

# RAIL MODELLER

*AUSTRALIA*

Price \$10

October November 2020

Volume 1 No.3



r ma 101120

LEARN SHARE CREATE



Editor/ Publisher **Robyn Taylor**  
Editorial Assistant **Trevor Gibbs**  
Email **info@railmodelleraustralia.com**  
Facebook **Rail Modeller Australia**  
Phone **0411 297 800**

**Rail Modeller Australia** is available as a free download and is also available as a printed magazine for those who prefer that format. The printed version will be at a cost of AUD\$14.00 which includes postage within Australia. Information for overseas postage is available by contacting us via our email address.

### **DONATIONS**

To help us to keep this as a free magazine we do need financial support and donations can be made using the paypal Donate Button on our website.

### **ADVERTISING**

We are happy to accept advertising in the magazine, for further information and pricing please contact us.

### **CONTRIBUTIONS**

Contributions are welcome and can be in the form of Articles, Photographs, Technical information or other items related to the hobby of model railways. All contributions will be considered but may not be accepted for publication. All contributions must be the original work of the author including photos which should be identified with the makers name. The final decision for publication of articles will remain with the Editor. For further information on providing articles for the magazine please contact us either by email or phone.

### **COPYRIGHT**

The Rail Modeller Australia logo is copyright and may not be used without the express written permission from the editor. This magazine and the contents are also copyright. Articles and other information provided remain the property of the original author and have been used within these pages with their consent.

## From the editor

Unprecedented, uncertain, these words have epitomised one of the most challenging years that most of us will wish we never experience again. The loss of so many and the mental stress that comes with isolation while trying to beat the pandemic means that no one is untouched. With rolling lockdowns and trying to manage a range of issues has been quite stressful for everyone. The problem is made more difficult due to financial uncertainty, and the time it will take for life to normalise. In the larger scheme of things, hobbyists have managed to remain optimistic about the future, and I put that down to having a hobby to keep us interested and challenged in a rewarding way.

It is humbling to see the camaraderie that is evident in social media posts found within our hobby and the positive feedback that is given. Thanks to the efforts of other modellers, we are inspired to learn new techniques and be inspired by what fellow hobbyists' are doing. These positive aspects are a fantastic distraction from the issues around us. Beyond our pursuit, we need to be proactive in our support for others during these times and show compassion and understanding when it is required. A simple phone call to a friend could be a life saver.

The motivation behind publishing this magazine is to provide a format to support the hobby and share the knowledge and experience with skilled modellers and newbies in our hobby. Along the way, we will see the simple and complex layouts that are all part of our hobby and we will have the opportunity to learn new techniques.

I want to offer my sincere thanks to Trevor Gibbs our Editorial Assistant, who has been a virtual powerhouse in helping me with the magazine. I am thankful for the support and effort that he has made, assisting me with articles penned by his network of friends and his own contributions.

We are grateful for our advertisers' support, who also help keep the magazine viable and ask that you support their businesses as much as possible. A big thank you to those who have donated to the magazine as these funds help keep the magazine going. Until next time, stay safe and:

"Keep on Training."

# Contents

# 6

## NEWTON BROADWAY



Jeff Lynn describes his achievements on Newton Broadway which replaces a previous layout.

## ***Towards More Reliable Track***

By Trevor Gibbs

Track work can make or break the pleasure of operating a layout. Here we will look at a couple of strategies to make your track work better

# 12

# 17

## **3D** PRINTING

WE MAKE A SET OF 5 CONTAINER WAGONS IN HO SCALE



## **THE BICYCLE THAT CHANGED A LAYOUT AND A LIFE**

Clyde Humphries shares his ideas on animating a layout using Magnorail

# 20

# 26

## **BUILDING A TWO ROAD ENGINE SHED IN CARD**

A step by step guide to designing and creating an HO scale model using inexpensive materials

This publication nor the editor accept any responsibility for the accuracy or reliability of articles or advertising contained within these pages. We do not necessarily subscribe to the views or opinions expressed or implied by contributors or advertisers. The publication does not guarantee either expressed or implied to the good conduct or practices of those who advertise in this publication. We reserve the right at all times to refuse acceptance of material that is considered to be unsatisfactory for publication.



BRING THE **MAGIC** OF



TO YOUR LAYOUT OR DIORAMA



SCALE CYCLISTS\* ACTUALLY PEDAL THEIR WAY THROUGH LAYOUTS AND VEHICLES DRIVE THEIR WAY AROUND ROADWAYS WHILST, SPEEDBOATS OR YACHTS CAN CRUISE LAKES OR PONDS.

**WORKS WITH ALL SCALES\***

ONLINE SALES THROUGH



[WWW.MAGNORAILOZ.COM.AU](http://WWW.MAGNORAILOZ.COM.AU)

CHECK OUT OUR YOUTUBE CHANNEL AT [KLATCHCO56](https://www.youtube.com/channel/UCklatchco56)



*\*CYCLISTS AVAILABLE ONLY IN HO SCALE*

**25 Years  
Experience**

**JURGEN ENGEL**  
**SPECIALIST LARGE SCALE  
LOCOMOTIVE BUILDER**

**All Work  
Done  
In House**



Authorised Stockist of  
**SMS Paints and Tools**

Contact Me: [jurgenengel@y7mail.com](mailto:jurgenengel@y7mail.com)

- \* ALL O SCALE & GARDEN RAILWAY KIT ASSEMBLY
- \* HO BRASS KIT ASSEMBLY FOR MOST KITS
- \* BRASS LOCOMOTIVE REMOTORS AND REPAIRS
- \* ANDIAN FIGURES PAINTED IN HO & O SCALE
- \* O SCALE A SPECIALITY

**AUSTRALIA WIDE POST AVAILABLE**



[www.facebook.com/www.scalerailkitassembly.com.au](http://www.facebook.com/www.scalerailkitassembly.com.au)

**PLEASE SUPPORT OUR  
ADVERTISERS**



HO Scale 2CA Bogies



Twin Bar & Catcherless Pilot for early XPT Powercars



Replacement Chassis for Endeavor & Xplorer Models



HO Scale RDH 2220 & 2233 Kits



AVAILABLE NOW

COMING SOON



**news, cards, gifts,  
magazines,  
books and more!**

**TRADING HOURS**

Mon - Fri  
5:00am - 7:00pm

Sat  
5:30am - 5:00pm

Sun  
6:00am - 2:00pm



The Woolworths Centre  
133 Oxley Station Rd, Oxley, Queensland



Phone 0411 297 800  
Email [info@railmodelleraustralia.com](mailto:info@railmodelleraustralia.com)  
Website [www.kangarooobbycraft.com](http://www.kangarooobbycraft.com)

**HO SCALE PALLETS  
10 PACK  
AUD\$8.00**



# NEWTON BROADWAY



## Jeff Lynn describes his achievements on Newton Broadway which replaces a previous layout.

Newton Broadway is still under construction, with more work on the upper level required which will keep me busy for some time. The major woodwork was done by fellow BRMA member, and very good friend, Doug Newton, and I completed minor adjustments and trimming, plus newer woodwork as the layout progressed.

Newton Broadway replaces an earlier layout which survived for over 20 years, unfortunately that layout was a duck-under design and my knees were starting to complain. My wife Agnes suggested swapping rooms and this was readily accepted, so a new design was drawn up that would allow maximum access incorporating the largest possible radius curves

for the main lines within the given space constraints. Access has been improved thanks to Doug's decision to include castors on each support leg. The layout is resting on a carpeted floor, but rollability has been improved by some bargain priced plastic floor sheeting intended for offices, bought from in the clearance section of Ikea. The sheets were quite scratched, and I managed to purchase them for a bargain price.

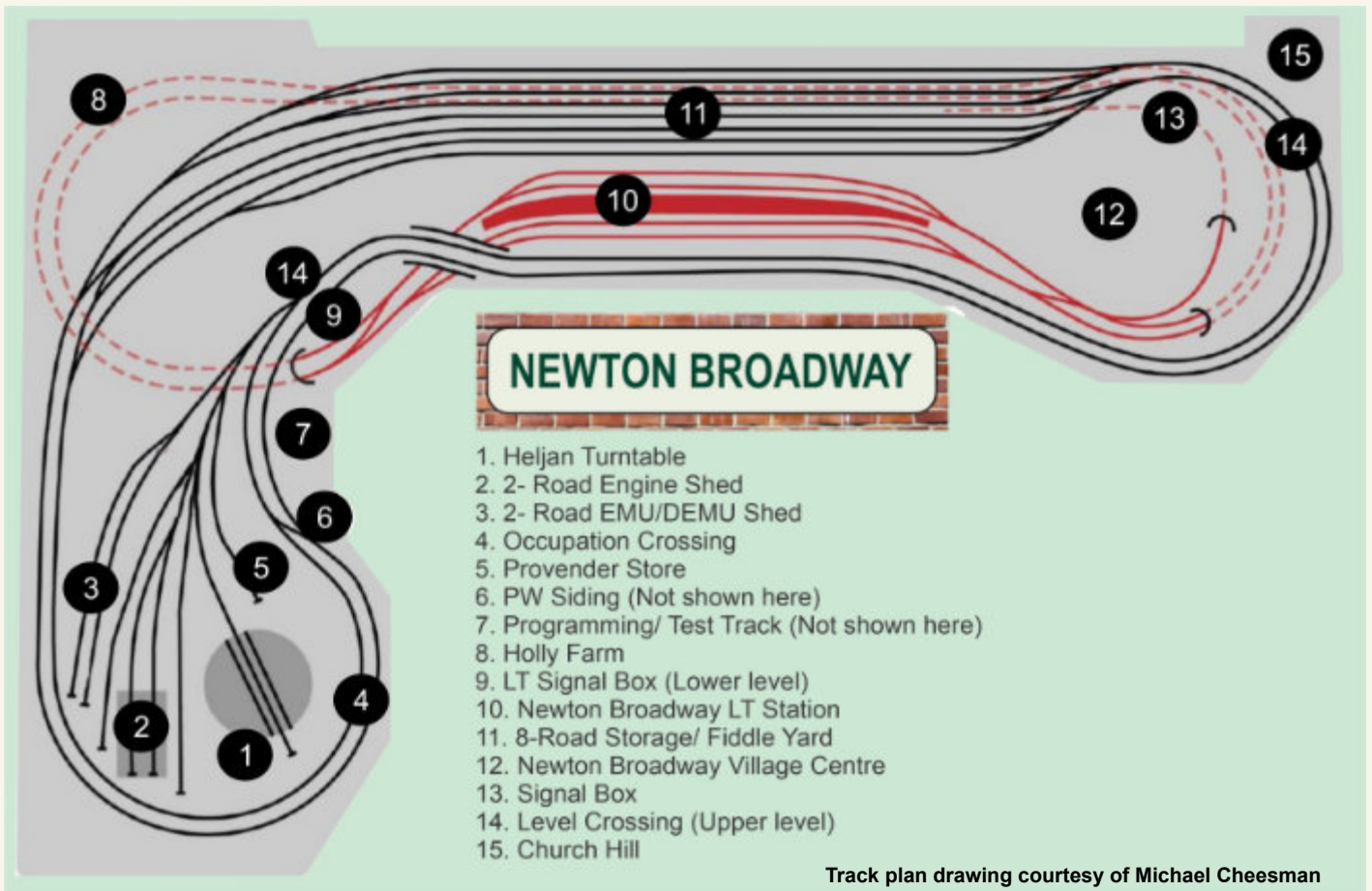
The upper level represents BR Southern Region, although time periods are flexible, so pre-grouping or modern day stock can be seen at different times, and occasionally together. This level is set up entirely for DCC using NCE Power Pro 5amp system, and all points have auto-frog-polarity switching modules.



The lower level is primarily set up for Digital Command Control (DCC -NCE), but a rotary 4-pole switch allows switching between DCC or DC control or for all tracks to be isolated. The latter allows for the power board to be live for use with tools while leaving the tracks unpowered. This level represents an unspecified (read: generic!) London Underground line. While the setting is fictional, it will most closely represent an area to the south of London. Most of this circuit is covered (in tunnel) but all pointwork is in the open section around the station with its single island platform.

