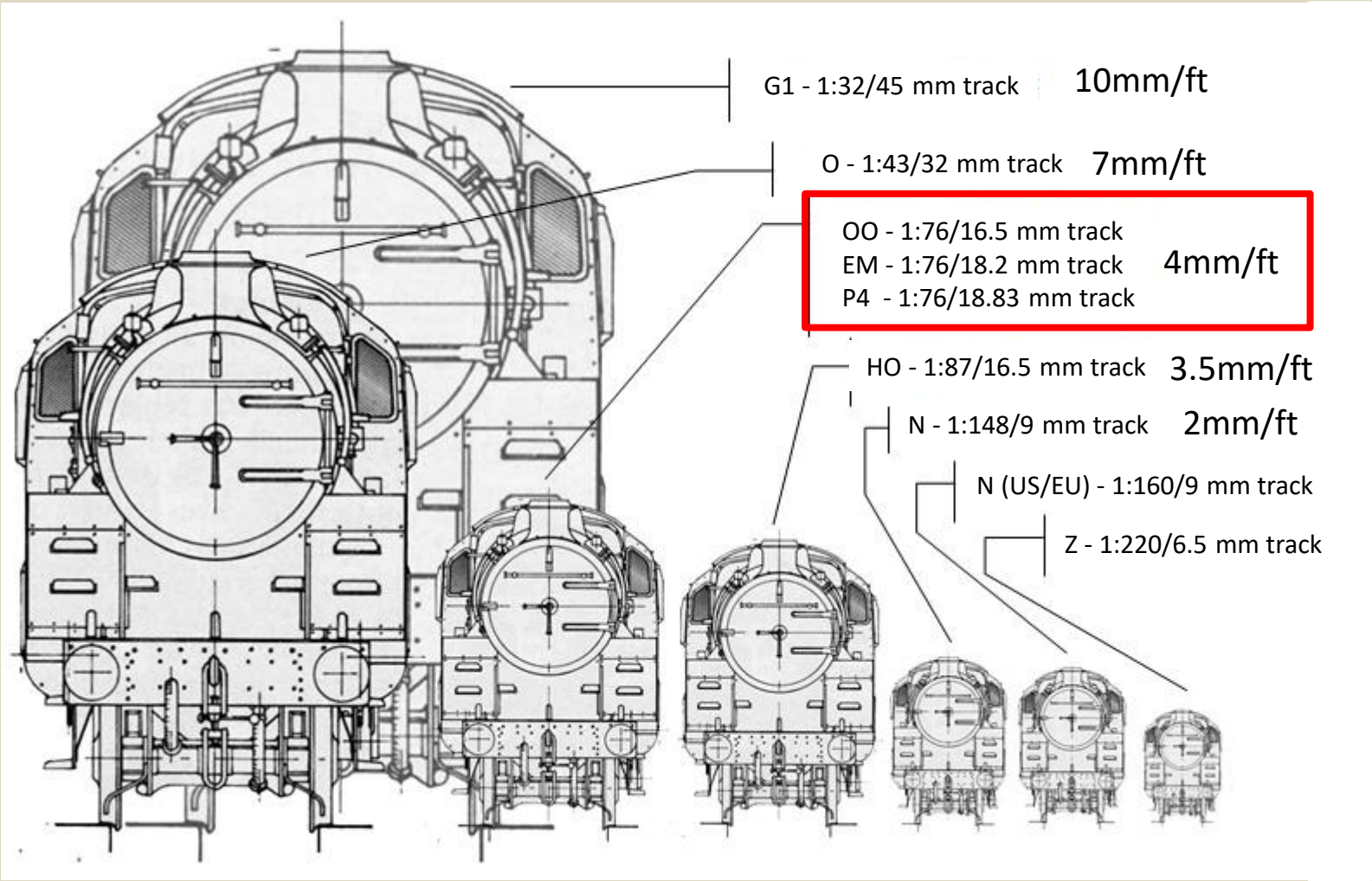
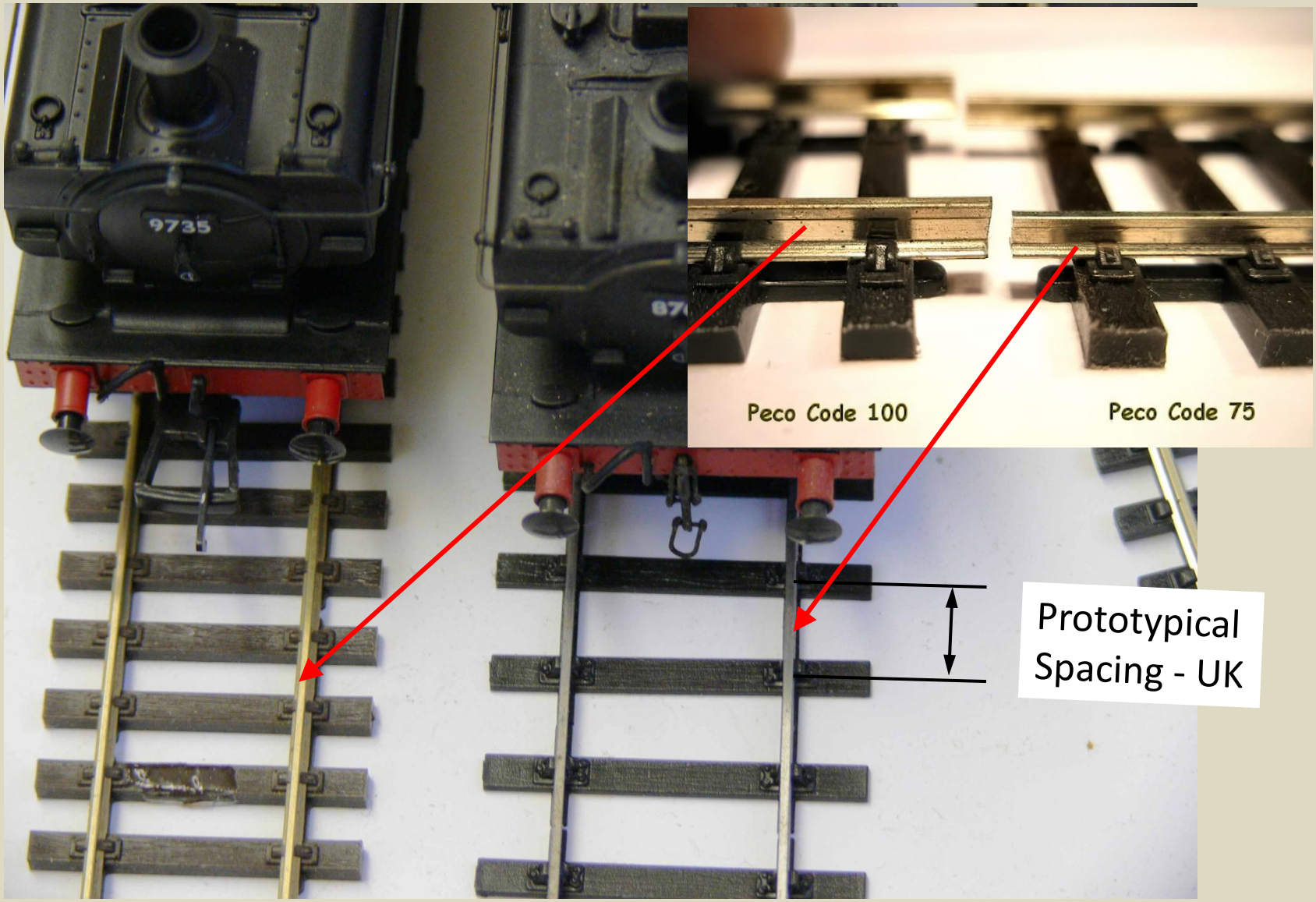
Brighton East:
4 mm Scale, EM Gauge,
Southern Area 3rd Rail Layout

© Andy York

The issue of gauge and scale!



Comparison between OO and EM track



OO - Peco Streamline

EM - C & L

OO - Peco Streamline

EM Handbuilt

Basic Layout Facts

LOCATION: Brighton East depicts a Southern Region rail terminus loosely around 1998 to 2003 where 3rd Rail EMU's prevail on passenger services.

SCALE: 4mm/ft

Track gauge: EM – 18.2 mm

Layout size: 13' 3", 10 ft scenic using 2 x 5 ft scenic boards and a 1m fiddle yard board.

Track height: 48" from the ground.

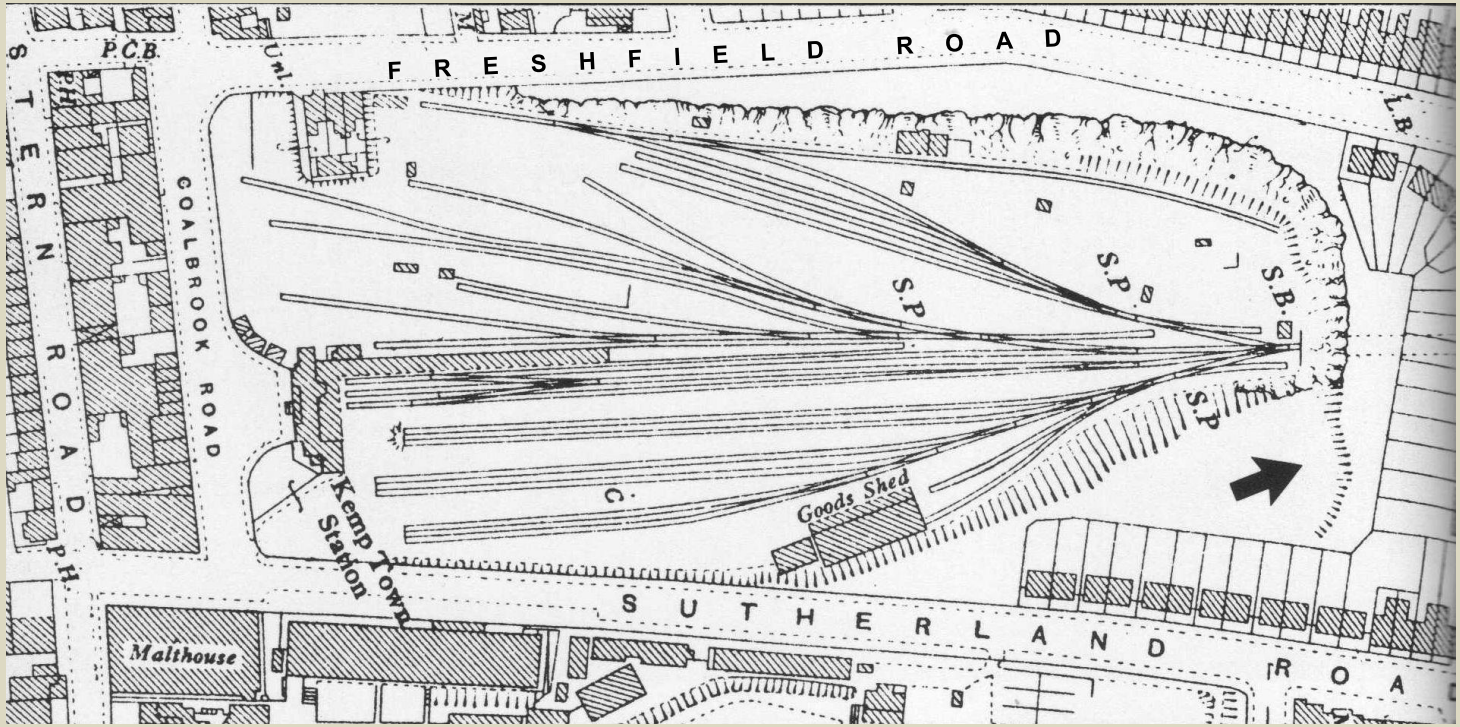
Board Construction: 6 mm ply sandwich beam with integral back scene.

Genesis - 1: A departmental unit!