All points on the lower level have all been wired with polarity controlled by Peco microswitches beneath the Peco solenoid point motors. Point control is primarily from a mimic panel with a probe and stud contacts, although it may also be possible to use DCC accessory decoders as well in the future.

London Transport (LT) Underground trains are represented by four sets of LT EMU 'surface' stock (CO/CP, Q, F and modern S stocks) plus two pannier tanks and two Bo-Bo electrics presently fitted with DCC decoders and other trains will follow in the future with the A60 stock set under construction, and C stock as yet unstarted.



There are also three 'tube' trains of EFE origin, two of which are motorised but not yet DCC-fitted. These also need pin-point axles and bearings fitted to all trailer bogies to make them more viable. A 5-car set of Graham Farish generic suburban coaches has been painted in various shades of brown to represent LT's Dreadnought stock. The Farish coaches are wrong in every single detail for this, but do, in fact, look quite good.

Third and fourth rails have been laid at the right-hand end and this is slowly being extended to include all of the visible underground lines to represent LT's form of electrification, while the upper level main running lines and any EMU sidings will eventually gain third rail. To keep up interest, the yet to be built loco shed will not have third rail at all.

*The third and fourth rails are clearly visible in this photo. The village also has a popular bus service.*



*Below: The London Transport Pannier Tank is resplendent in the LT red livery as it makes its way along the lower level. The third and fourth rails are well represented here.*





The upper level double track run is fully operational, and the eight road storage/fiddle yard is fully useable, although no points on the upper level have had their point motors wired up yet. Points at the right-hand end have below baseboard mounting and big holes in the baseboards covered with 'L' shaped pieces of card that slide in from each side leaving only a very small gap for the operating pin. All other points will have above board point motors, which are not as elegant but easier to maintain and wire up without having to crawl under the boards.

Dapol working upper quadrant semaphore signals have been installed on the upper level,

while 2 aspect colour light signals are the rule for the underground. Several of the latter are Train Tech Sensor Signals, which work quite well, and have been programmed to be overridden by the DCC controllers if desired, as they have built-in accessory decoders. I am waiting for Dapol to release some upper quadrant junction signals for the storage yard approaches. The signalling will never be 100% accurate, but is intended to be representative. I have only one Distant signal at present as headways are really too close to allow more. Modelling compression means compromising a bit.

*Below: The Heljan turntable in place and ready to service the loco yard. The sheds are yet to be fitted after the final track layout is installed and wired.*



*Below: LBSC H1 Ivatt Atlantic "La France" 39 in the striking brown livery, storms out of the tunnel with a rake of exquisite Pullman cars.*



The engine shed and carriage sidings are being laid with Peco's new bullhead track and their code 75 points. The layout of the tracks has just about been finalised, but the track is not yet pinned down and wired, except for the Heljan turntable, which is fully operational already.

Some bridge and viaduct spans have been constructed or are being represented by "placeholders" until better structures can be substituted. As such, the newly laid track on the upper level is not all anchored in place and could 'float' and cause problems, although this has not been an issue so far. This will be rectified once the proper viaduct sections have been constructed (converted from Vollmer single track viaduct kits). A set of brick arches from my old layout form part of the placeholder structures – these were converted from Triang/Hornby brick viaducts and brick bridges, with three of each being required for each arch to get the necessary material to form double tracked viaducts.

There are several main periods modelled, with the 1960s, 1980s and mid-1990s being prominent. Stock, road vehicles and signage are intended to be changed to suit these periods. For the main lines it was intended to model a derelict station (no signage to give away the era!) but Doug N has suggested having plug-in station modules to allow a changeover to occur and this has quite a few merits worth considering.

My other major railway interest is in DCC sound. There are currently several steam locomotives fitted with sound and a good many more diesels and DMUs, plus three EMUs, with sound from various sources (mostly Howes or Legomanbiffo).



Work on the village area is continuing, slowly reaching its final appearance.

There is a programming track that gives the appearance of disappearing into tunnels at both ends, seemingly connecting with the underground tracks, but in fact completely separate. It is fully scenicked and can be used for photographic purposes with posed locomotives. There is a 6-position rotary switch allowing this track to be connected to a 12 V DC controlled supply, the programming output of the Power Pro system, a Power Cab (used for most of the jobs), and an ESU LokProgrammer. In addition, I have an old computer hooked up to all three of the DCC inputs so JMRI Decoder Pro or the LokProgrammer can be controlled from the computer interface.

You may also spot a 'few' buses around the place! These are another interest of mine, and started off as purely an adjunct to the model

railways, but took off on their own later. More recently, I have been dabbling with some European HO scale models too, as a result of a trip to Denmark and Germany in 2018. The European trains, being rather larger than BR stock, don't look out of place side by side in model form, even though the scales are quite different.



*Below: Cyclists take a break as a freight train rambles by. Above: Buses are another interest and fit in well with the scenery.*



# Towards More Reliable Track

By Trevor Gibbs

Track work can make or break the pleasure of operating a layout. Here we will look at a couple of strategies to make your track work better



Fig 1 A CP Rail F7 A-B combination haul a train into an Intermediate Station on the St Agnes Railway.

When I got started with electric model trains as a nine year old, I was limited to Tri-ang set track with a mixture of Standard, Series 3 and Super 4 track over the early years. The rolling stock was lightweight but had the rolling capabilities of bricks! The curves were sharp with even sharper entry points off dead straight tracks. Derailments were frequent enough on those curves when the deep flanged wheels tripped on minor flaws at the joins or point guard rails.

In my teens, I joined an O scale outdoor model railway club where I was introduced to scale model trains. The curves I laid with flexible track as a 15 year old looked very good and the finer flanges worked well. However trains still derailed occasionally for unexplained reasons. Over a long period of time, those events reduced as my track laying got better. However the derailments did not totally go away. I have laid curves with flex track totally by sighting and minimal measurement. Although the trackwork was quite good, it was not foolproof.

## SUGGESTED CURES

Over the years a number of suggestions have been offered in various hobby mags and forums. Here are a few.

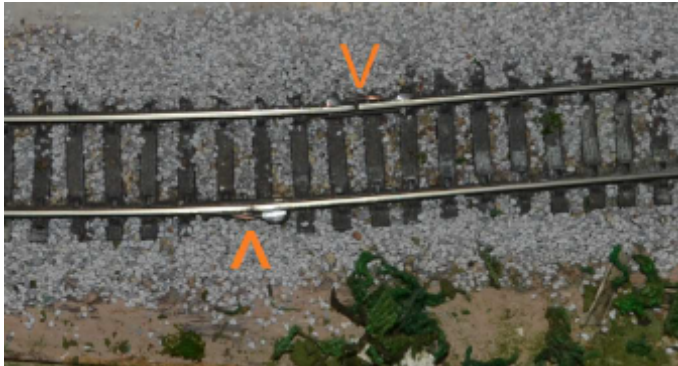
**1. Use a Transition Curve** - Instead of a straight hitting a curve, a gentler lead into the curve will assist the model change its mode. The lead in does not have to be particularly big and the curve will ease any shock caused by the change in direction of the model wheels.



*Fig 2 The Radius between A and B is about 800mm - between B and C and beyond about 600mm - makes a softer transition into the curve. The white material is styrene packing to super elevate the curved siding.*

**2. Stagger the Rail Joints** - When Flex track is laid in a curve, the inner rail will be longer than the outer rail. Use that length to stagger the joints so your train only passes one rail joint at a time.

If there is a misalignment, the wheels only have one faulty side to get past instead of two. In the extreme, you could cut one rail of the flexible track in half.



**Fig 3** This is the shortest distance I have between staggered joints. In fact, it is the only such joint since the flex track on the curves was replaced with combinations of set track curves.

To allow for space for the rail joiner under your rail, you will need to undercut the plastic sleeper with a razor saw or hobby knife.

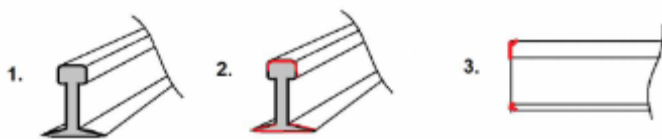


**Fig 4** This is showing undercutting the rail so that rail joiners can be inserted.

A benefit of this is that when you do reach the next straight area, you will have a couple of longer lengths of rail rather than many short off cuts.

### 3. Deburring and angling the joints

For all its faults, the Tri-ang track of the early to mid 60's was deburred and angled on the ends which helped the wheel flanges track better which the products of today do not seem to have emulated. The angle of the ends of Tri-ang rail would have been the result of the rail cutter used in the manufacturing process. It is a process that can be easily applied to all track at every joining point.

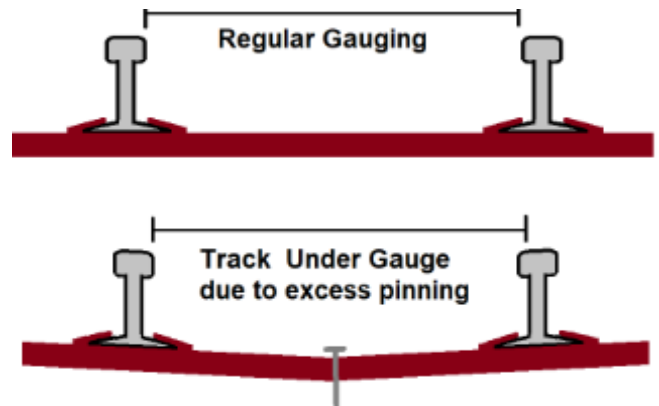


**Fig 5** The end of a rail showing where burrs can occur outlined in Red. and the burrs will need to be removed

### 4. Double check your track and wheel gauges

People often pin down their track and consequently the sleepers can squeeze up and the rails can go out of gauge. Some wheels on rolling stock are on an axle pin and only there by virtue of an interference fit. The wheel can move over time!

Track can be pinned down on the outside of the sleepers before it is ballasted and maybe super-elevated. We will discuss this later because we want to ensure the trains run reliably!



**Fig 6** The pinch effect on the gauge of the track by nailing it through the centre. This can be avoided by spiking the sleepers on the outside of the track or drilling a small hole in the sleeper centre.

The NMRA standards gauge is a very useful tool to check both of these



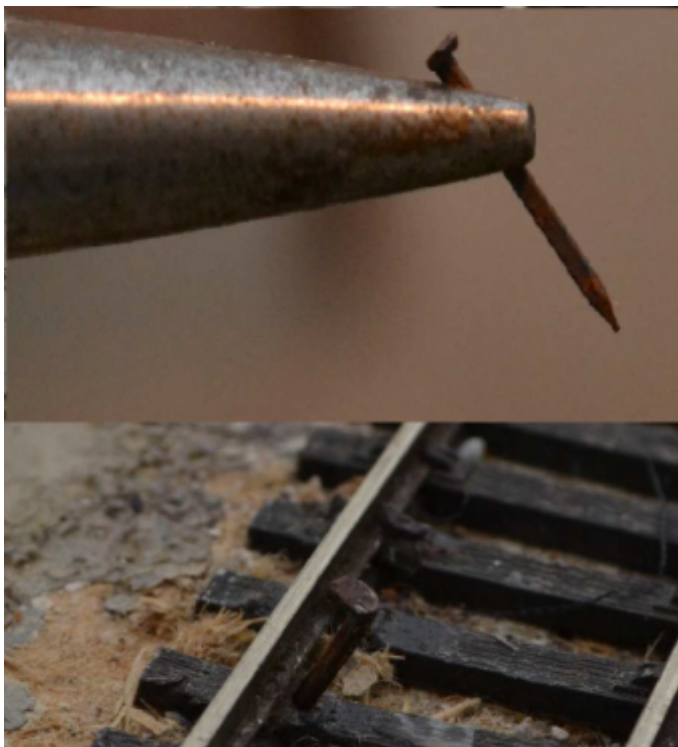
**Fig 7** Checking the Rail Gauge with the NMRA track gauge. The whole profile of the gauge is to allow for the overhang of rolling stock clearing tunnel mouths, buildings and signals. It is a lifetime investment as an aid to better track laying.



**Fig 8** *Checking the gauge of the wheels in situ. These notches are set for the correct back to back spacing of wheels.*

Wheels are often a tight or “interference” fit on the axle so they can be moved on their axles until they are in gauge.

Rail gauge can be corrected by spiking the track in much the same way as the real railway does, through the sleepers and holding the base of the rail. Because sleepers and spikes are dissimilar materials, the spikes will need to be pushed in occasionally. Real railway spikes loosen off like this well!



**Fig 9** *Inserting a spike to assist with rail gauging. The head of the spike will hold the base of the rail which would normally have been part of the moulded sleeper.*

**5. Soldering the joints** - To do this you still need a rail joiner and stagger the joints as well. I could see this being OK for hand laid track but difficult with our usual flexible track so I have only ever attempted it once.

My layouts and offshoot fiddleyards lived in a garage or shed for the best part of 50 years. The track was subject to weather extremes so allowance for rail expansion was important.

## MIXING SET AND FLEXIBLE TRACK

A few years ago, I saw a layout quickly built using a combination of Flexible “Straight” sections and Set Track curves. This allowed for a very realistic appearance of the “straight” main line and sidings which flowed freely rather than geometrically. Inspired by that, my club made a small portable layout using the same idea.



**Fig 10** *Note the flowing sidings, streamline points and set track curves. From all accounts it was a very quick layout to assemble, set up but not fastened for this show.*

After a lot of years of use, some of the flex track on my own layout gave way at the sleepers around the corners during a particularly warm summer. At that point, I replaced those curves with set track pieces of varying radii to fit the free hand laying of the original flex track.

Peco make what they call Radii 1-5 set track curves. I only have one short section of Radius 2 track. Using compound curves such as an R5 curve coupling to make a transition to an R4 or R3 curve as shown in Figure 2. It was quite a successful move for me.

I did have to cut a couple of pieces of track to fit the geometry as I did in Figure 2 and deburr all the rails. The new set track curves were steady whereas the old rails had started to lift. With a little bit of judicious painting of the sides of the rails, it became hard to pick the difference between the old and newly laid track sections.

**Super Elevation** - occurs when the outer part of a curve is raised relative to the inner rail. This is done to assist the dynamics of the train “banking” and negotiating the curve at an optimum track speed.

Some time ago, I saw a forum post showing pictures of other modellers’ attempts at super elevation through a couple of different angles. I especially liked the effect of some of the larger locos leaning into a model curve. I started to experiment with raising my layouts’ track to achieve a similar effect.

I learned that the effect on those posts on very large radius curves was achieved with a .040” or 1mm spacer under the outer rail. On my layout, that would have been way too high - I did not want the effect of slot cars going into embanked corners.

My local picture framer gave me offcuts of a thin .020” foam sheet material that had a fine granular texture used for separating foam core sheets in transport. You can see it in place in Figure 2. That material has doubled as a surface for asphalt on my platforms and the concrete areas around the loco depot.

I had a number of pieces left over so I cut slithers and strips to elevate the outside of those curves. The performance of my trains has improved further.

Another of my favourite “go to” materials is the styrene from margarine and yoghurt plastic tubs. I have used these in turned form for searchlight signal discs. It is also useful in strips as they are about .005” or .13mm.

Old plastic credit and “loyalty” cards are thick and strong and work well.



*Fig 11 A Canadian National GP40-2L ready to couple to its train leaning into its elevated curve. The relay box in the foreground is simply made with a couple of styrene offcuts glued to a nail. Such details will be the subject of a future workshop article.*

The hardest part was to grade the angle of the elevation into the curve. You will need a couple of different thicknesses to build up to the maximum elevation.

Figure 12 shows the effect I was trying to achieve. I think a narrower layout such as mine would not “stand” being too steep from this view and I experimented with a couple of sizes. I went for .020” maximum. It is your railway so feel free to use more elevation to suit you and your layout!



*Fig 12 Northern Alberta Railways 205 arriving for a cross with an Eastbound RDC3. The angle of super elevation gives an effect I am happy with although I have seen higher camber levels*

Testing your track and trains and correcting any issues when you have laid your track is critical. Derailments are NOT fun but they occur far more frequently on our models compared to the prototype. I have travelled many kilometres on trains and only once did I ever think we would be coming off the track.

On your layout, you will need to test run a number of locos with light and heavy loads in both directions. Include using shunting locos pushing and pulling freight and passenger cars over all the areas of your track at realistic speeds.

Where there are problems with several items of rolling stock, check the location and nearby track with the track gauge. Wheels can lift off well before the point you think it is malfunctioning.

Ask yourself, has the rail dropped or slightly bent in the process of being laid, particularly on a curve? Sometimes rail does have a slight kink not apparent to the naked eye. Are the rail joiners and joints properly aligned?

In the extreme where a “tripping” area cannot be found, it is much easier to start again with a new length of track. Put the difficult section in a less critical spot such as a large radius curve or straight.

When I renovated my layout, I chose to test the track with the “most sensitive to tripping” locos I owned! The testing to get rid of one or two of those areas was exhaustive and the tracing difficult but worth it.

Now my derailments are usually caused by human error and sometimes by mechanical “failure”. I had a loco wheel set that worked loose a couple of times going out of gauge which then picked at the points.

This only appeared while I had a train operating session with my older grandson. To fix the problem, I used the NMRA gauge to reset the wheels and a small dab of super glue to hold the wheel at the right position on the axle – in an area that will not affect operation.

### **Finishing Touches – Painting the track**

I find some mundane tasks very therapeutic including painting the sides of rails with a colour that suggests weathering.

While I like lower profile track, I have stuck with Code 100. Painting the side of the rails with a small artist brush and a rusty brownish poster paint makes a lot of people think it is closer to scale than it really is.



***Compare the pair – both Code 100 rail with the bottom track laid, painted (with a red brown poster paint) and ballasted and it has a much finer look.***

Take care not to paint inside of point blades and between rail joins but a finer paint brush and a little bit of patience goes a long way.

Allow time for the paint to dry and test run your trains again in case you have accidentally created an insulated area .

### **Finishing Touches – Ballasting**

Some simple Ballasting and you are finished!. Not your favourite task? Plenty of layouts have been built without it as was the original Trans Australian

line (in case you needed a prototype) but I think it adds to the appearance. There are a number of ballasting tools available but I have not used it much as it was almost as quick and more relaxing for me to apply it, especially around points. A large paint brush from a set of art brushes from a reject store is more than adequate for the task.

For those of you who do not know, Code 100 rail is .100 inch or 2.54mm high. Code 70 is .070 of an inch or 1.8mm and so forth. Code 100 scales to 155 pounds to the yard or 77 kg/metre which is a bit oversize.

Most heavy duty railways in Australia are laid with 62kg/metre rail - but the painting reduces the apparent height of the Code 100 rail... I can live with the visual difference being hidden by the paint.



***Fig 14 Manicuring the Ballast with a Paint brush***

I have used a range of ballast products over the years for different projects including foam underlay, a clay based product and Woodland Scenics ballast.

The product you use will depend on your preference for colour and lighting. To set the ballast, you will need to lightly spray with water mixed with detergent over the ballast.

The detergent acts as a wetting agent. Use an eyedropper with diluted Matte Medium or spread clear drying White PVA glue over the inside and two outsides of the ballast and leave to dry overnight. Make sure you use a clear drying PVA glue as you can spoil the appearance of the Ballast with a yellowish tinge.

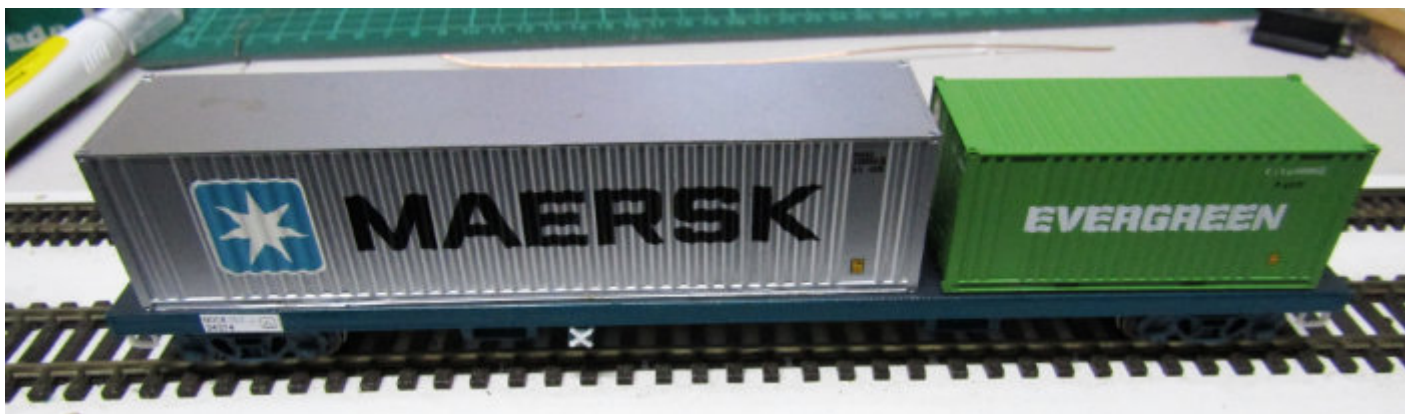
Test your trains thoroughly again, clear up any loose or stray ballast, clean the rail tops and enjoy your trains.

Happy Track Building!



# 3D PRINTING

WE MAKE A SET OF 5 CONTAINER WAGONS IN HO SCALE



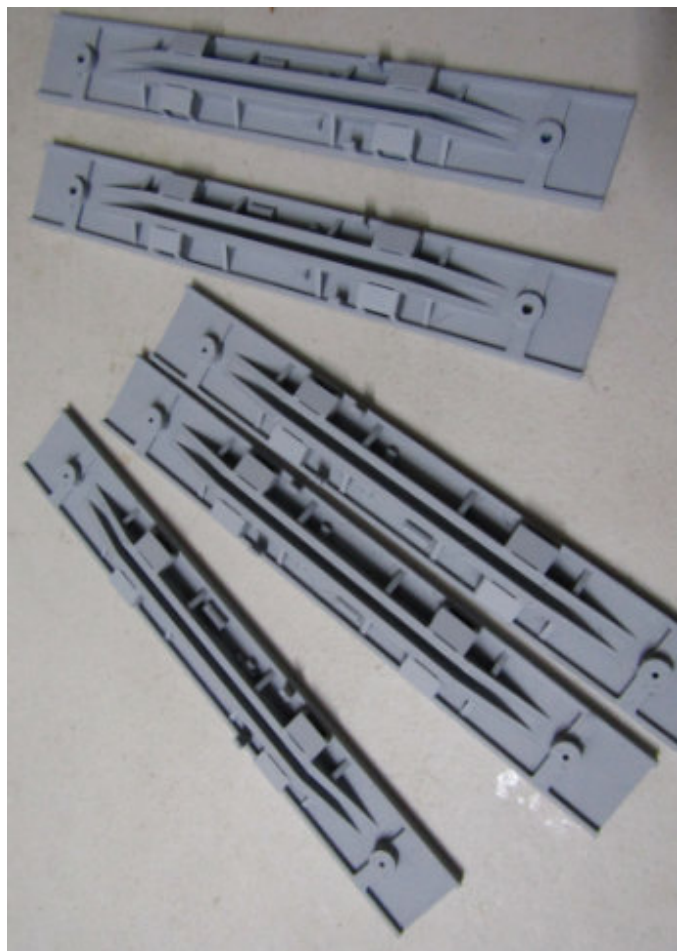
In my previous article I described the 3D drawing and printing of an N scale container wagon. This time we will be taking the N scale drawings and enlarging them to HO scale. One of the biggest advantages of 3D printing is the ability to enlarge or reduce drawings to a range of scales. The only problem is having a 3D printer that has a bed large enough to build the model.