2EPB Set converted to a Sandite Unit

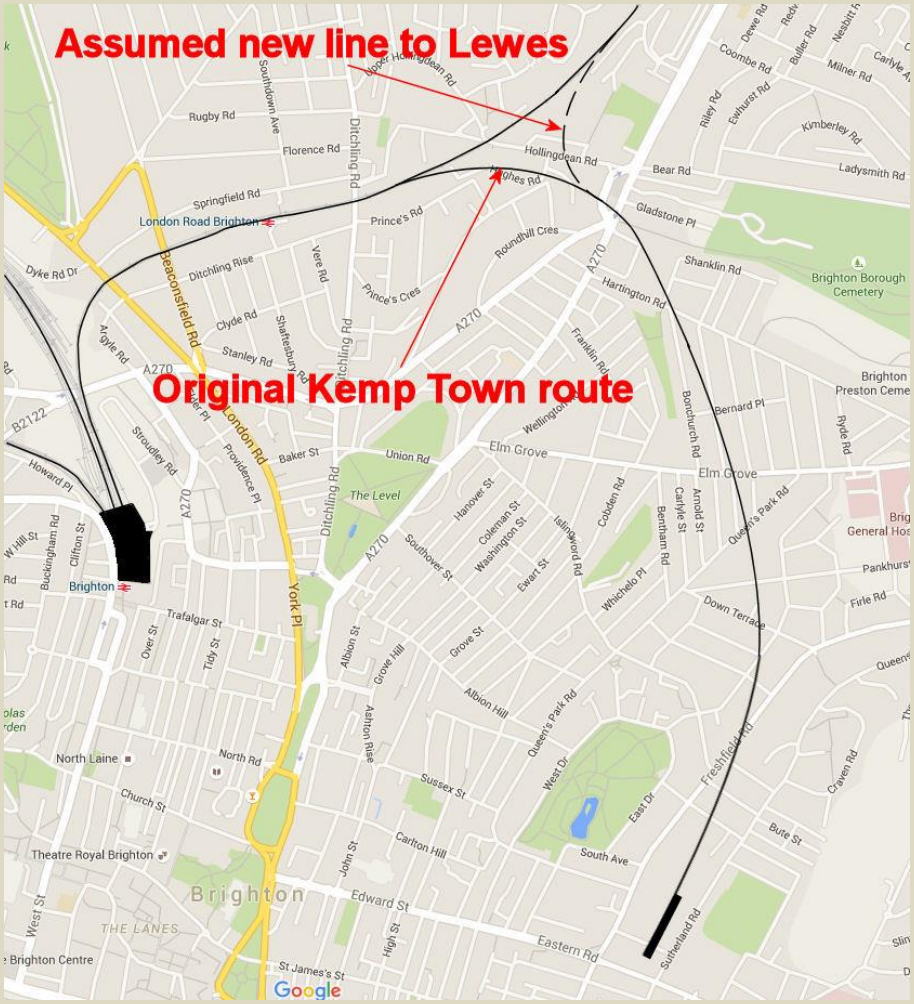
DC Kits 2EPB kit

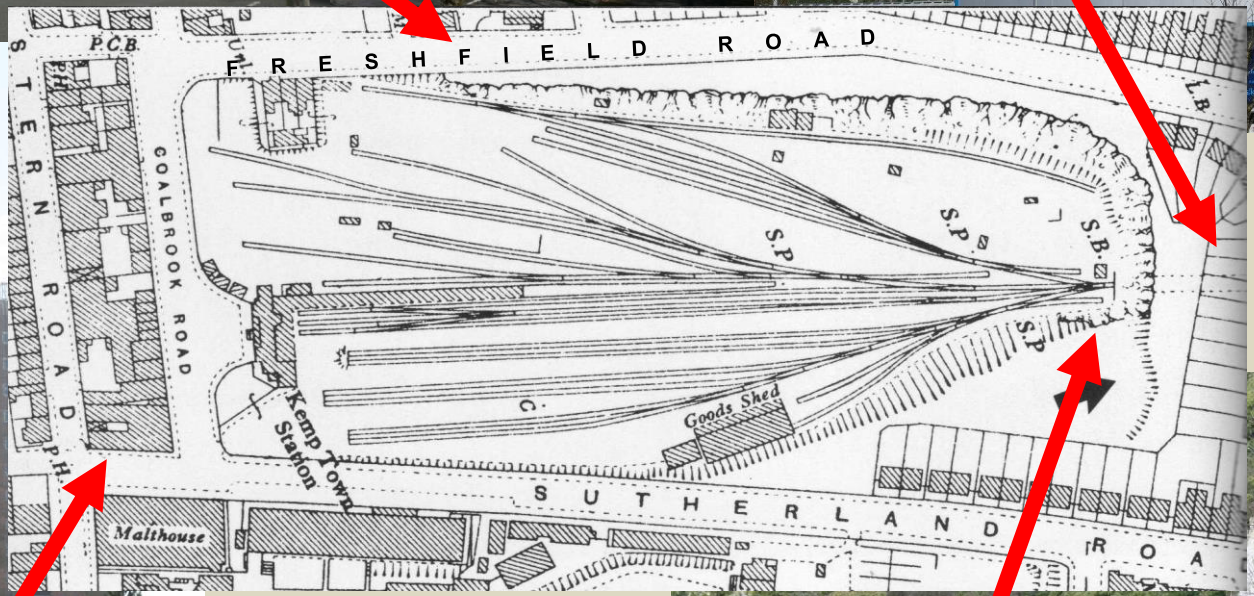
Genesis - 2:
Brighton Kemp Town

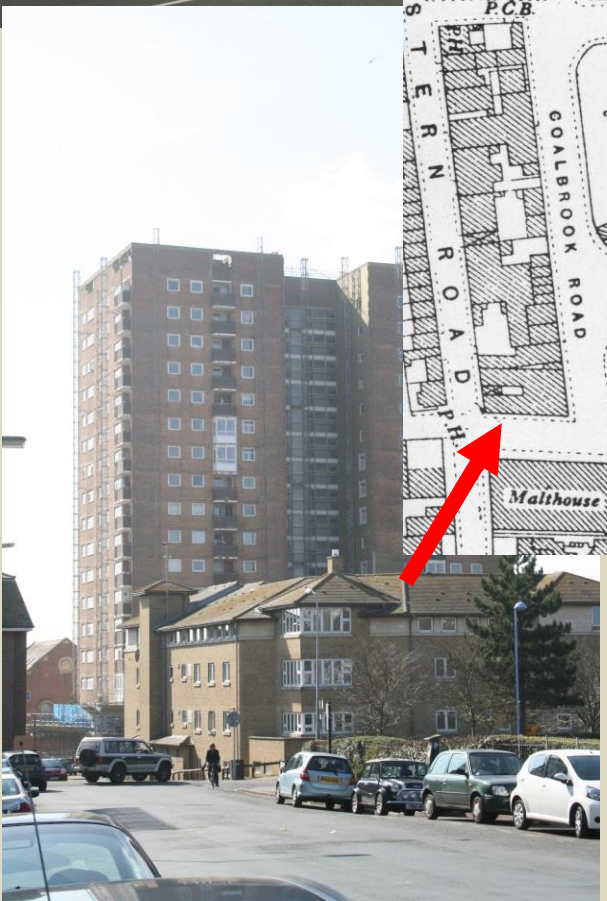


Back Story

Brighton East is based on the old Kemp Town branch. Passenger service ceased in 1933 and it finally closed to goods traffic in 1971. What if the line had never closed and to help with increased traffic the line was electrified, doubled along all its length and a triangular junction added to allow direct access to Lewes? Brighton East is not a prototypical rendition, the space was not available to do that, but hopefully it gives a flavour of the very compact terminus and the surrounding area that was Kemp Town.



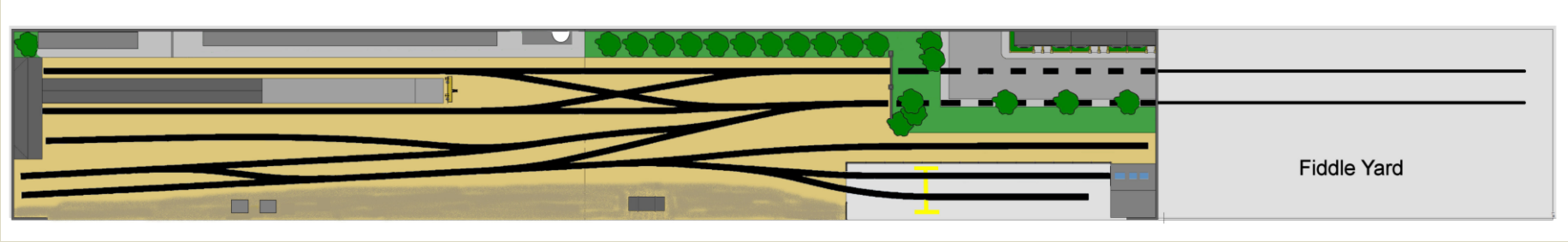




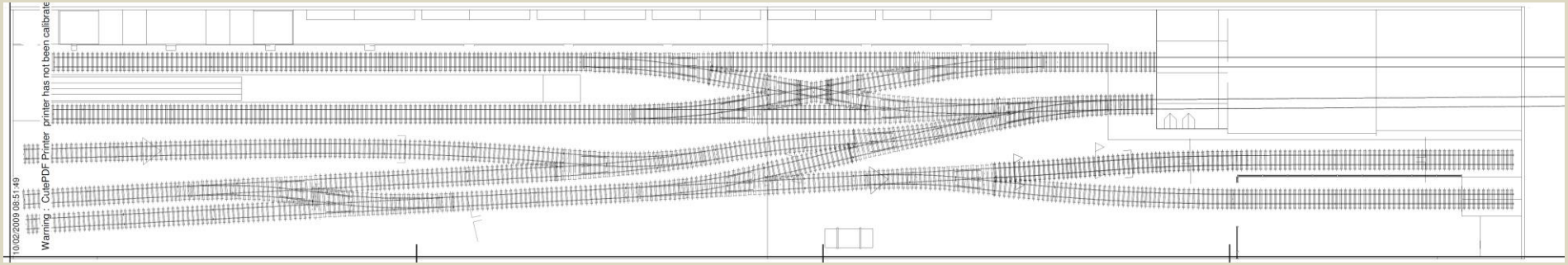
Brighton East locations

Where do you start:

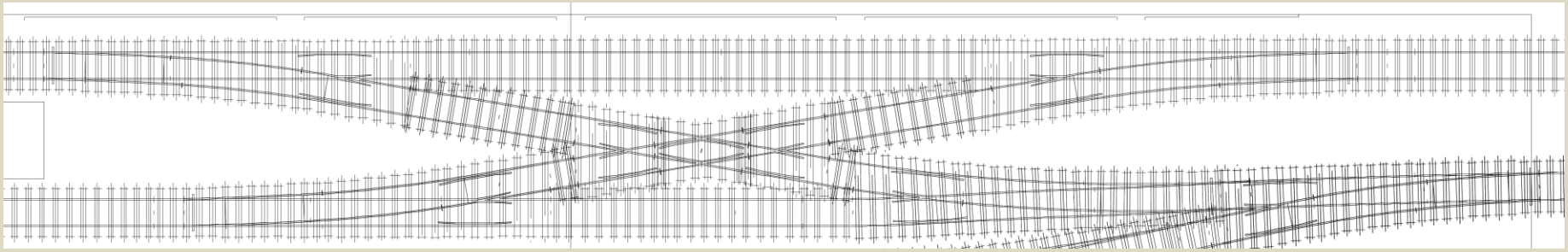
The track plan was computer generated using the track design software TEMPLOT and was configured to give a lot of operating potential



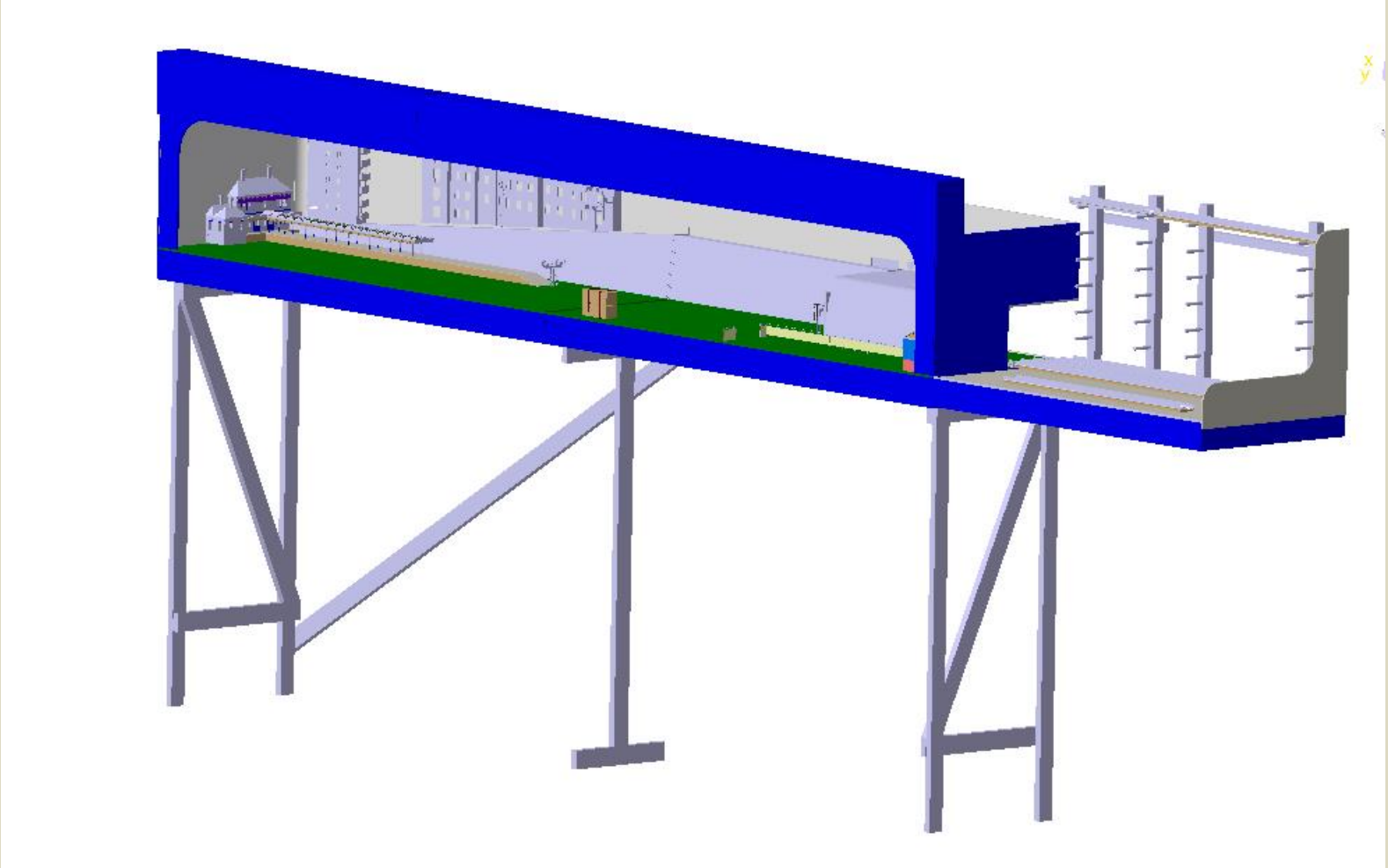
Exhibition brochure plan.