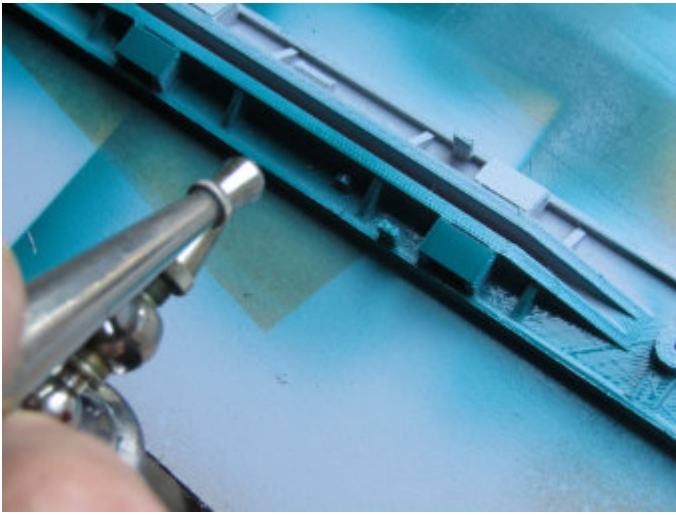
The recent purchase of a 3D printer with a build volume of 300 x 300 x 400mm gave me the opportunity to start making some HO models for my friend. The process of enlarging a small file to a larger one seems simple enough but I found that some of the wall thickness increased proportionally and meant that the final artwork needed some modification to make the finished model less clunky.

Once the artwork was sorted I set up 4 wagons in the slicing software. The printing was done using a quality setting of .15 and a brim as build plate adhesion. The print took just over 7 hours to complete. The brim was removed using a sharp craft knife and a small piece of styrene was cut and glued to the model as the base for the chain boxes. When the glue was dry the models were primed using a spray pack of primer surfacer. Due to the fact that these models will be fitted with containers, I have not indulged in the usual sanding of the surfaces to get all the surfaces smooth.

With the primer dry the models were then painted in PTC teal using automotive acrylic laquer. A second batch was painted in PTC red. The models do require shunters steps and the brake handles and

these were drawn up in Tinkercad and printed. The first few attempts at this were not successful but after some adjustments a reasonable result was achieved. Further adjustments to the drawings and settings in the slicer software has resulted in a much better product.





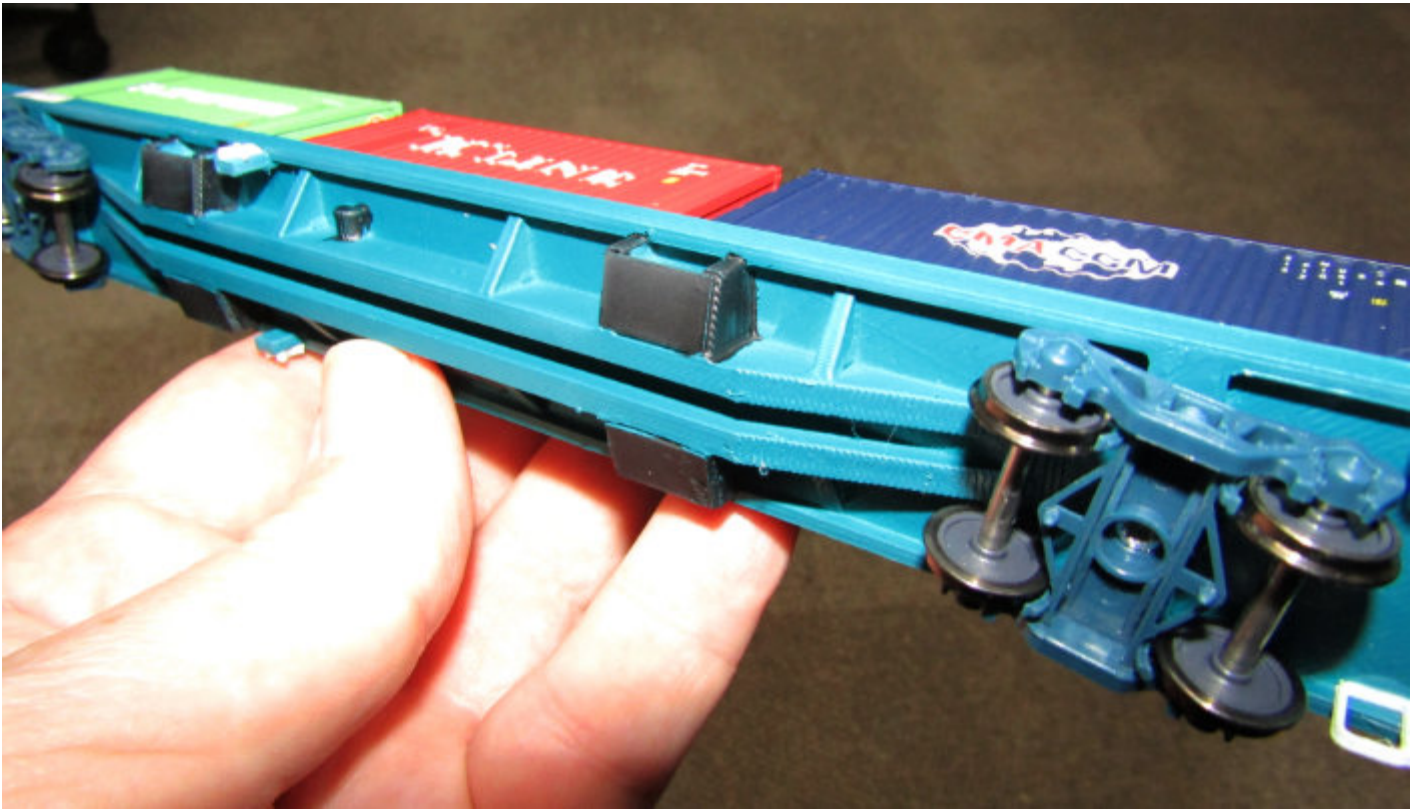
*Painting the models using an airbrush and automotive acrylic lacquer. Two coats were needed to achieve good coverage.*

The models were dry overnight and they were then painted with a matt finish, again leaving to dry overnight. To finish the models it was a simple case of fitting the buffer plates, Kadee couplers and the bogies. We also painted the tanks and the chain boxes in matt black. A codeboard was then created in Corel Draw and printed on sticker paper, cut out and then applied to the models.

In summary, this has been a rewarding job, and although not as prototypically correct as I would like these models to be, they do look good on the layout. In these early stages of learning this new technology a project such as this helps to build skills, but above all else it is an inexpensive way to add rolling stock to your fleet. I have used an Australian made filament to print these which is PLA+ and I have found it to be very good.

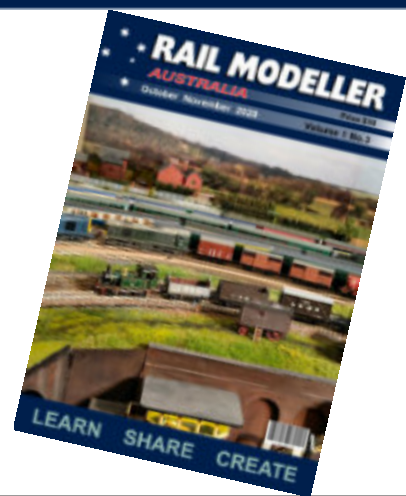
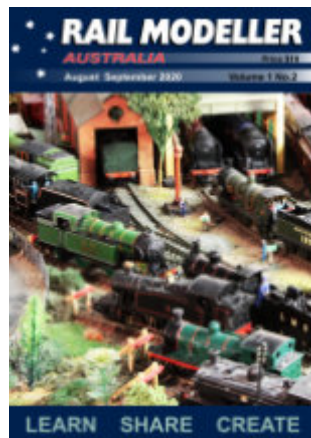


*Four of the ten wagons made is shown here in PTC Teal colour. The next stage for these wagons will be weathering in order to make them look more “used”.*



*Although not super detailed, there is some basic underfloor detail. The bogies are a SDS models product.*

# RAIL MODELLER AUSTRALIA



**ADVERTISE YOUR BUSINESS IN THESE PAGES**

**[info@railmodelleraustralia.com](mailto:info@railmodelleraustralia.com)**



# THE BICYCLE THAT CHANGED A LAYOUT AND A LIFE

Clyde Humphries shares his ideas on animating a layout using Magnorail

The story of how a little HO scale man riding his bicycle changed a Mountain Resort into a Lake Resort with two iterations along the way as well as a planned retirement into a thriving online business!

Picture an HO scale layout of the railways, buses and tramways of the Dutch city of Nijmegen in 1927. Suddenly a bicycle appears around a corner with a man actually pedalling his way along the road – the crowds are mesmerised. A HO scale cyclist actually pedalling his bike on a layout – WOW!



From that time in February 2010, the little bicycles from the Netherlands have finally pedalled their way to Australia. So fascinated with this concept I was one of the first hobbyists to try out this unique Dutch invention. The video of that little cyclist has literally changed my perspective in modelling and layouts and I am now the Australasian agent for Magnorail, the company that evolved from that first little cyclist. My hobby is now an online business appropriately named MagnorailOz with customers around the world.



Prior to this I had constructed a small (150cm x 60cm) exhibition layout named Echo Mountain that featured the Faller Car System. The movement of the cars added more action than just trains circling a layout. In those days, even the Faller Car System was not a commonplace sight at exhibitions. Not being a fine scale modeler I was never very good at gluing things together or creating spectacular scenes, so in order to capture peoples attention I decided to use animated models to create interest. The primary reason for all the movement on the layout was to actually entertain both children and adults with a little bit of scale magic rather than static scenes with the odd train appearing every so often.

Such things as the chooks behind the General Store would come alive when I sprinkled magic food on to their grassed area.





Children would watch for ages waiting for the boom gates to close, the chairlift do a loop or the tram automatically go back and forth. Echo Mountain was successful in entertaining exhibition visitors with a chairlift operating up the mountain slope and Faller cars and trucks zipping around the little village which was bisected by a railway line taking passengers from the outlying areas to the chairlift station. The boom gates would close with the oncoming tram, the cars and trucks would dutifully stop, and the chairlift would continue taking tourists to the top of the mountain and back down again.

However, that initial bicycle video from 2010 got my creative brain ticking away, imagining how I could incorporate the Magnorail system on the current layout. Not wishing to trash everything, the decision was made to keep the mountain and

chairlift but create a mountain lake and track with two Magnorail systems and the Faller Car System circling the lake. The second iteration of the layout became Echo Lakes, a camping and tourist attraction for those people with ski boats and yachts whilst the chairlift and bush walks allowed activity for the less water inclined of the community.

## Echo Lakes

Echo Lakes saw miners excavate a tunnel through the mountain to allow the trucks, busses and cars continue their journey around the layout using the rock from the tunnel to build a dam wall to create the lakes (or so the story goes). To keep a railway theme and allow me to continue to attend model railway shows, a new story was created. Echo Lakes #1 had lost its railway as busses more economically serviced the tourist trade to Echo Mountain. This then left an abandoned right of way, so the council turned it into a Rail Trail with a public walking track and some vehicle access for food and ice cream vendors and bicycles, and so Echo Lakes #2 was born. Bicycles could be seen pedalling along the Rail Trail whilst the Ice Cream van drove around selling his wares. Thankfully the Council did not allow him to play Green Sleeves through his speaker system a move appreciated by the locals.





Below, on the lakes, yachts glided across the water and speed boats with skiers in tow zipped around oblivious to the noise restrictions. It was all go with the occasional foray into the open waters by the local house boat (Faller Car System Boat) which mostly avoided the other watercraft. Where are the trains? How come there are no trains on a train layout at a train show? Such comments were a little upsetting but the paying public were fascinated with the layout, and any negative comments were soon forgotten when Echo Lakes received an Encouragement Award at the 2016 Grampian Model Railroaders exhibition for innovation in the hobby. The award was achieved thanks to the Magnorail System introducing cyclists pedalling along the paths, speedboats, yachts and houseboats sailing across the lake surface.

Whilst the idea of a rail trail was great, it really did not show the true potential of the Magnorail System and the Faller cars and busses kept getting stuck inside the mountain, careening off the road or running out of battery during an exhibition.

The design for Echo Mountain/Echo Lakes #3 came about after dreaming about what I should do to make the layout more interesting. Does anyone else dream about layouts too? Layout iteration #3 used Magnorail's flexibility to form a loop on two levels, with vehicles and bicycles now able to go up and down a ramp at either end of the now widened and extended rail trail. The wider Rail Trail allowed the addition of a tourist line traversing the trail with another Magnorail loop just circling the trail's top section. Although the line only carries trams and the occasional works department "Gandy Dancer" it silenced the criticism of having no trains on the layout. Echo Lakes #3 retained the chairlift and Echo Mountain but the Faller Car System became too awkward to operate so was finally retired. However the Faller houseboat was retained and continued to operate until Echo Lakes was finally retired to be reborn as Crater Lake.

We will see Crater Lake and its construction in the next issue of Rail Modeller Australia which features four Magnorail activities on both land and water plus an HOe tourist train that traverses the edge of the layout. One of the motivating things that prompted me to experiment with the Magnorail System, was the desire to see water skiers zooming

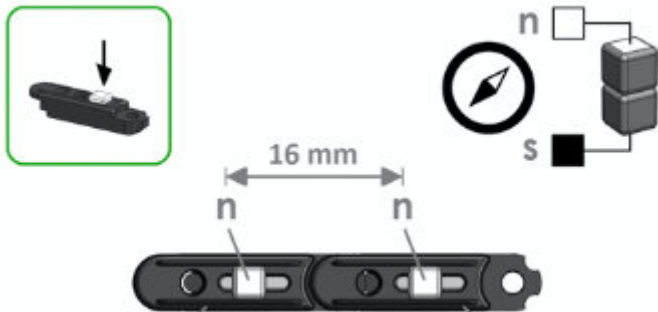
around a lake. Something that I had not seen anywhere on YouTube or at train shows. Using the addition of Preiser 17304 Speed Boats plus modified Wiking 009502 Motor Boat with Trailer and of course speed-boats need water skiers so Merten HO2168 Water Skiers Set can be seen being pulled along behind. Using clear acetate and affixing the skier to it, with a micro magnet keeping them upright, the skiers are kept at the correct distance keeping the ski rope (thin hat elastic) taut even around corners. The addition of some fiber-fill strands such as found in cushion inserts, give the effect of water foam from the boats and skiers. Adding yachts and sail boarders are an easy task when you understand how Magnorail works and that it only takes micro magnets to move light objects such as the sailboard or jets skis without stressing the motors.





### HOW DOES IT WORK?

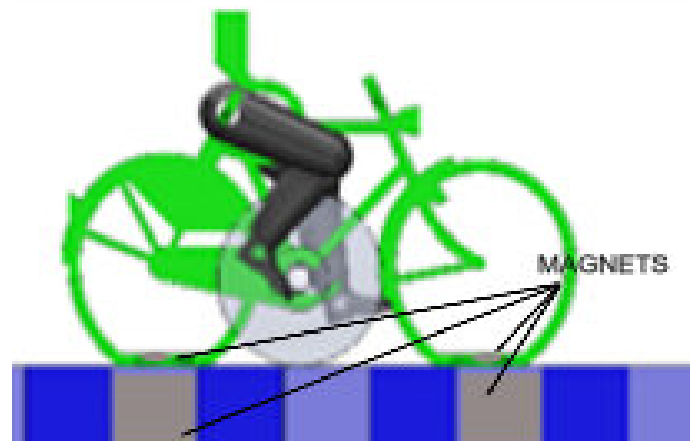
The Magnorail System is unaffected by what is on the surface as all the motive power is underneath. This means you can run practically any scale on any surface within the boundaries of the physics of magnets. Enough magnetic attraction to move the vehicle but not too much that the magnets retard the motors ability to move the chain links underneath. Within the Magnorail track channel the plastic links have strategically placed rare earth magnets, in a sequence of your choice. The links form a continuous chain that flows smoothly through a 12v DC motor that hangs down from the track so the surface above is completely flat and viewers are unaware as to how it all works.



The various sized links, enable you to place bicycles and vehicles in which ever sequence you choose and also to suit whichever scale you are modelling. The picture at right show the magnet sequence for bicycles.

The System can operate any free-wheeling vehicles

via a slider that attaches behind the front axle of the vehicle or really any reasonably light item such as jet skis, swans, killer whales or even yachts and pedal-boats. Importantly the system can be used in TT, Z, N and HO scales and some larger scales like Lego with the appropriate adjustments to the number of motors taking into consideration the weight and length of the vehicles. The basic concept for the magical pedalling bicycles (only available in HO scale) is a clear wheel with articulated legs attached to the wheel. The bicycle is held upright against the road surface attracted by magnets underneath in the Magnorail Tracking System giving it the traction to turn and the legs seemingly pedalling away. Micro Neodymium rare earth magnets in the bicycle wheels ensure a firm connection with the track surface, which are attracted to other larger rare earth magnets inserted





in the flexible chain underneath.

The finely engineered system uses a snake like, flexible track that can cope with up to 90 degree turns and inclines and kits also include two turning loops that allow the chain to turn back on itself in a tight 180 degrees turn. The ability to have tight turns is a real benefit when you have small layouts like my Echo Lakes layouts or cramped areas that require a sharp turn or very small radius like ponds, rivers or even a bicycle path in the bush. The flexibility of the system has allowed me to produce a few scenarios around the available Magnorail ready to run cyclists. I modified the cyclist known in the Magnorail catalogue as Man on Cargo Bike to become a flower seller who can 'pedal' his wares at a roadside market when not circling the roads and pathways, so you can add a little of your own magic to bring your layout to life. The Santa Claus with his trailer laden with a Christmas Tree gets children excited every time he pops into view. I printed stickers on the computer that I awarded to children

who found Santa on the layout.

The tandem bicycle engenders itself to the older viewers who remember the song about daisy and her beau on a bicycle built for two. It is all part of my philosophy to make my layouts entertaining and of interest to all ages.

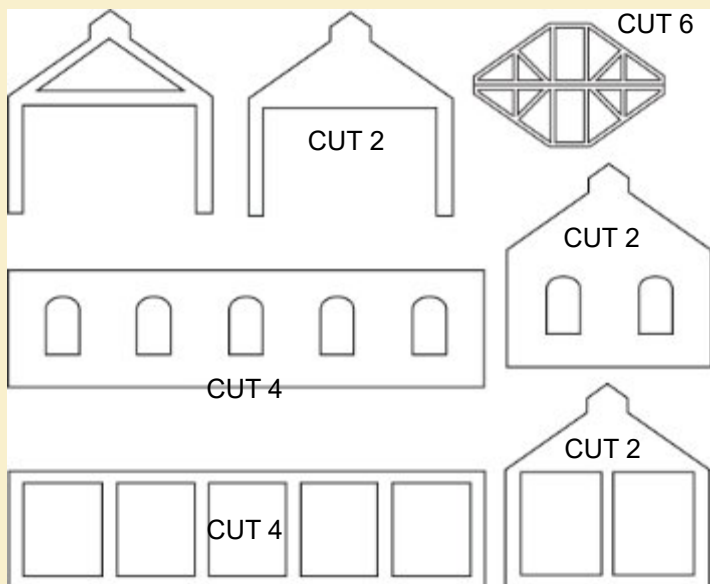


# BUILDING A TWO ROAD ENGINE SHED IN CARD

**A step by step guide to designing and creating an HO scale model using inexpensive materials**

A new layout I am working on for a friend required a 2-road engine shed that was reasonably long to accommodate some of the larger steam locos in his fleet. We did look at buying a kit, but nothing seemed suitable so the best option was to design and build one from scratch. Due to the size of the model I was keen to include some interior detail such as roof trusses and wall bracing which would also add to the strength of the structure. I do like working with card as it is easy to cut using simple tools and the adhesive has no awful odours thereby allowing me to work inside. Cost is another factor as card is

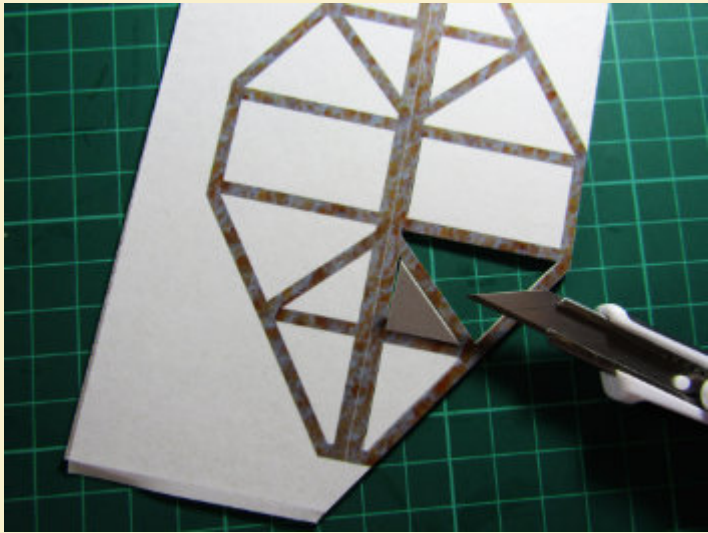
cheap to buy and readily available. Two brick papers purchased from Kangaroo Hobby Products were a red brick for the external walls and a lime washed brick for the interior. From the same supplier some large screen printed arched windows and corrugated iron sheets. The card used is 1mm thick grey boxboard purchased from an art store some time ago. PVA glue is used in the construction of the model, and basic tools include a steel ruler, a .5 pencil, a sharp craft knife or small snap blade knife and a cutting board. I also had on hand some felt pens used to colour the edges of the card.



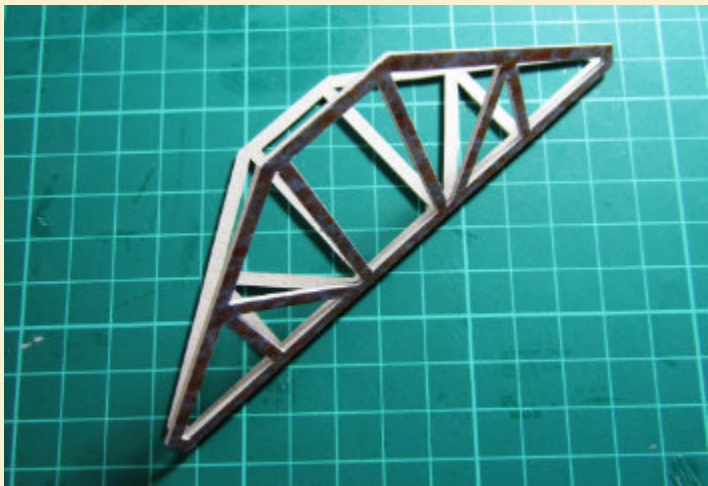
The design for the model is first drafted out on paper with a pencil and the measurements for each part. I then check my design for any errors and once satisfied with the draft I then refine the drawings using a computer drawing program. The resulting print is shown here with all the components needed for the model except the roof and the roof vent. Some parts need to be cut a number of times as shown on the drawing. These additional parts are used for internal bracing. The model is constructed using a layer technique that in this case will produce a wall thickness of 4mm, creating a strong model when finished. If you are unable to use a computer for the design stage, it is quite easy to transfer your design to the card using a ruler, pencil and square.