Templot plan



Detail of the scissors crossing

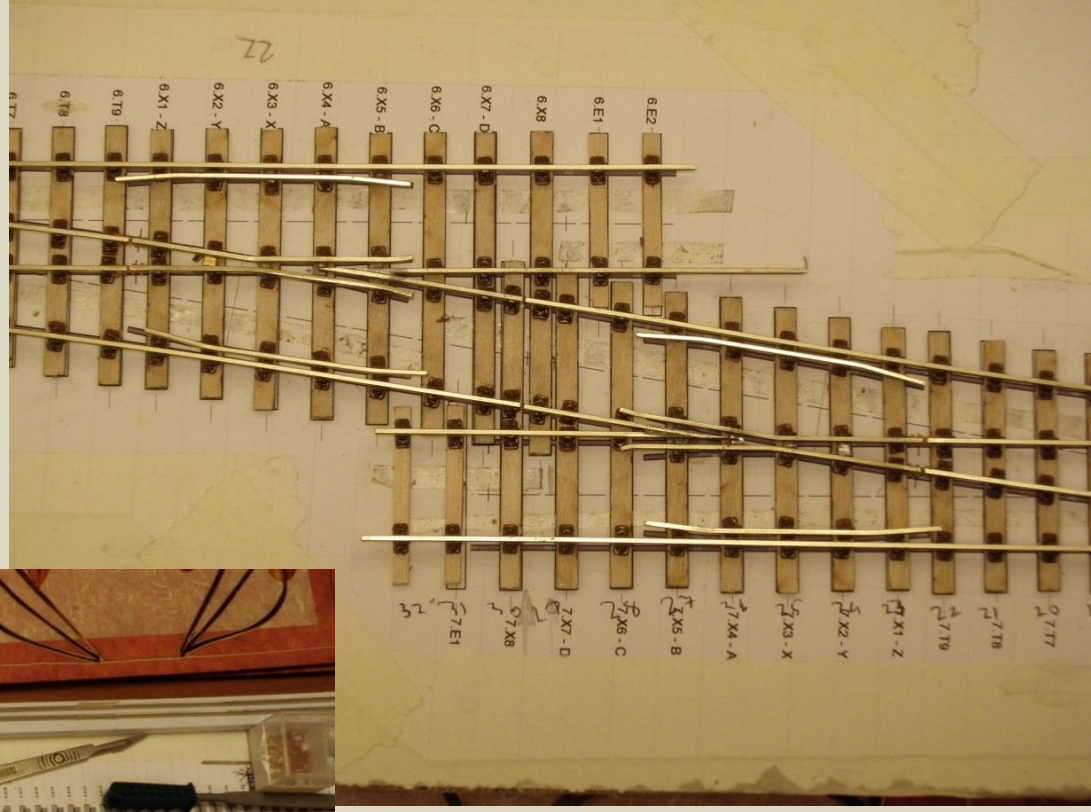


The layout was designed in 3D CAD. Starting with the boards, basic scenery and track plan, the model was updated with the final track layout and design of buildings, signals etc. as the layout progressed.

Baseboards and lighting units under construction. Note the basic scenic were installed before any track was laid.

The full size track plan being used with stock to check it would all work as anticipated and to decide the uncoupler positions.

The track was built directly onto prints of the relevant parts of the Templot track plan.



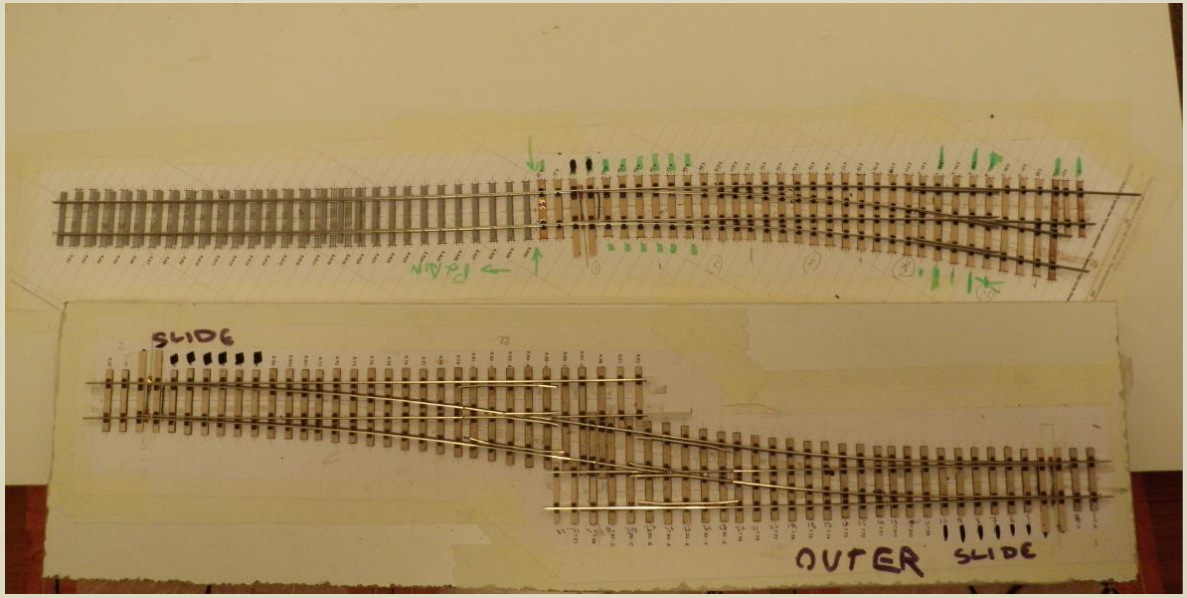
Concrete flat bottom rail uses Exactoscale fast track bases.

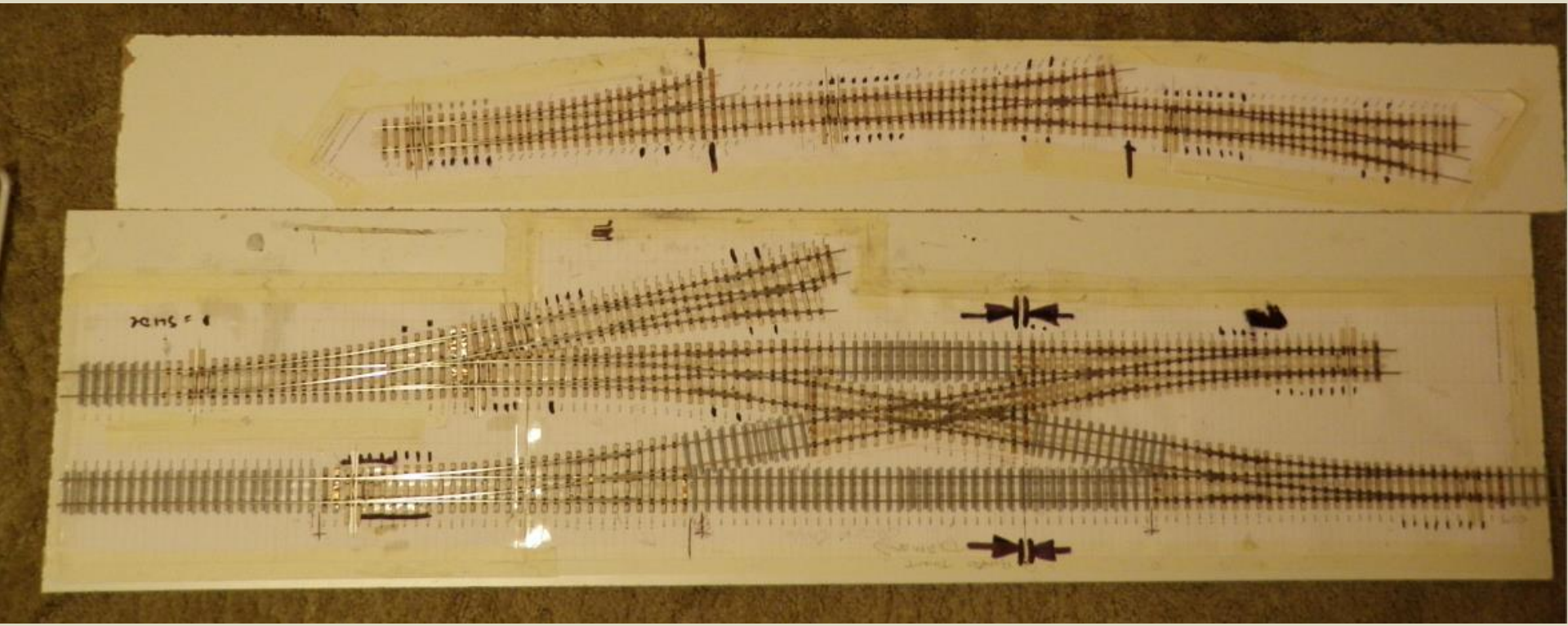
Main line points use Peco Panderol chairs and plywood sleepers.

Yard track is bullhead all from C & L components.

The point work was built as formations.

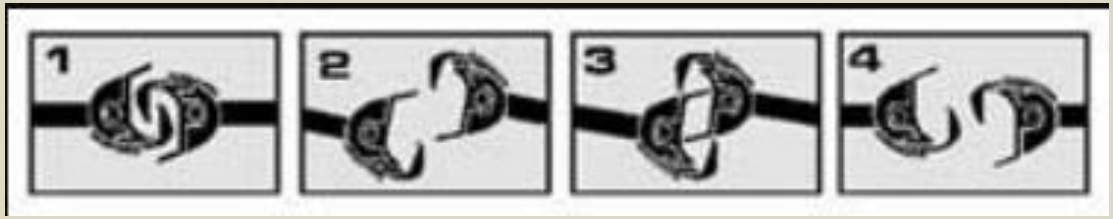
The board joint in the scissors was built into the assembly and is where the black arrows are.



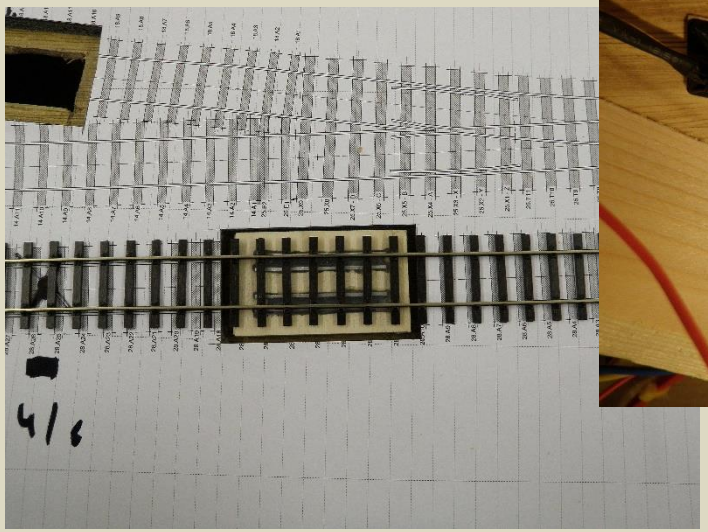


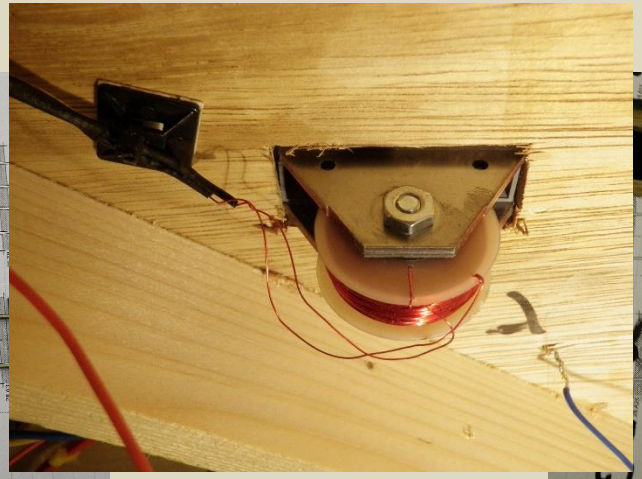
The track is laid on a foam base.

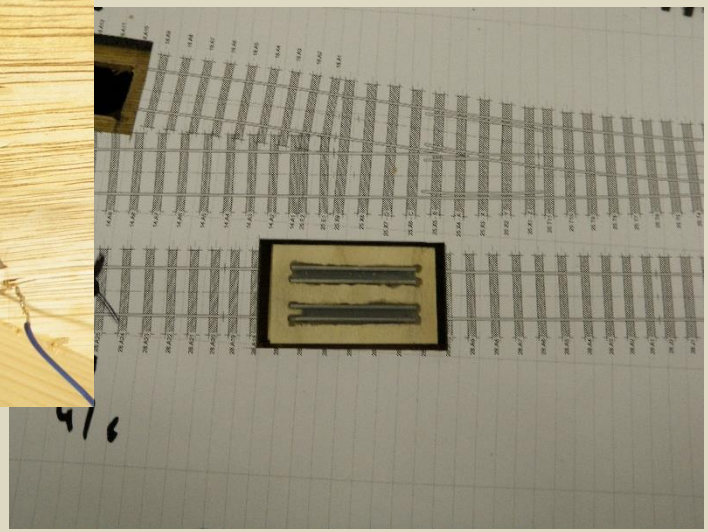
Then a track plan was taped in position and the Kaydee uncouplers positions marked.



The layout uses Kaydee couplings, these are actuated by electromagnets for hands free operation. The Kaydee magnets are modified such that they lay flush with the track bed making it easy to ballast.

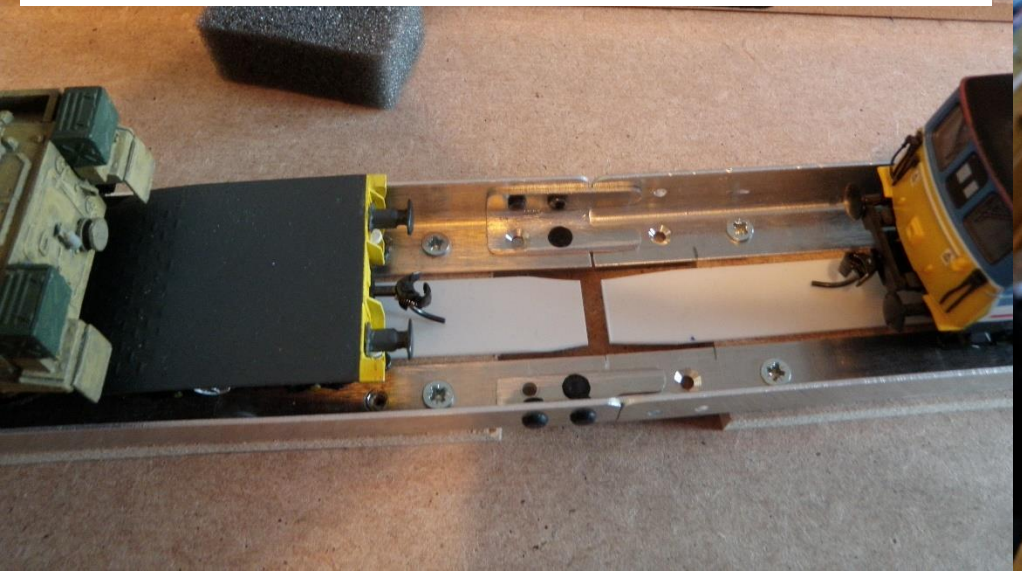






The track plan was left in place. Then the relevant section for each point formation was cut away and then the formation was glued down using Copydex, the remaining parts of the track plan ensuring correct alignment. The plain track was laid last.

Fiddle yard with cassettes made from 1mm aluminum, laser cut and CNC bent into angle, mounted on 6mm MDF bases.