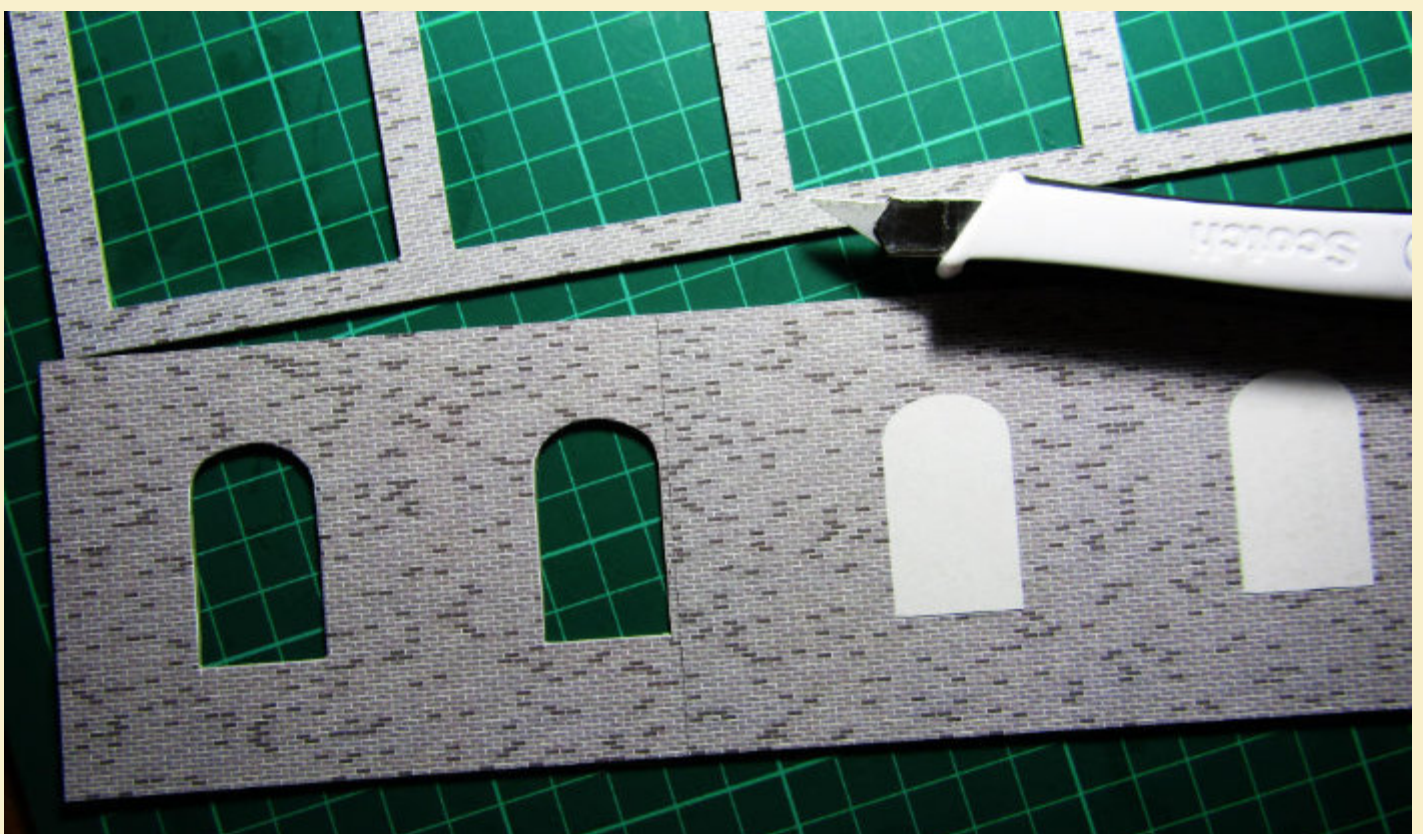
Once the design has been finalised cut card pieces slightly oversized to each design element and glue the brick paper onto one face using PVA or UHU glue stick. Remember to separate the internal pieces which will be lime washed brick and the external walls that will be in red brick. I use a roller/brayer to ensure the brick paper is well adhered to the card and then using an offcut of melamine board layed on top of the card I leave it to completely dry. Use of the heavy board helps to keep the glued piece flat. When all the card pieces have been finished in brick paper the design elements are traced on to the rear of the card. The pieces are then carefully cut out with the help of a steel ruler and a very sharp knife. Be aware that a blunt knife will make it difficult to achieve a good result.



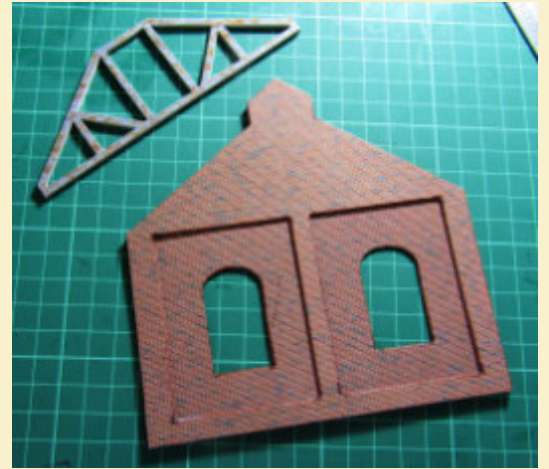
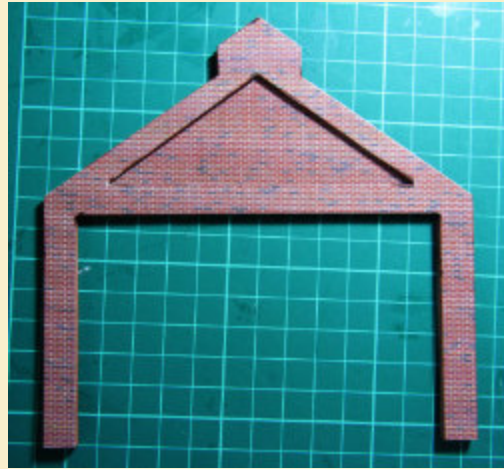
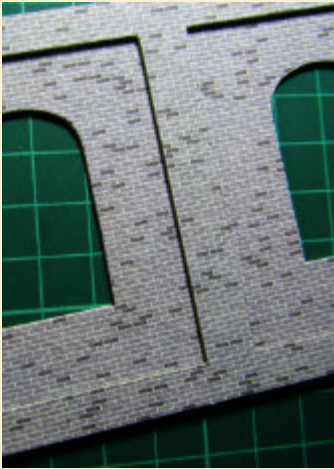
The trusses used in this design are two sides cut out with a centreline only lightly cut to allow the piece to be folded and glued together as shown below. The completed result was much more rigid than cutting the parts individually and then gluing them together. The completed piece was also less likely to warp. I did place the melamine board on these until they were completely dry. The 1mm card was quite easy to cut by doing a light cut initially and then a slightly heavier cut does a clean cut. I really can't stress enough how important it is to use a sharp blade.



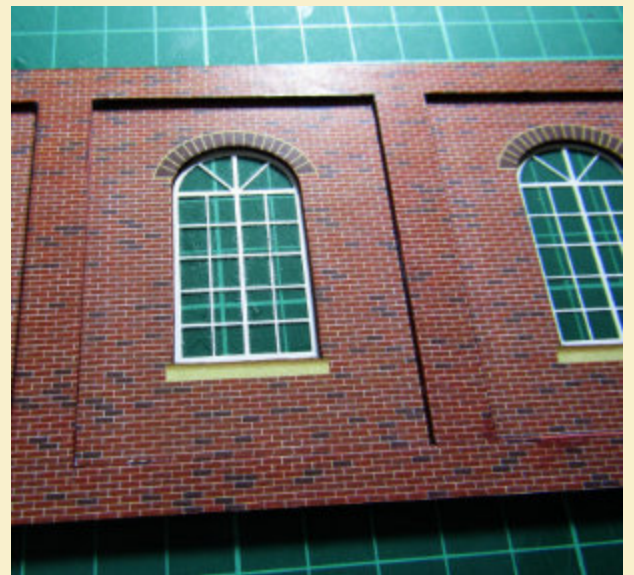
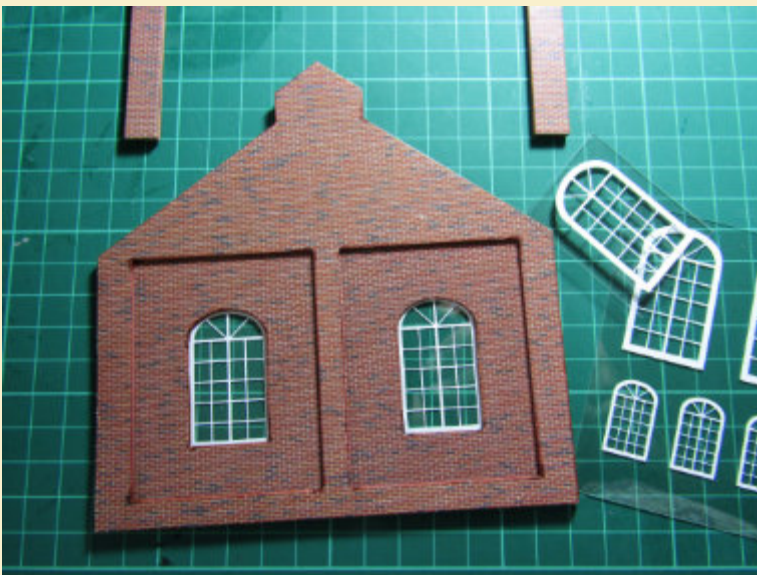
The photo below shows the internal wall panels being cut. Once the cutting process is complete the two parts are glued together and then placed under the melamine board until dry. The same process applies to each wall, but you must not glue the internal walls to the external wall panels just yet as prior to doing this we need to glue the windows in place.



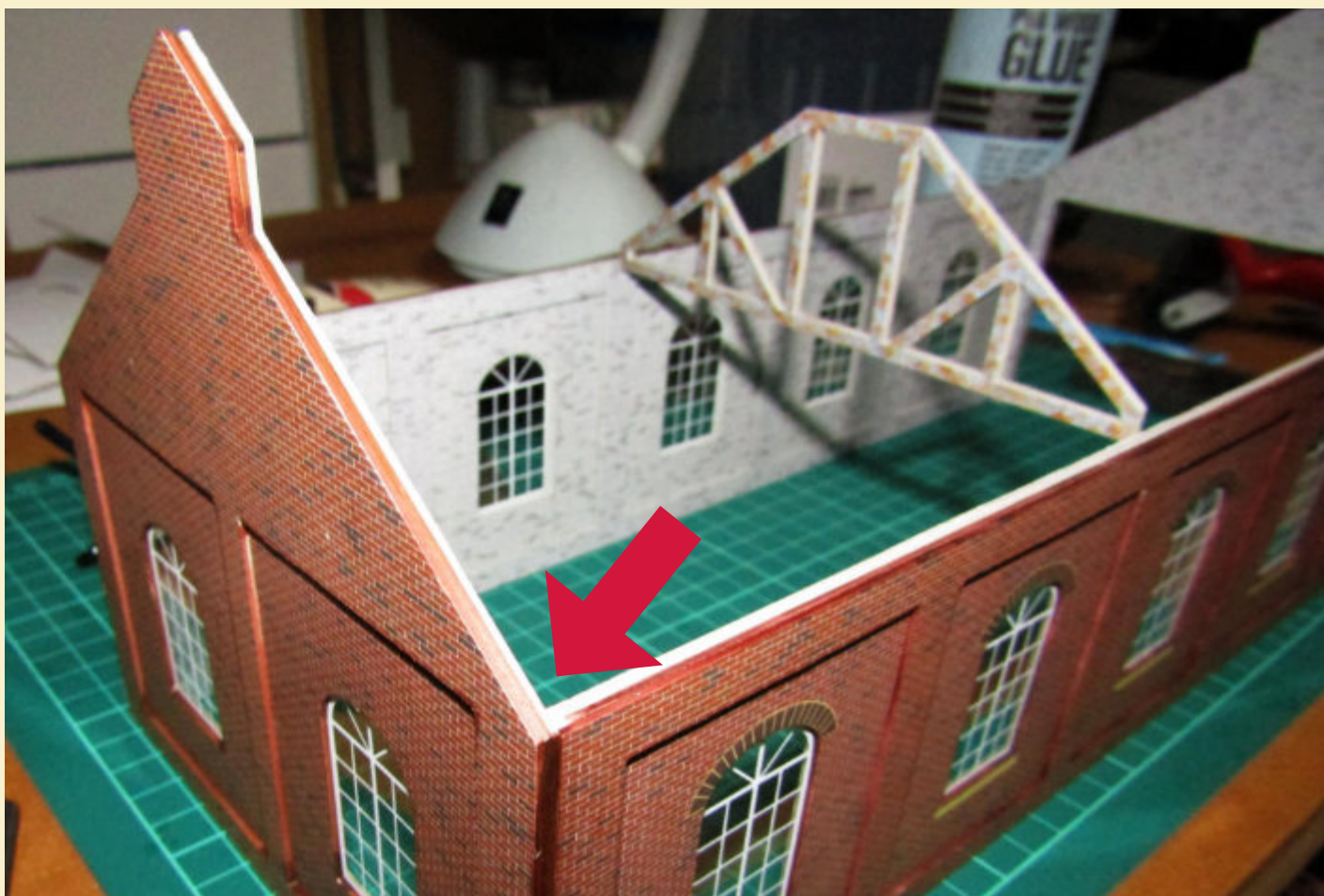
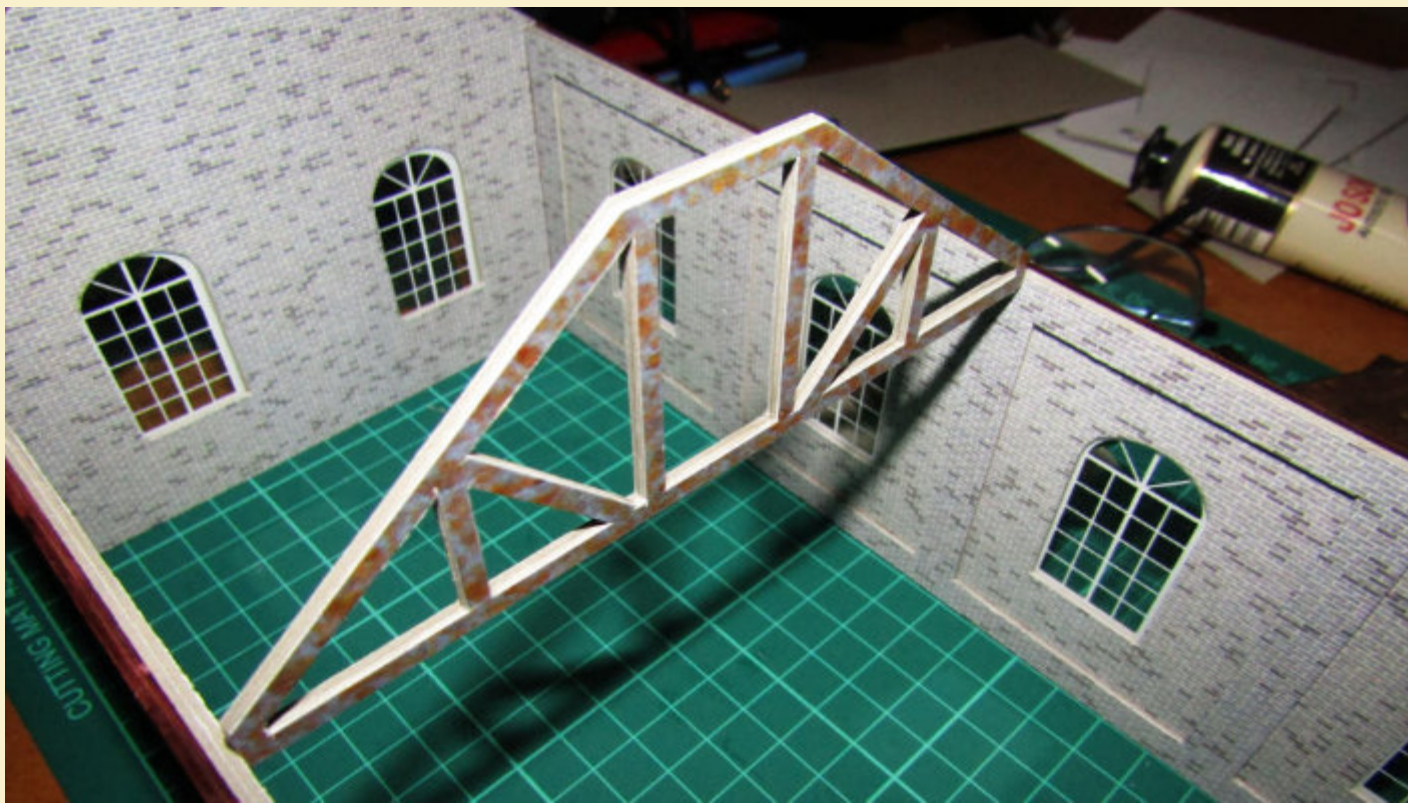
The layer technique is shown here as each of the walls are gradually built up, The raw edge of the card is a grey colour which is OK for the internal walls. The external walls where there are cut edges I have run a coloured felt pen which is the approximate colour that matches the brickwork. At this stage it becomes a bit easier to understand the basic line drawings and how it all comes together.



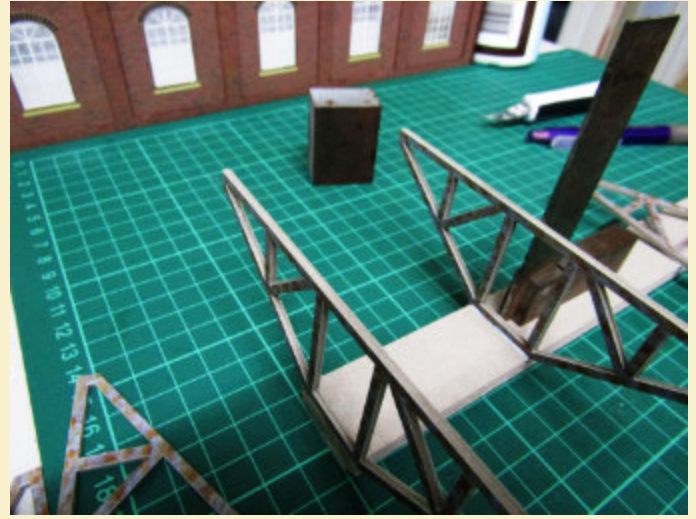
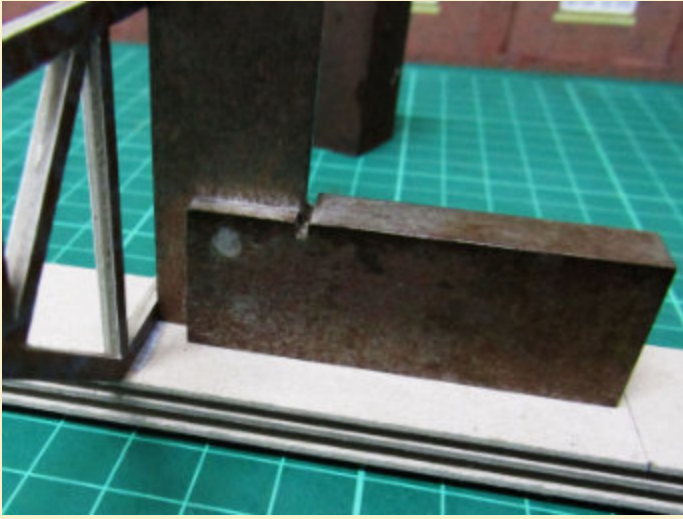
Below: The next stage is the windows, these are screen printed on a clear polycarbonate and the sheet has a protective film on the back that needs to be removed. Carefully cut out each window with a 3mm border around it and glue the windows in place using a small amount of PVA glue. Take care to align the printed window within the opening making sure the printed side is facing out. When dry glue the internal walls on the back of the external walls and place weight on the pieces until dry.



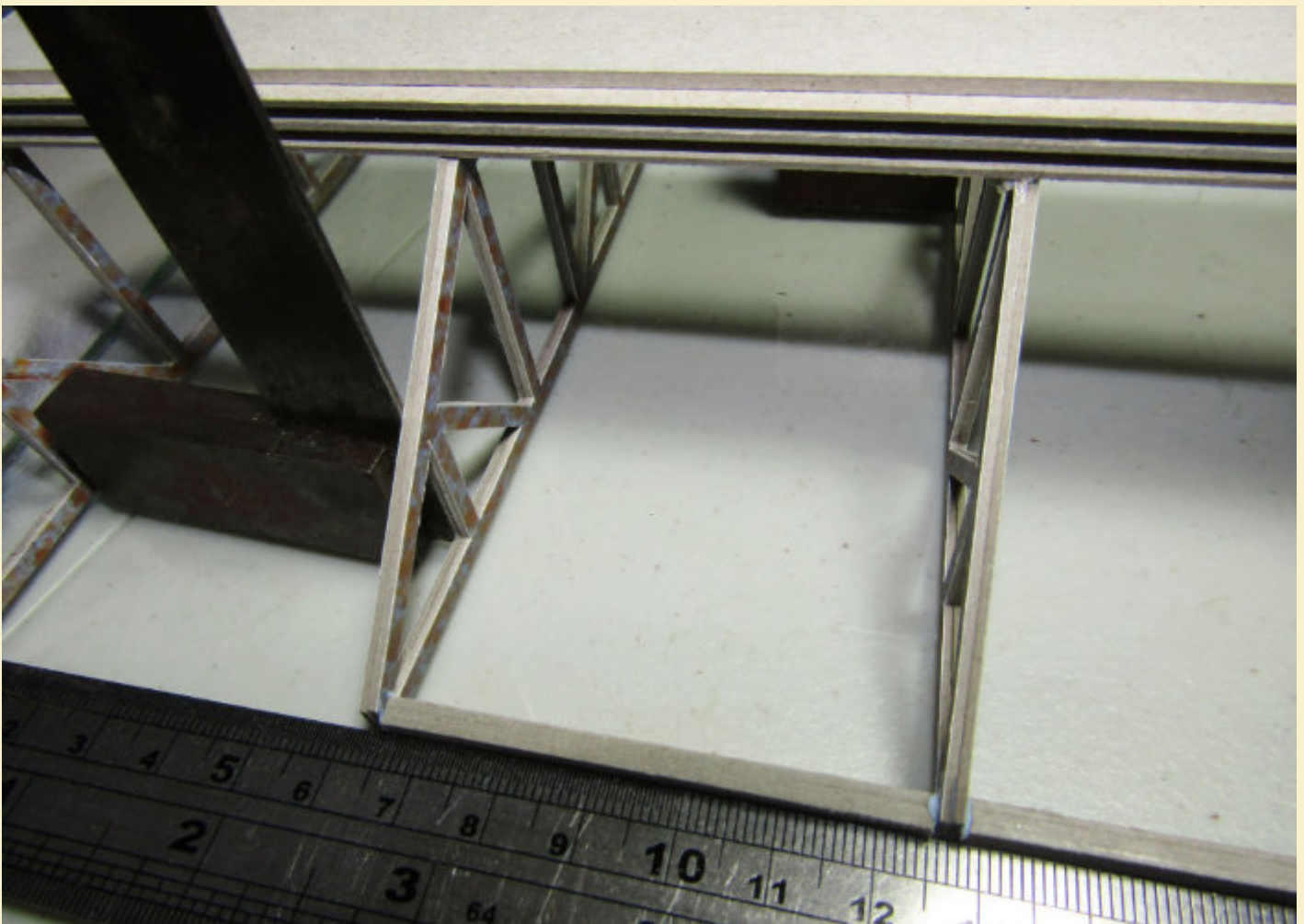
Putting the shell of the building together is next and it is important to use squares to ensure the corners are square. Using PVA glue the side walls of the building are fixed to the inside of the end walls as indicated by the arrow, this ensures the roof rests correctly on the model. The roof is to be removable and I have used the trusses (not glued in place) to hold the side walls in while the glue dries. Once the shell was glued together I left the model overnight to ensure that the glue had fully dried