How the layout is controlled:

Trains

Historically model trains have been controlled using Direct Current (DC) In DC, the only way to have independent control over multiple trains is to have different sections of track using their own supply of power.

However Brighton East uses:

Digital Command Control (DCC) is a more advanced system of operating a model railway. As the name implies, this is a digital system rather than an analogue one. In DCC, power is constantly supplied to the rails, and the movement of each train is controlled using a DCC decoder fitted to each locomotive. When the operator issues instructions using the command station, these are transmitted through the track, to all locomotives. However, these instructions are only acted upon by the locomotive for which they were intended.

Theoretically you only need two wires to control the trains!

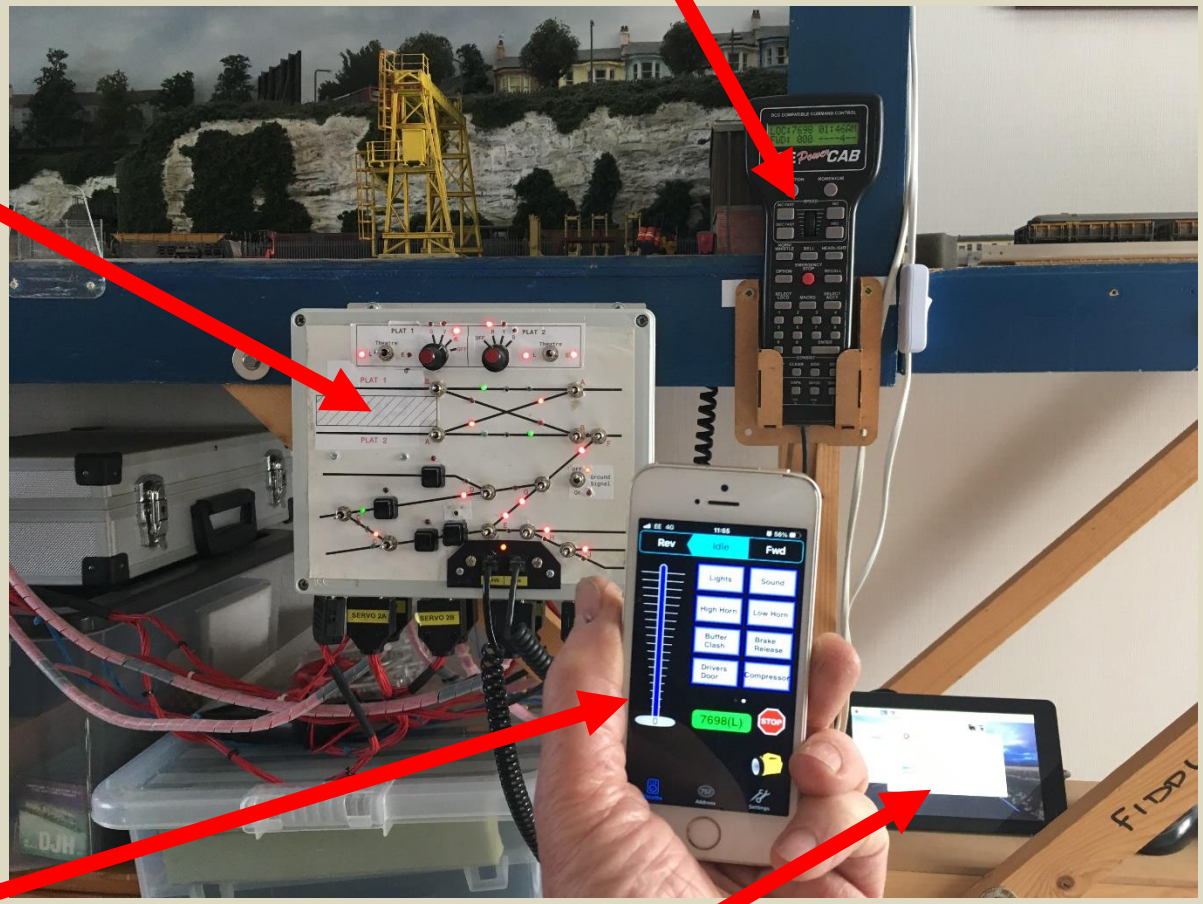
Points

RC Servo’s operated by servo controllers using an analogue control panel

How the layout is controlled:

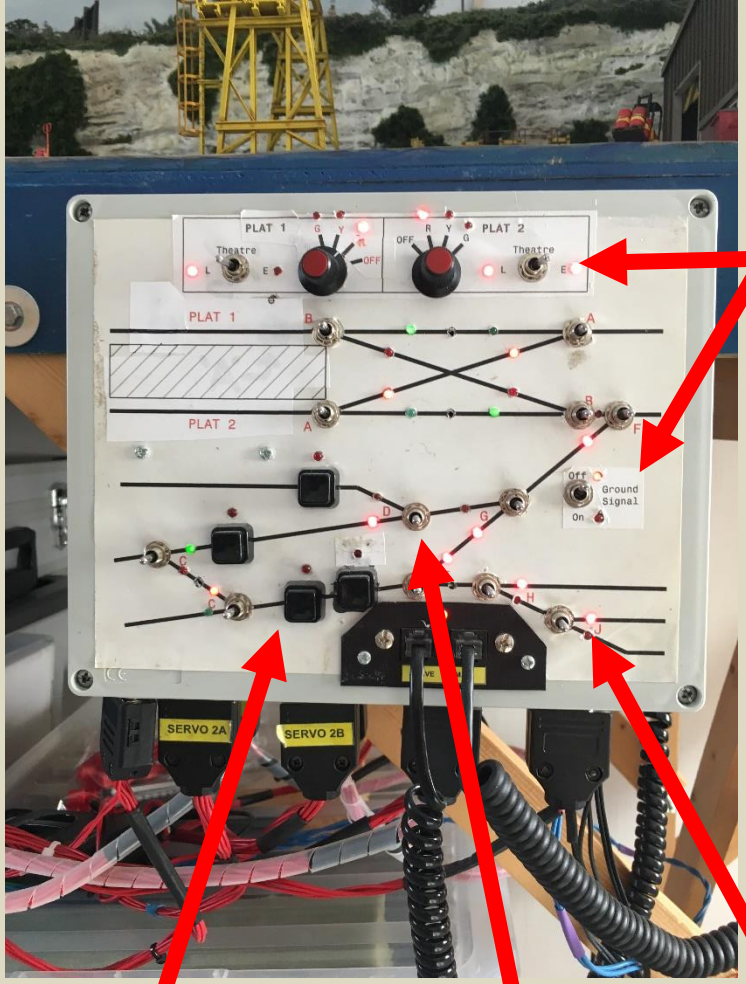
NCE Powercab used as the master controller and as a throttle if required.

Track control panel - see next slide



Smart phone, in this case an iphone running a free app called WiThrottle, talks to the Raspberry Pi and via software called JMRI talks to the Powercab.

Raspberry Pi connected as a slave controller has its own dedicated WIFI router. It is running JMRI software

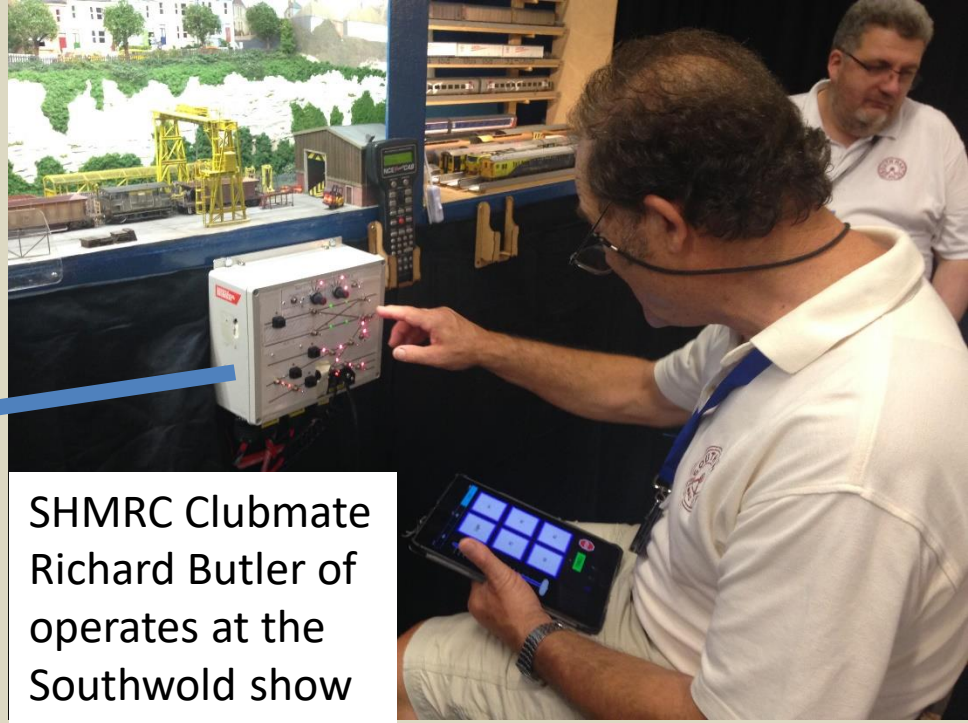


Signals

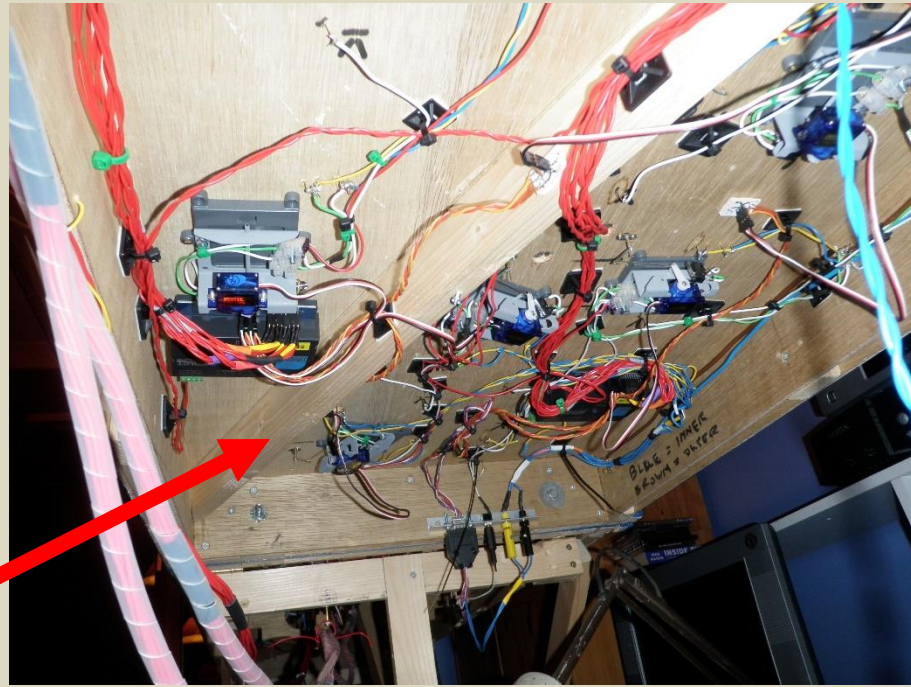
Uncouplers

Point control switches

LED's show the position of the point

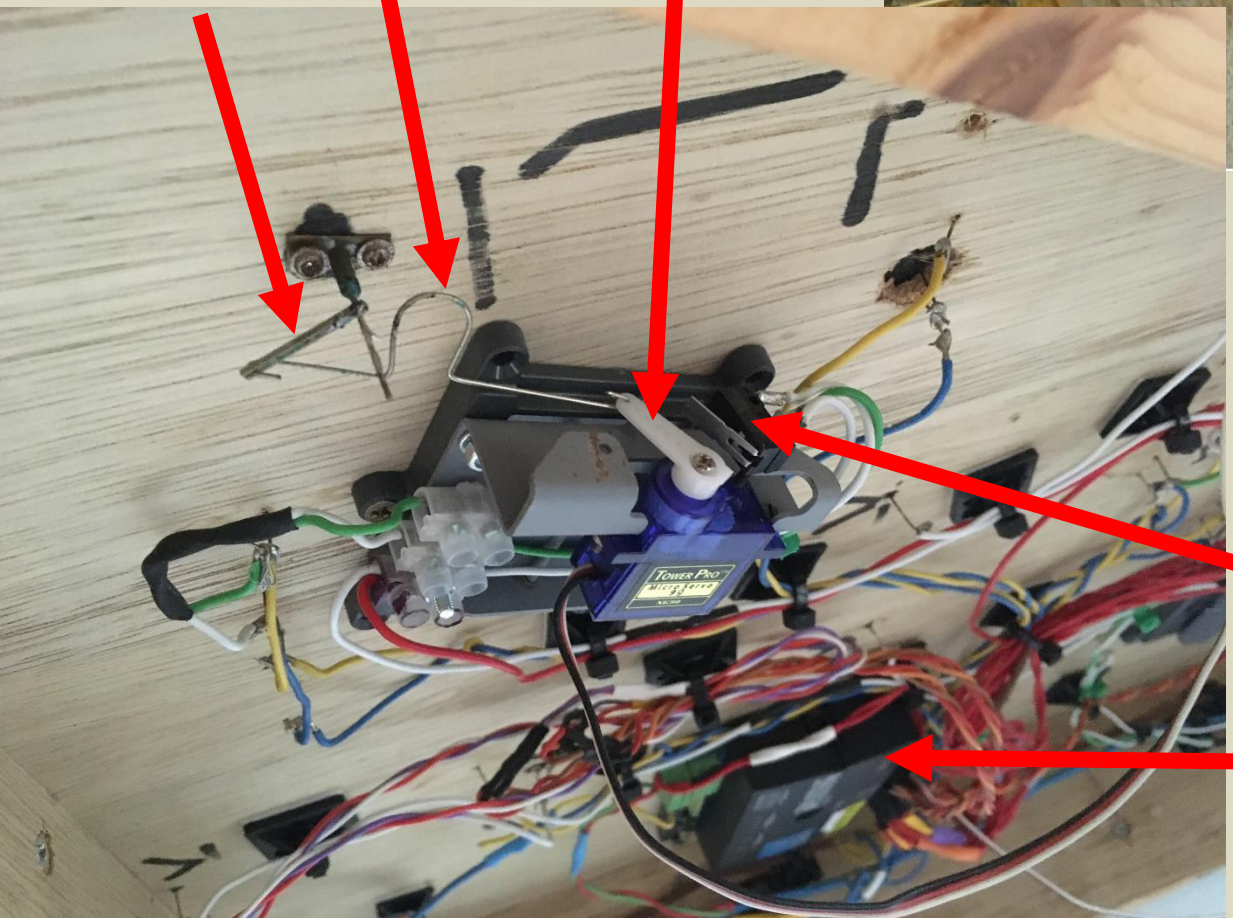


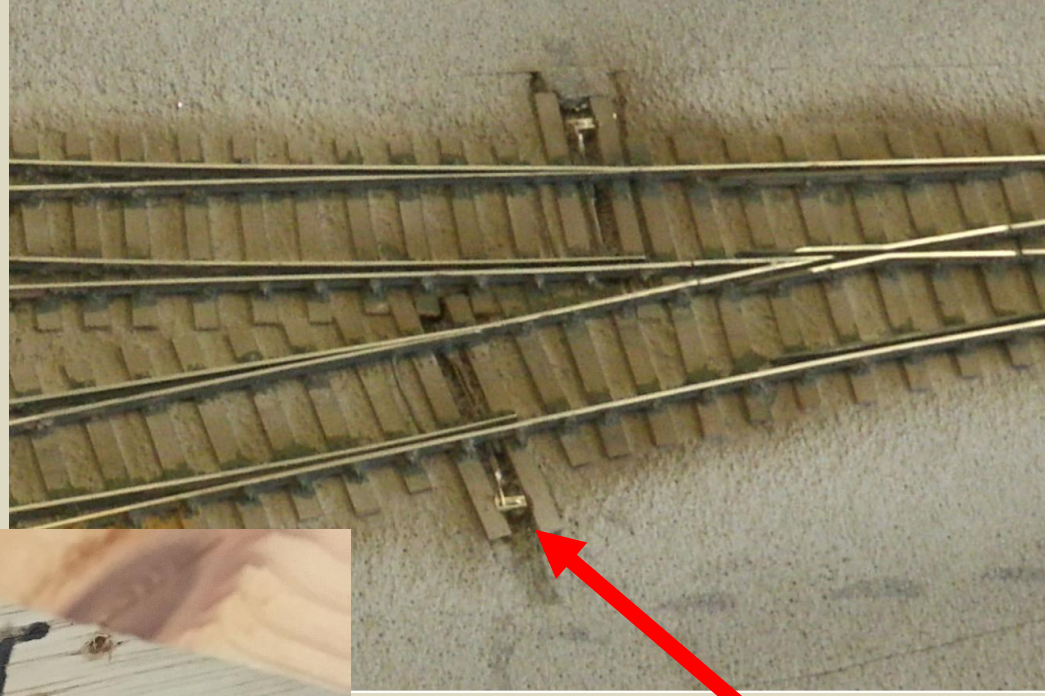
SHMRC Clubmate Richard Butler of operates at the Southwold show



Someone said DCC was only two wires!

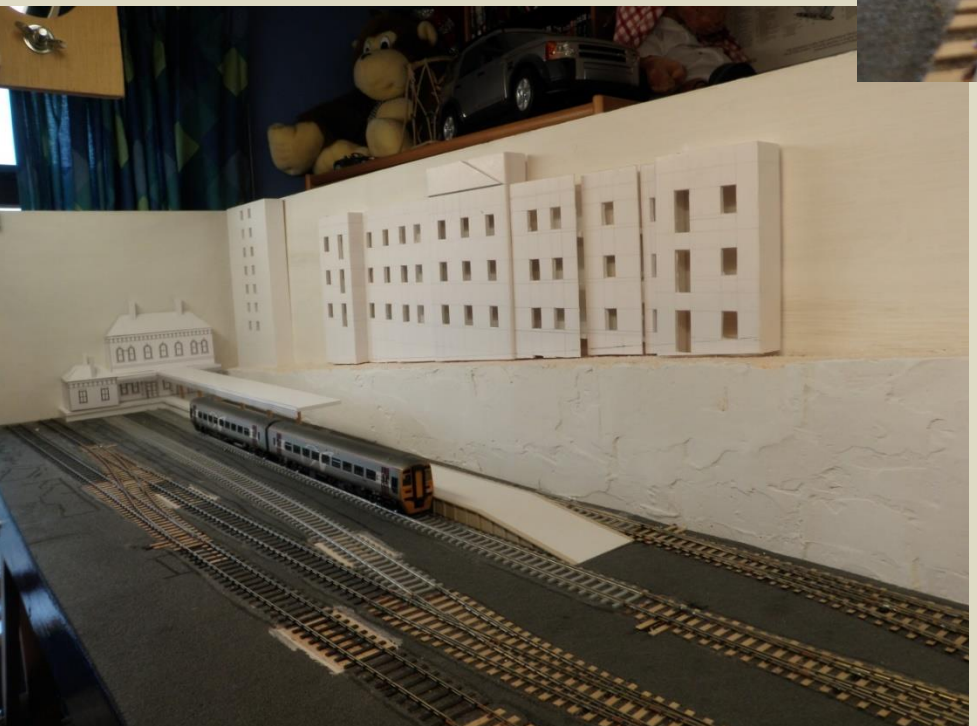
Point Operating Mechanism





Track side turnout crank. Note the difference in length between the two crank to ensure maximum servo movement is used.

After laying the track and getting the layout operational work started on the scenic and the first mock up of buildings. Initially rough cardboard items. The final mock ups were prints of the CAD models mounted on foam board shells.

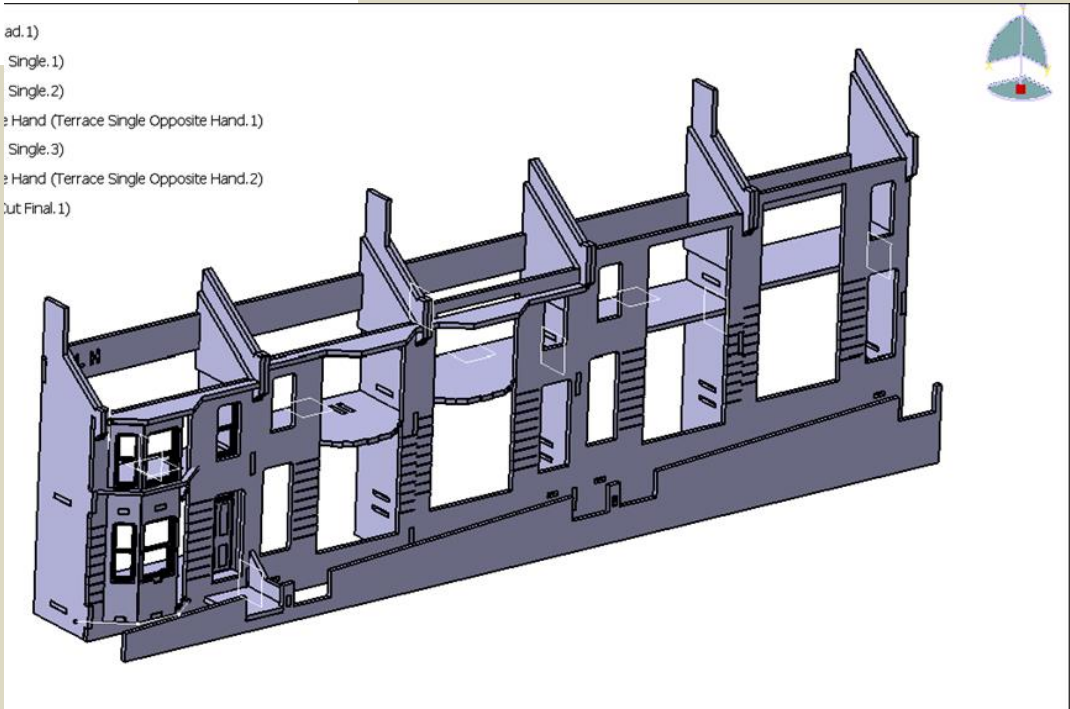


The track was airbrushed with Phoenix paints. A blast all over of ‘sleeper grime’ on the main line and ‘weathered sleepers’ in the yard. After cleaning the rail tops the sides were painted using a Rusty Rails painter with ‘oily track’ on the main line and ‘rusty rails’ in the yard.

Then ballasting. A long laborious job! The ballast was mixed from various scenic ballasts to match the colour typical of the region. It is glued down using dilute PVA.

A fairly prominent local feature is the Freshfield road terraced houses and helps define the area as Kemp Town, Brighton. These photos from a field trip show what needed to be recreated.

The terraced houses were initially modelled in 3D CAD



From this model a Laser Cut kit was evolved.

Laser cut shell being assembled. The shell is 2mm MDF.

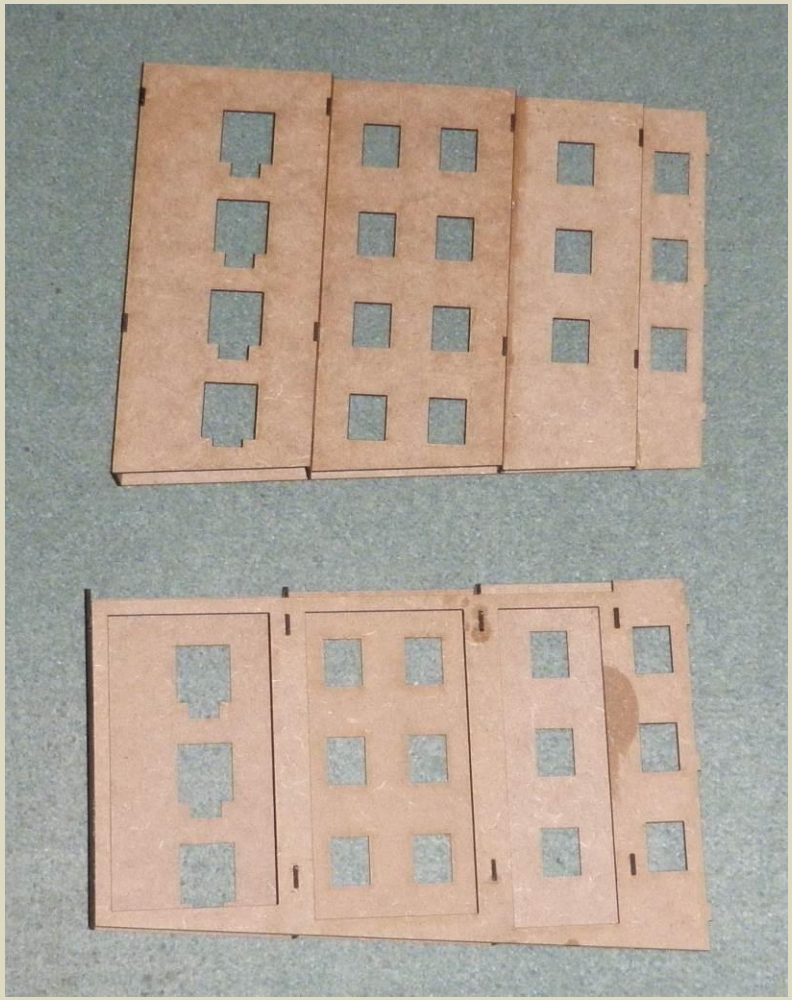
Finished prior to painting. The sash windows and frames were built up in layers from a laser cut plastic called Romark.

The finished article.

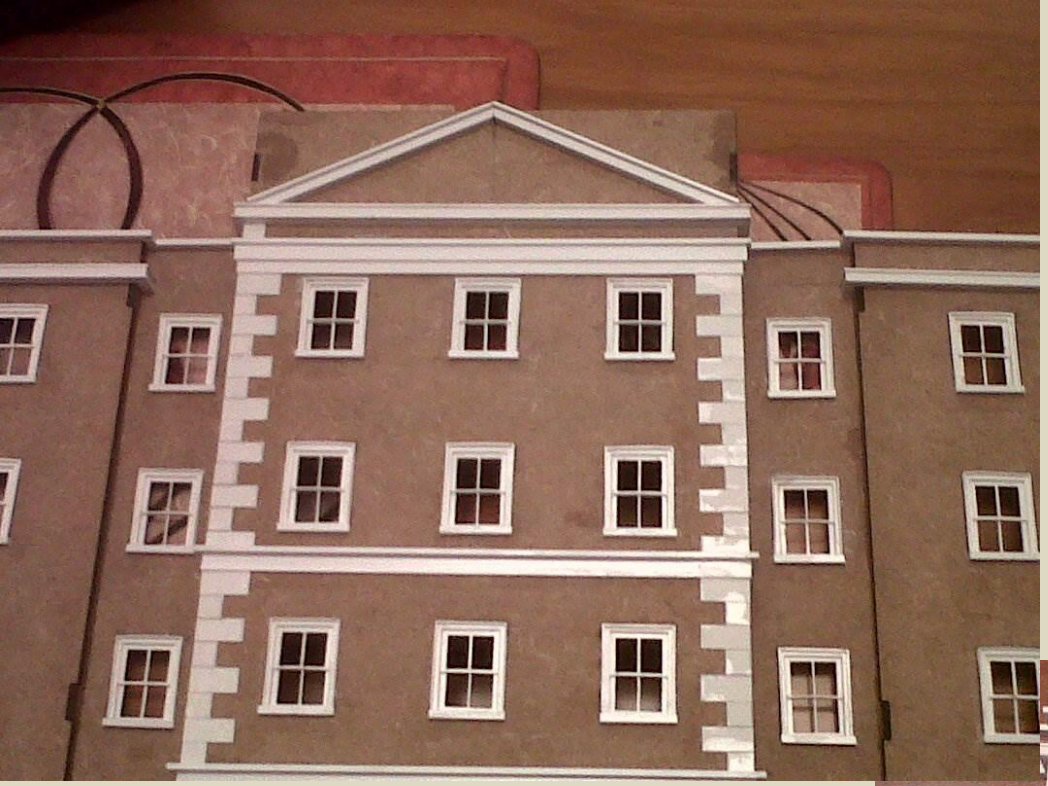
The Barry Building

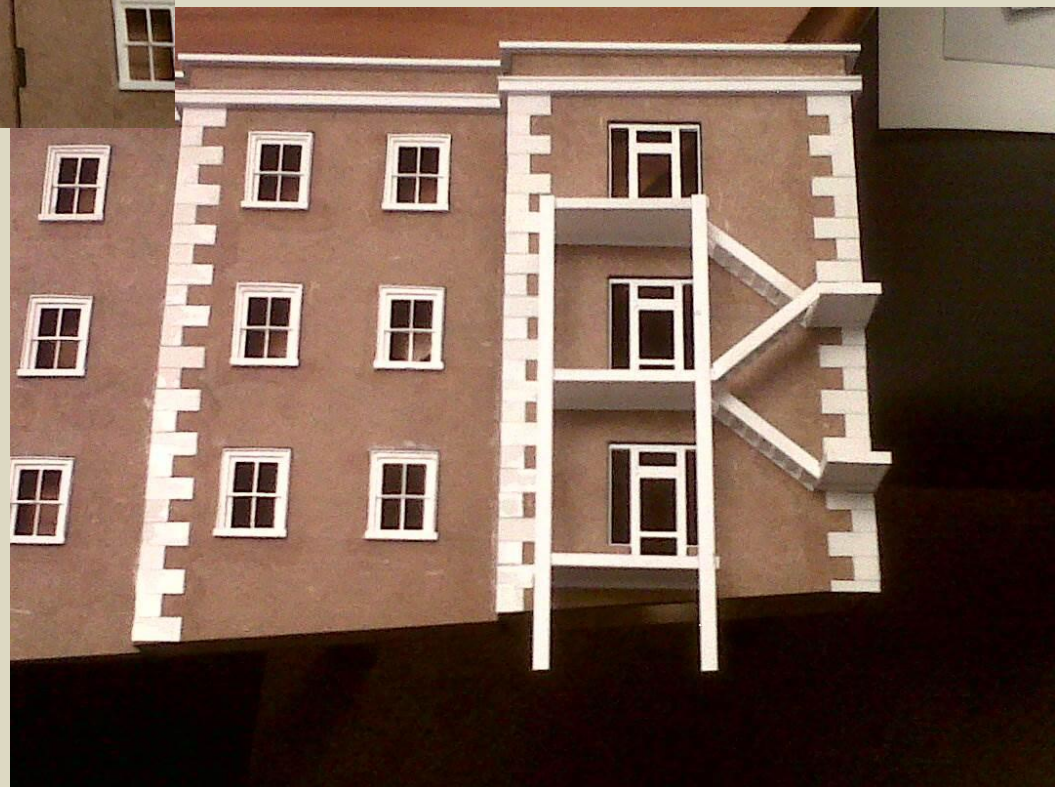
This iconic building forms part of the Royal Sussex County Hospital where my son Matthew spent 6 years training to be a doctor, so a representation of the building had to be included on the layout. It also helps fills a large space on the scenic background.

The model building is a pastiche of the front of the real but made to look like the rear. Left is a later mock up.



Again the CAD model was used create a laser cut kit.



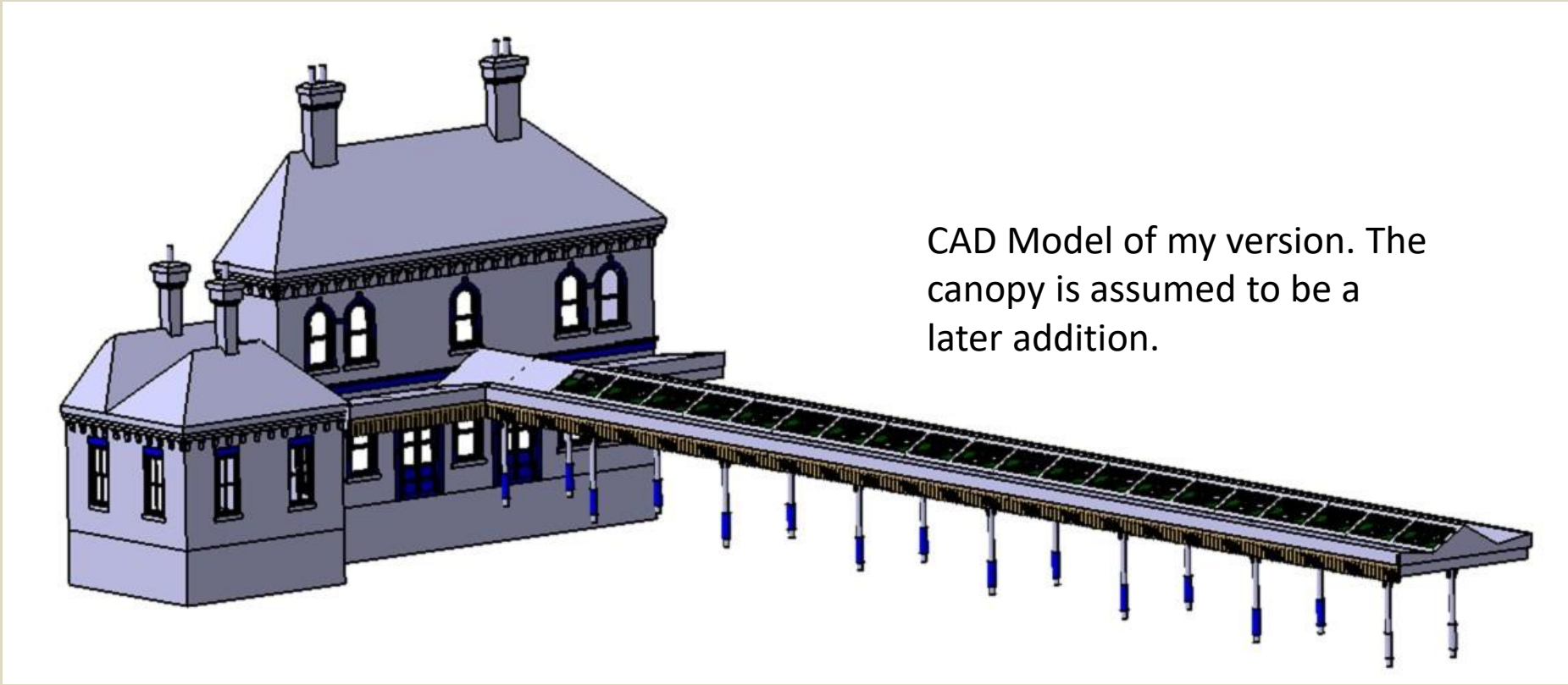


Partially assembled building. The edges stones are plastic card. Windows were made in the same way as those for the terraced houses.

The finished article complete with fire escapes. These were an interesting exercise in how far you can push laser cutting. The vertical railings are 0.75 mm thick.

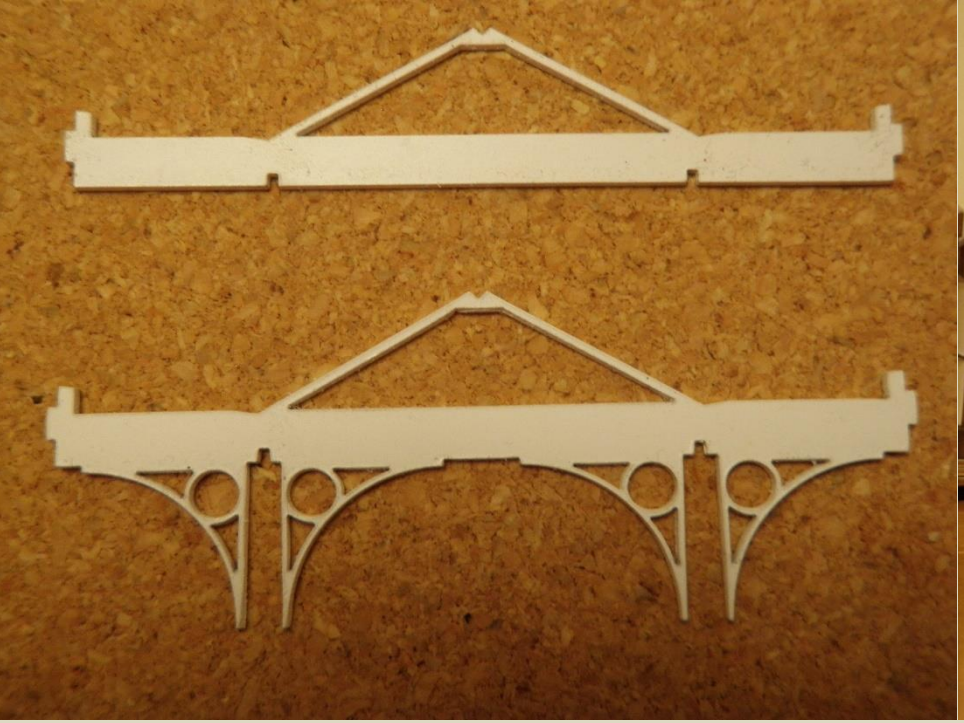
A very rarely modelled feature, Scaffolding. This involved a crash course in how to correctly erect scaffolding. It was all scratch built from plasticard directly onto a CAD drawing

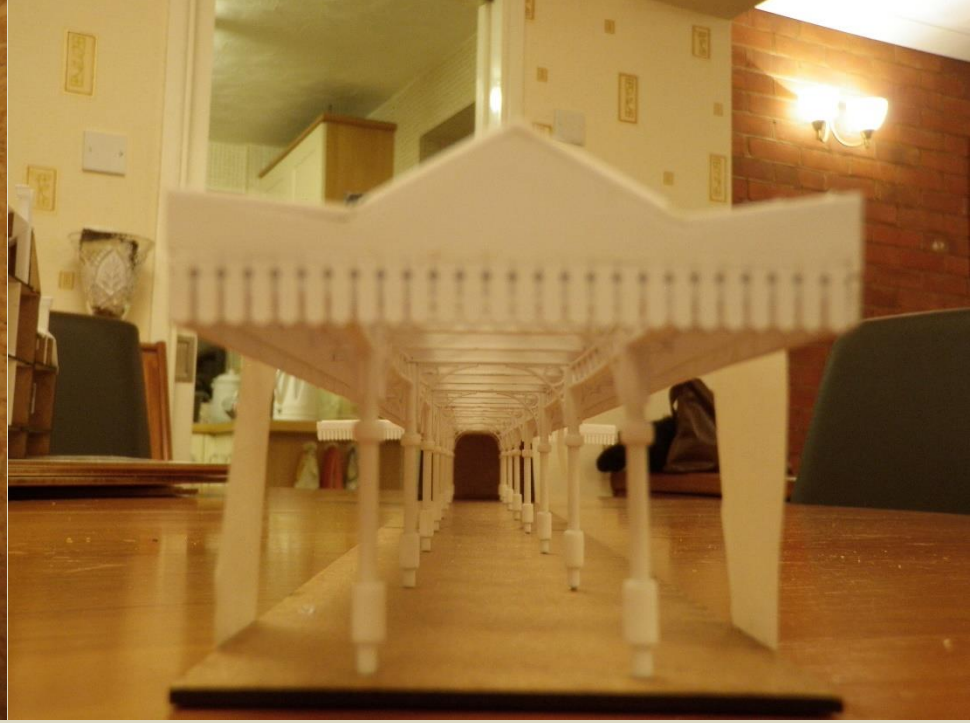
Kemp Town station building, note although a typical LBSCR building it has some distinct features.



CAD Model of my version. The canopy is assumed to be a later addition.

Yet another Laser Cut kit used to produce the basic shell.



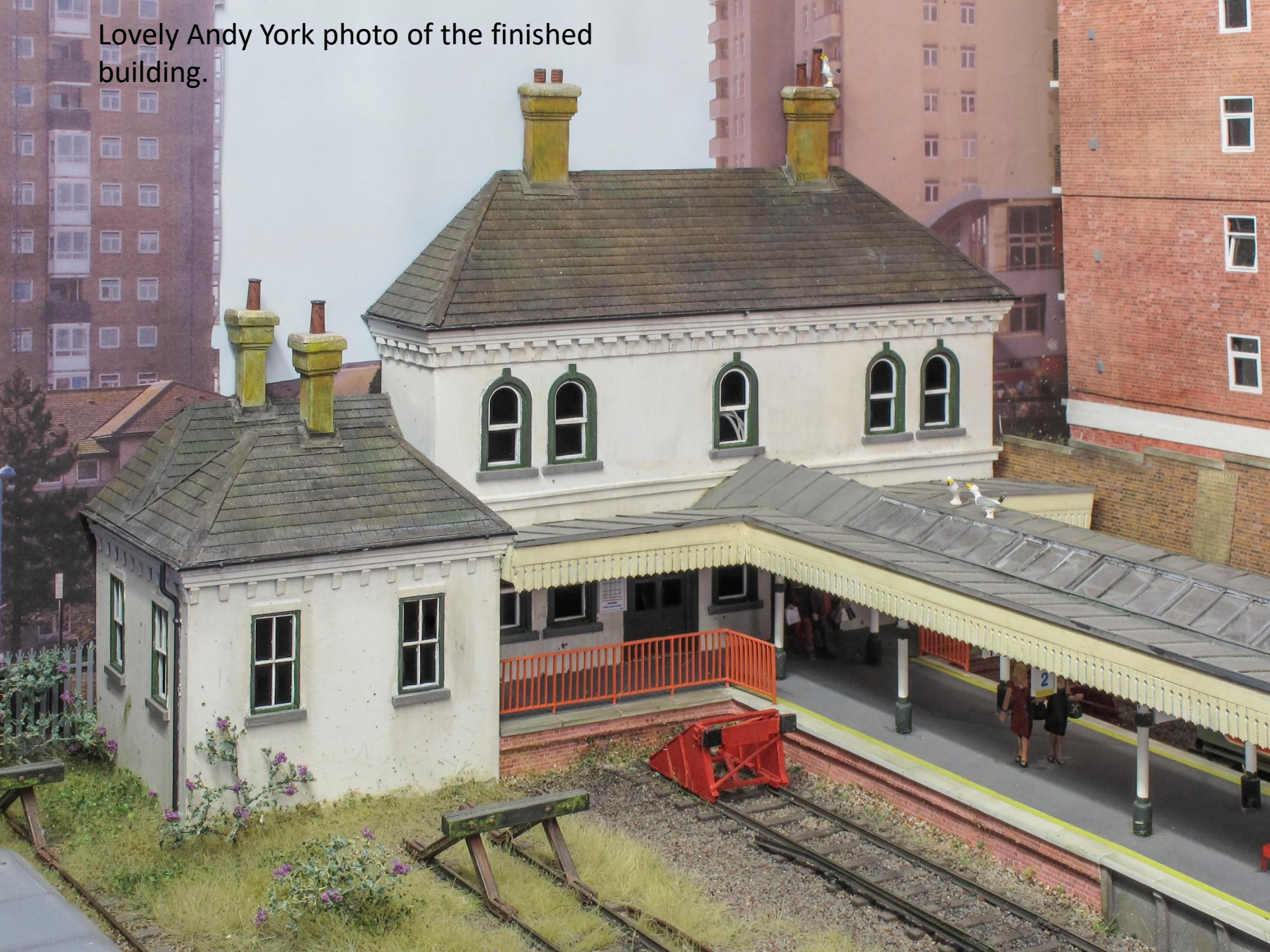


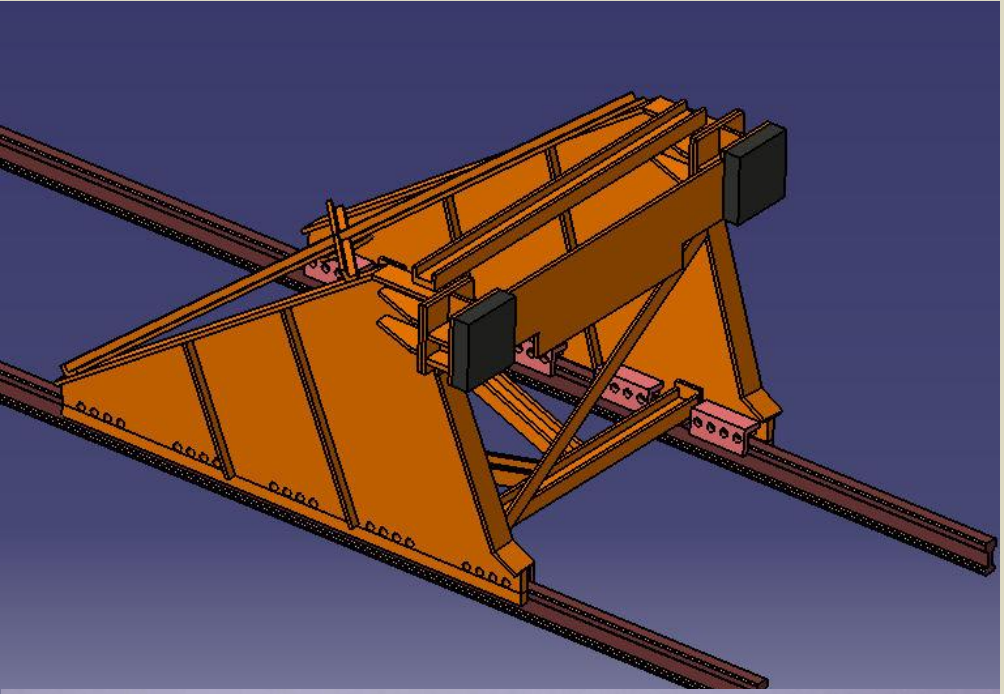
Station canopy in build. Assembled from a mix of laser cut parts and scratch building.

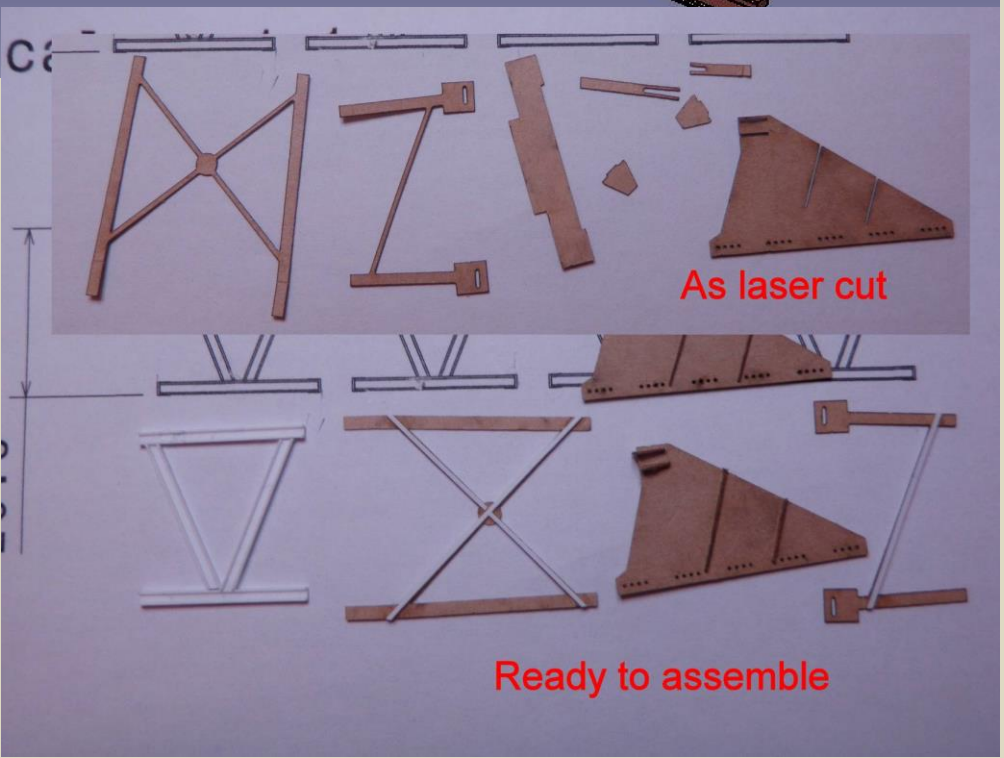
Completed canopy

First trial fit of the completed building before painting

Lovely Andy York photo of the finished building.







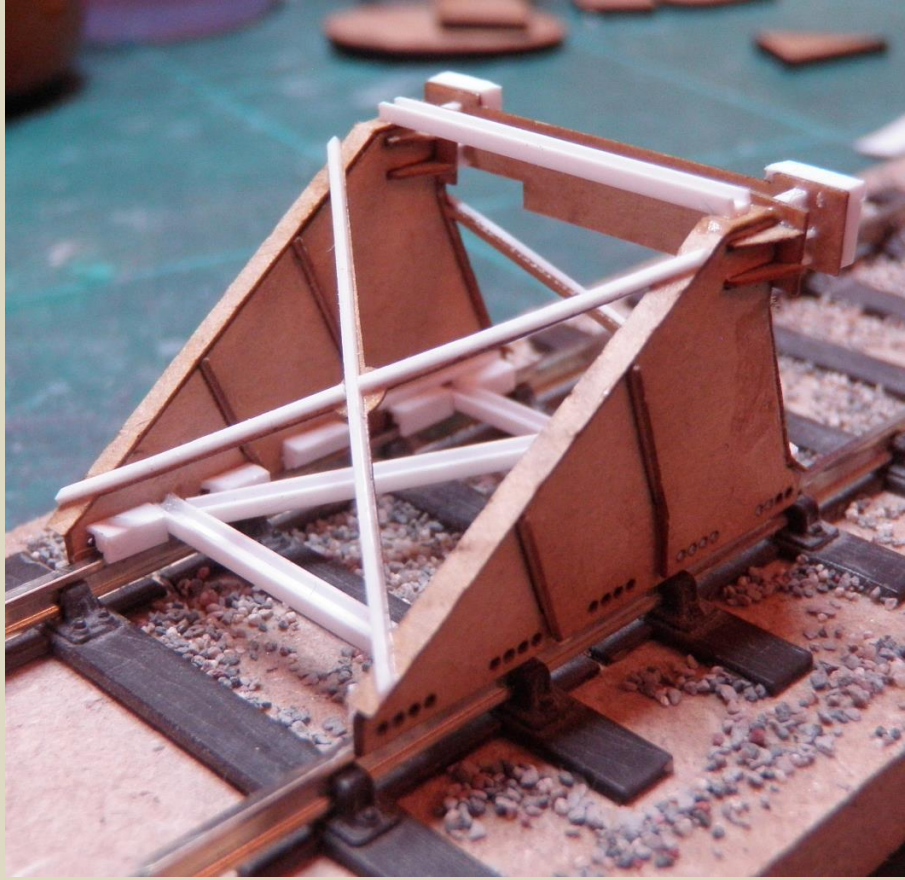
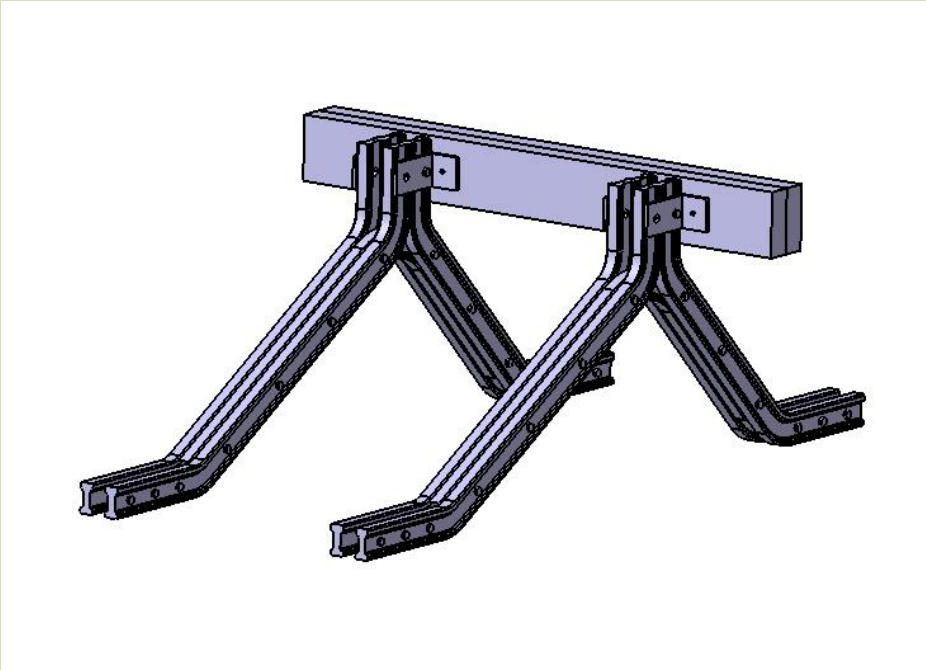
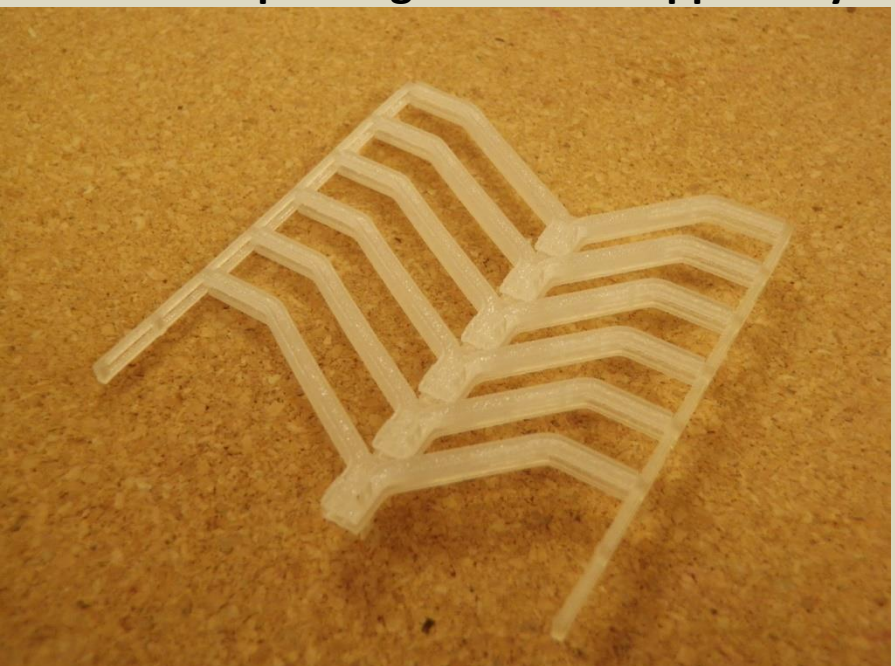
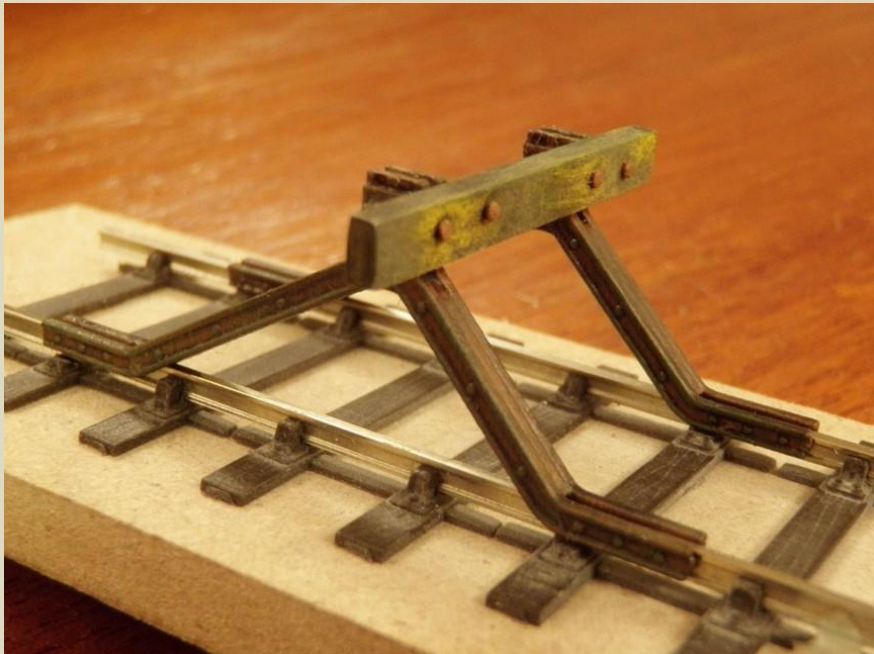


Plate buffers based on those at Brighton Station. A mix of laser cut parts and scratch building. The laser cut parts are made from 0.5 mm thick phenolic paper.



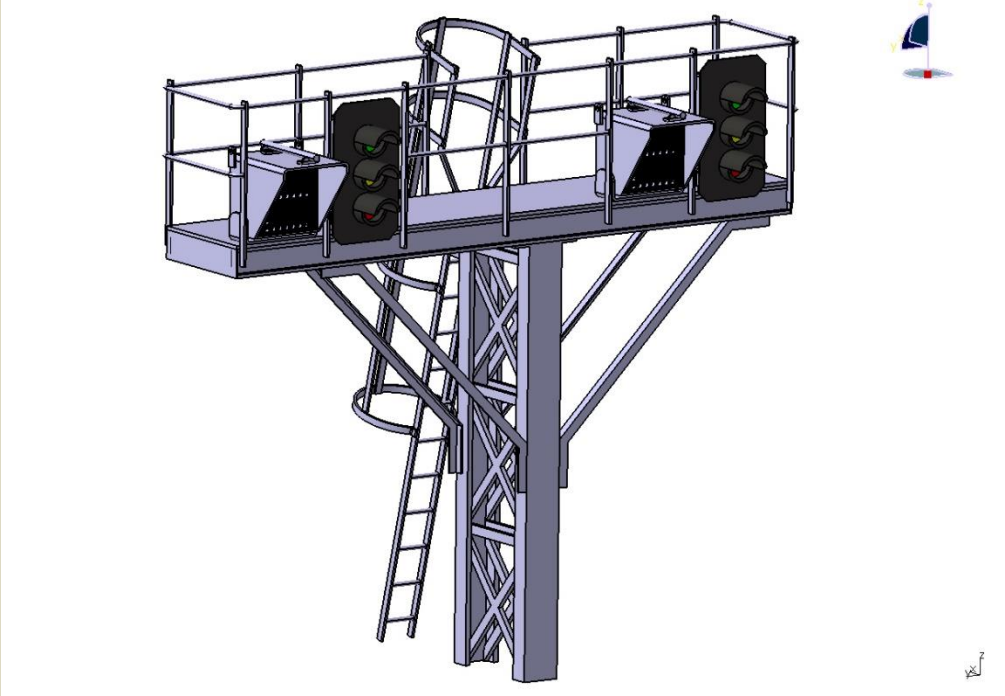
The yard buffers are based on a prototype at Chichester. The sides were a first foray into 3D printing and were supplied by Shapeways. These days I have my own printer(s)



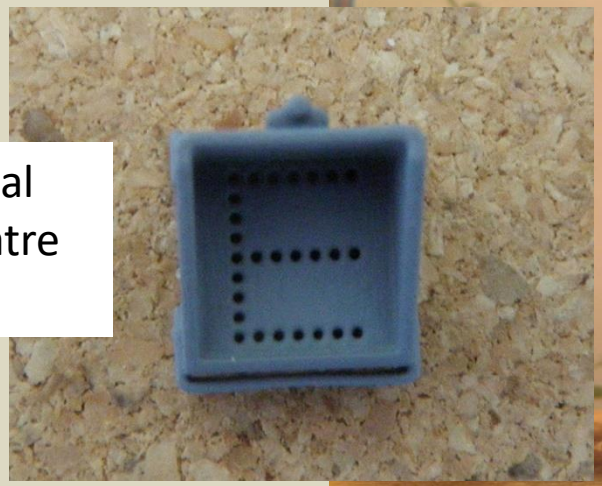


One of my favourite photos, showing the station and both types of buffer

The platform starter uses the one on Platform 23 at Waterloo as it inspiration



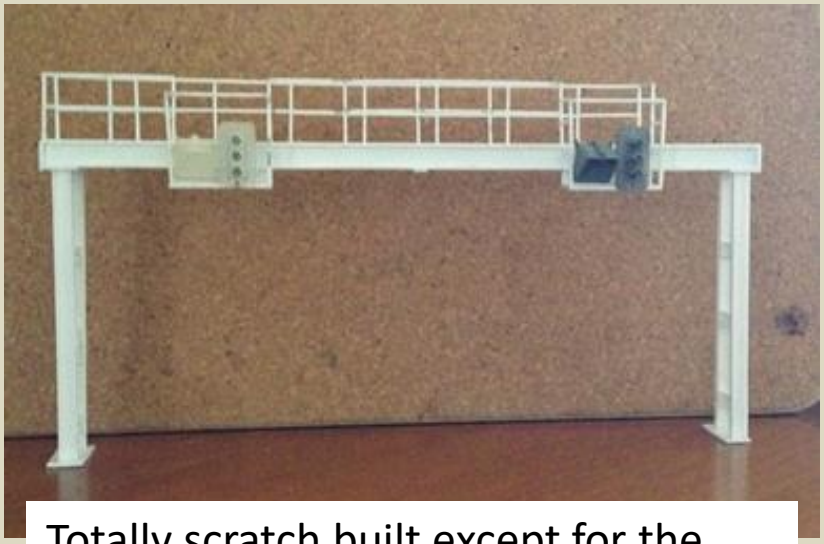
3D printed signal heads and theatre indicators



Scratch built brass gantry

Finished signal with operating lights and theatre indicator. Here the road is set for a train to leave from platform 2 for Eastbourne.

Home signal, based on the one at exit of the tunnel at Southampton Central station.



Totally scratch built except for the signal heads and theatre indicators

Cliff face vegetation

Woodland Scenics - Clumps

Woodland Scenics - Coarse Turf

Postiche covered with various mixes of light and dark Noch leaves

Acrylic wash to change the tone of the foam.

Woodland Scenics - Foliage net

Plus various other fine turf colours and more of the Noch leaves were applied to act as highlights.

Another classic railway feature is Buddleia. Made by my wife from sea foam covered with Noch leaves coloured with sugar paste dusting powder.

The grass is created from blends of different coloured and length static grass. Shrubs are postiche covered with various sizes and colours of scatter from Woodland Scenics and Noch.

Freshfield Road trees. Trunk and branches are wire frames coated with artex, then painted. The canopy was made using postiche covered with Noch leaves.

Other trees are sea foam covered with Noch leaves.

It just fits in the car!

In its bedroom home devoid of the curtains used at shows.

BRIGHTON EAST
EM
food
Fire point
food & bar
Cafe kitchen

Some notes on the stock and operation.

The layout is signalled for bi-directional running which allows a lot of flexibility in running in and out of the station and being able to operate the station and yard at the same time.

With two exceptions all powered stock is converted ready to run and the diesel units are all fitted with Lego Biffoman sounds. The passenger stock is representative of typical Brighton traffic, the exception being the Thumper, but they did run into Uckfield. The 4 VEP's run as 3 VEP's because there is not room for 4 carriages. Informed sources confirm that there were times when they ran as 3 car units. The two non RTR items are a DC Kits 2-EPB Sandite unit which was the model that started everything off and a Clockwork Models 08-16 Tamper. The tamper was the first production kit built to proof the instructions for Jonathan Buckie. The non-passenger stock is mainly departmental. A couple of trains are run because we can, the nuclear flask train on layover in Brighton (known for its green tendencies!) and a scratch built (1990's) Road Railer set. All the stock has been weathered mainly using an airbrush with Vallejo acrylics. Photographs of the actual locomotive or similar wagons were used as a reference.

Third rail gets quite complex! All constructed using Peco conductors and rail.
It is also a good shot of the paraphernalia that surrounds track.

© Andy York

A VEP drifts out the tunnel

© Andy York

And into the station, while another one waits to depart.

Gingsters 158 waits to depart for Cardiff. This is a repaint with transfers printed on Crafty Computer decal paper. My favourite livery.

© Andy York

Class 205 Thumper in Connex livery arrives at the station. I like them in this livery, it is different!

Plasser and Theurer tamper built from a kit waits in yard for its next turn.

© Andy York

Two VEPS waiting to depart. These are standard Hornby items re-wheeled, lots of lead on the motor bogies and light weathering

Hornby Class 73 acting as a thunderbird for a failed VEP. DCC makes this move so easy.

Another view of the Thunderbird!
Heljan class 47 in the foreground.

© Andy York

Apart from the VEP everything in this photo is scratch built.

© Andy York

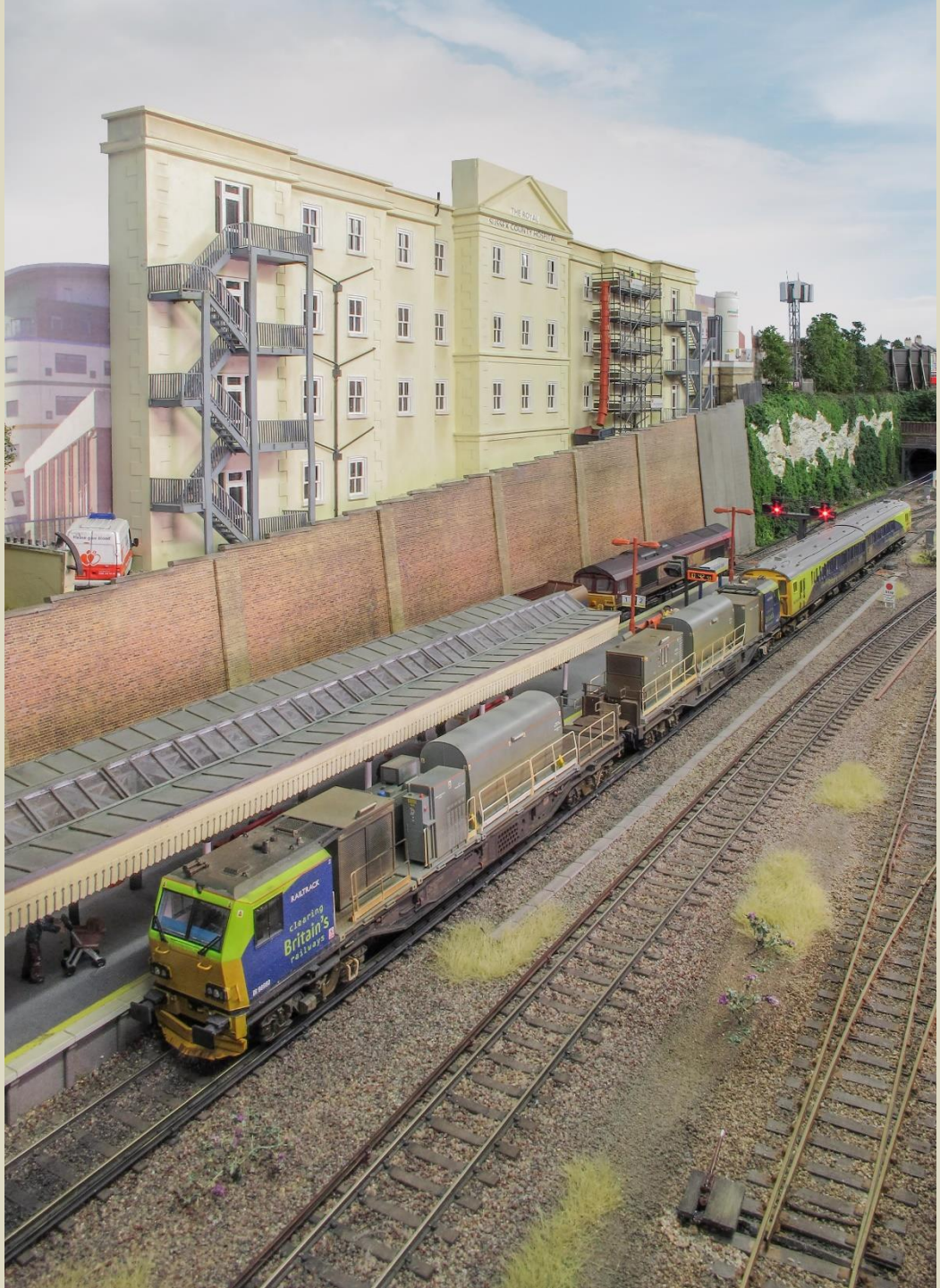
I drew the line at trying to make the clock work.

© Andy York

The 2EPB Sandite Unit, the Railtrack livery is so beautifully garish. Again home brewed transfers

© Andy York

Departmental possession. The EWS Class 66 is a very early Bachmann one. We also have a later Freightliner one



Another view of the departmental possession of the station. With both types of Sandite units in view. The MPV is the only stock I did not weather. A club mate who drives MPV's saw it when brand new and said it needed weathering. So I said well you do it, so he did!

© Andy York

My homage to the
Brighton’s Green MP!
Stop
© Andy York

Inspection Saloon Caroline departs with a Heljan Fragonset class 33 Spitfire. Caroline is an etched brass kit sadly no longer available.

© Andy York

The Bachman class 37 was my original sound fitted loco.

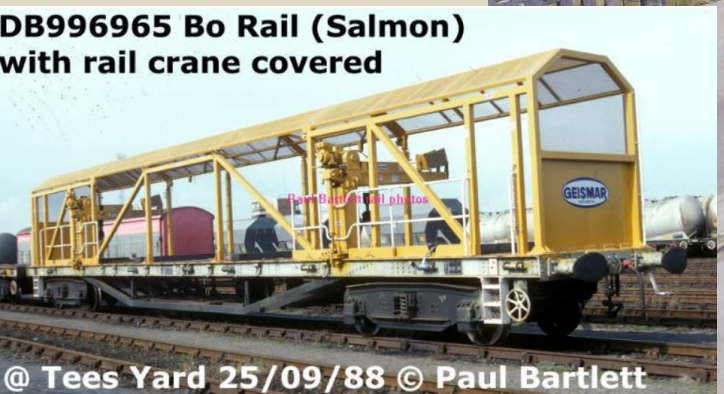
© Andy York

This cameo scene was used to break up the open area of the front of the layout.

© Andy York

Help point
76924
© Andy York

I like quirky stock. I found a picture of this modified Salmon on Paul Bartlett's website and had to have one. The base wagon is a Cambrian kit. The rest is scratch built.



© Andy York

The wagon repair yard, The backscene photo on the right was taken from the same angle at the old Kemp Town site.

© Andy York

Closer view of the wagon repair yard, The scenic block snow plough is an old etch brass kit I bought for £2 at an exhibition.

© Andy York

Penultimate slide - A view nobody sees!

© Andy York

Thanks for looking and finally I would like to thank:

My son Matthew for originally inspiring the project and help at exhibitions.

My fellow SHMRC clubmates for all their help at exhibitions.

But especially my long suffering wife Christine for making the Buddleia, trees, and planting of the cliff vegetation when I was up against it to get finished for its debut exhibition.

More layout build details can be found at:
http://www.rmweb.co.uk/community/index.php?/topic/16217-brighton-east-em-third-rail