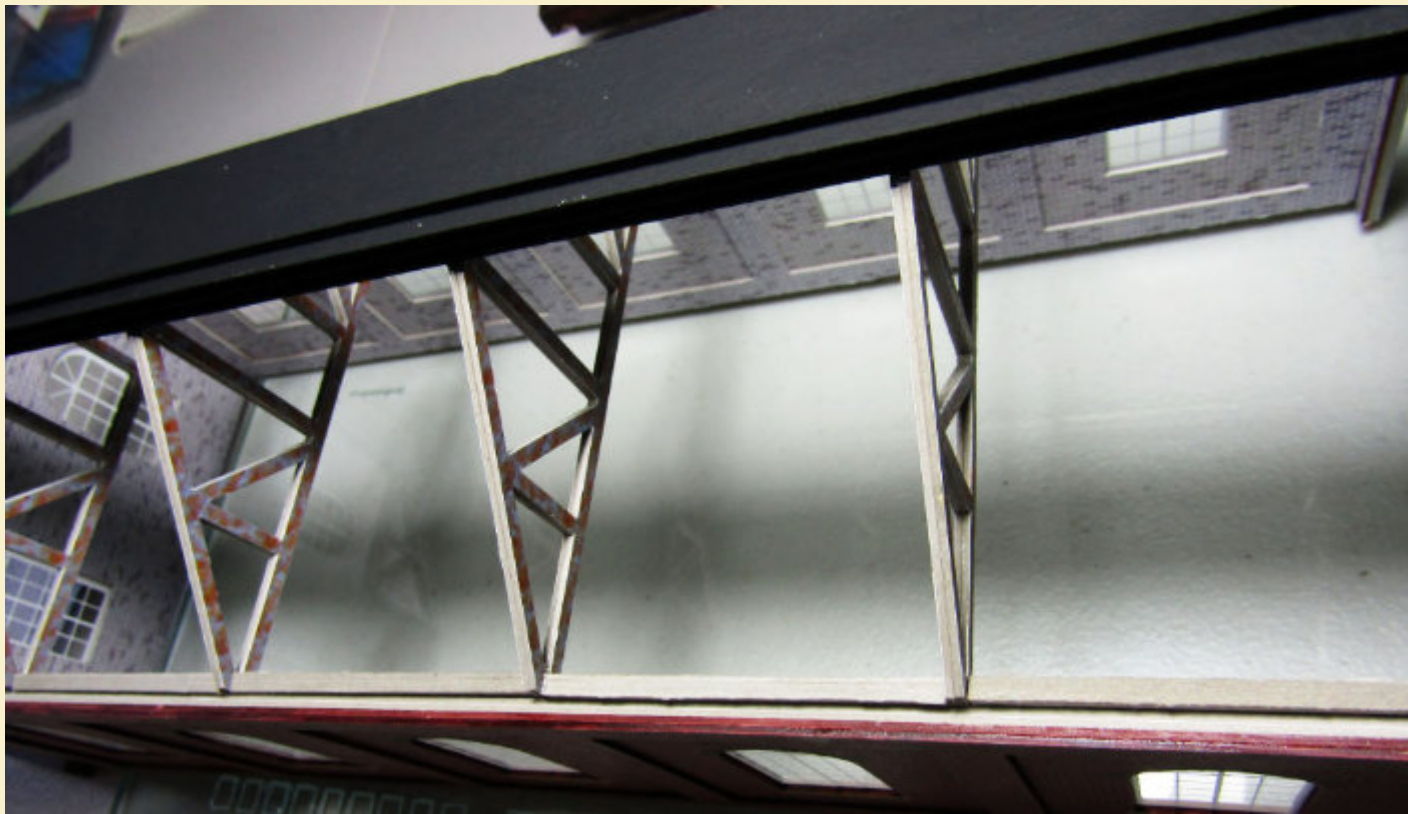
A roof vent was made using 2 different widths of card glued together alternately, the vent runs the length of the building and is used to attach the roof trusses. Measurements were taken from the building shell to ensure the trusses were placed correctly. Using a square and small weights to support the trusses they were glued in place. One thing I recommend is that the roof vent is painted prior to attaching the trusses as it is challenging once the structure is all glued together.



3 lengths of 1mm card were glued together and a strip 4mm wide was cut and used to make the side supports for the trusses. The roof and truss section was turned right way up and placed on a sheet of 6mm glass and using a steel rule and square as shown, the side supports were glued in place. Once again it is important to leave this construction overnight to allow the PVA glue to dry completely. In some places the model was adhered to the glass but this was easily released using a single edge razor blade.



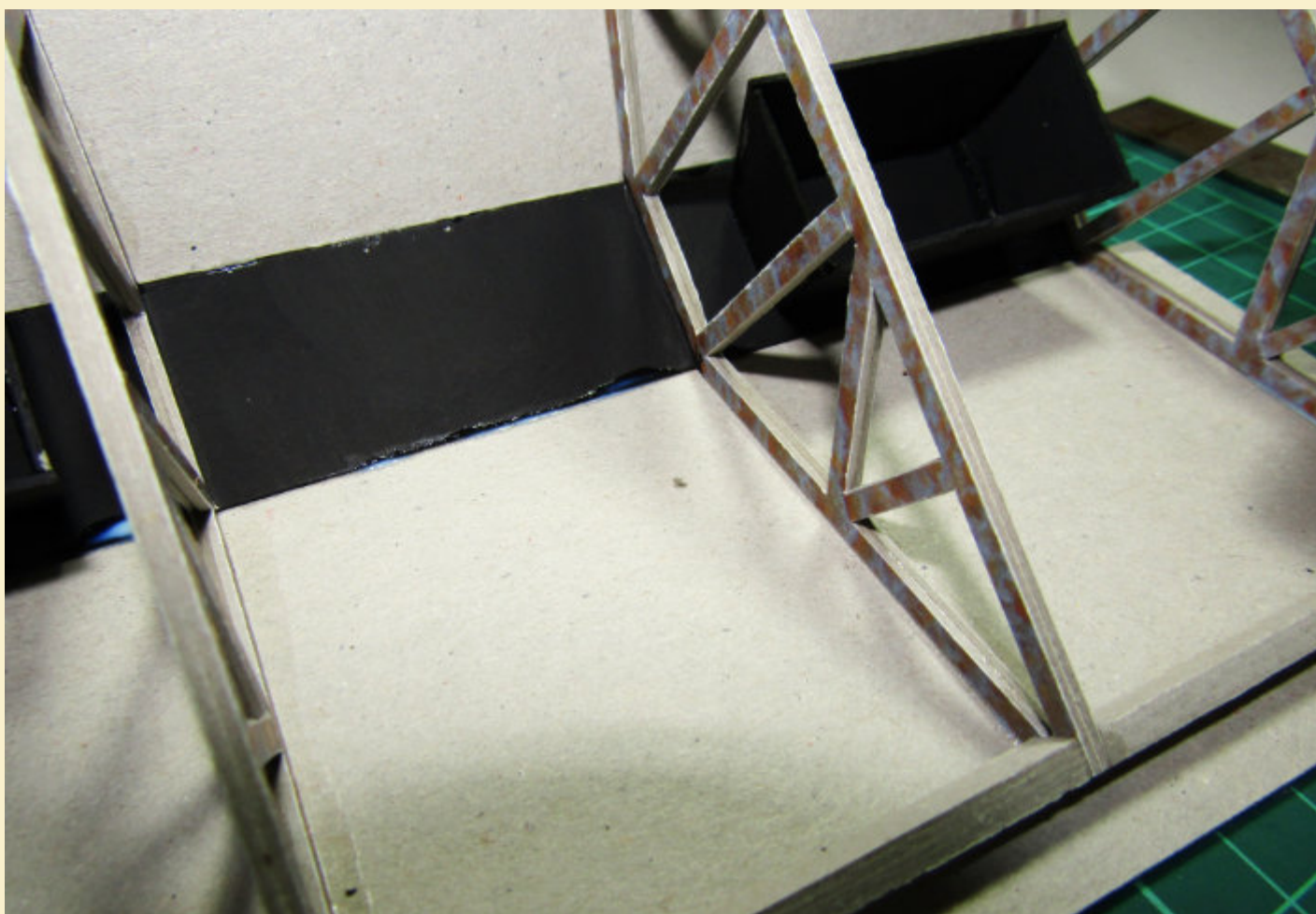
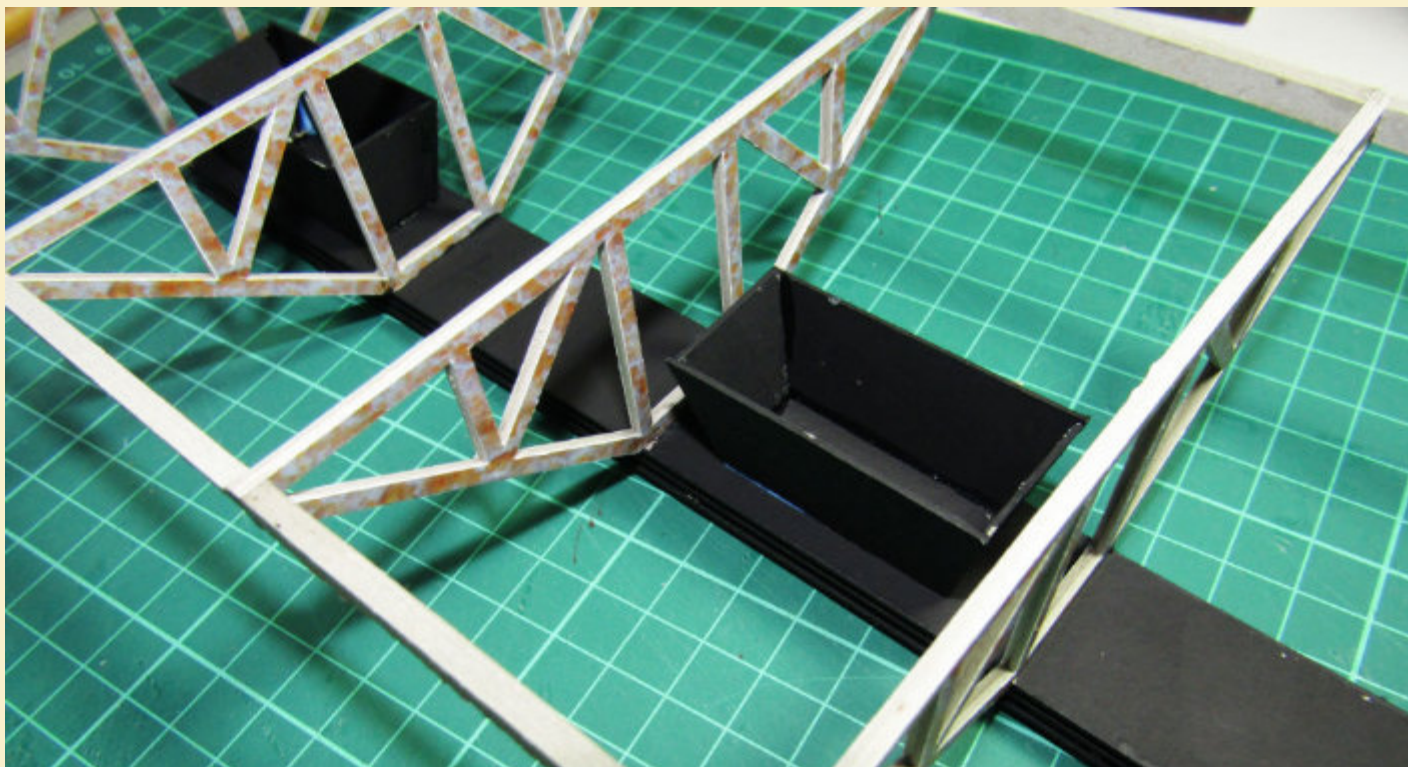
A quick test fit of the roof assembly to make sure everything is correct. As mentioned earlier the roof is designed to be removed allowing access to the model interior. If a derailment occurs or lighting needs to be replaced or fitting of extra detail inside the shed is required the roof removal will make the process considerably easier. Test fitting of components in a model such as this is recommended as finding any little issues early on can save a lot of problems once the structure is completed.



I have seen photos inside engine sheds where a large hood is placed at various positions in the roof structure in order to remove the smoke and fumes from inside the shed. There is most likely large fans inside these hoods but I decided that detail was not needed on this model. The hoods are a simple item to make using 1.5mm card. The dimensions were drawn directly on the card and 3 sets were cut out and glued together. You will notice that I painted the card first, so much easier doing it in the right order.



The vent hoods are glued in place using PVA and allowed to dry. At this stage the roof panels need to be cut using 1.5mm card and glued in place. The roof panels overhang the roof truss structure and this allows the roof to sit on the building correctly. The roof is two stage with panels over the vent attached using small triangles of card to support the length. Making the roof independent of the main structure required more planning than I thought and I had to make changes on the fly to get it right.

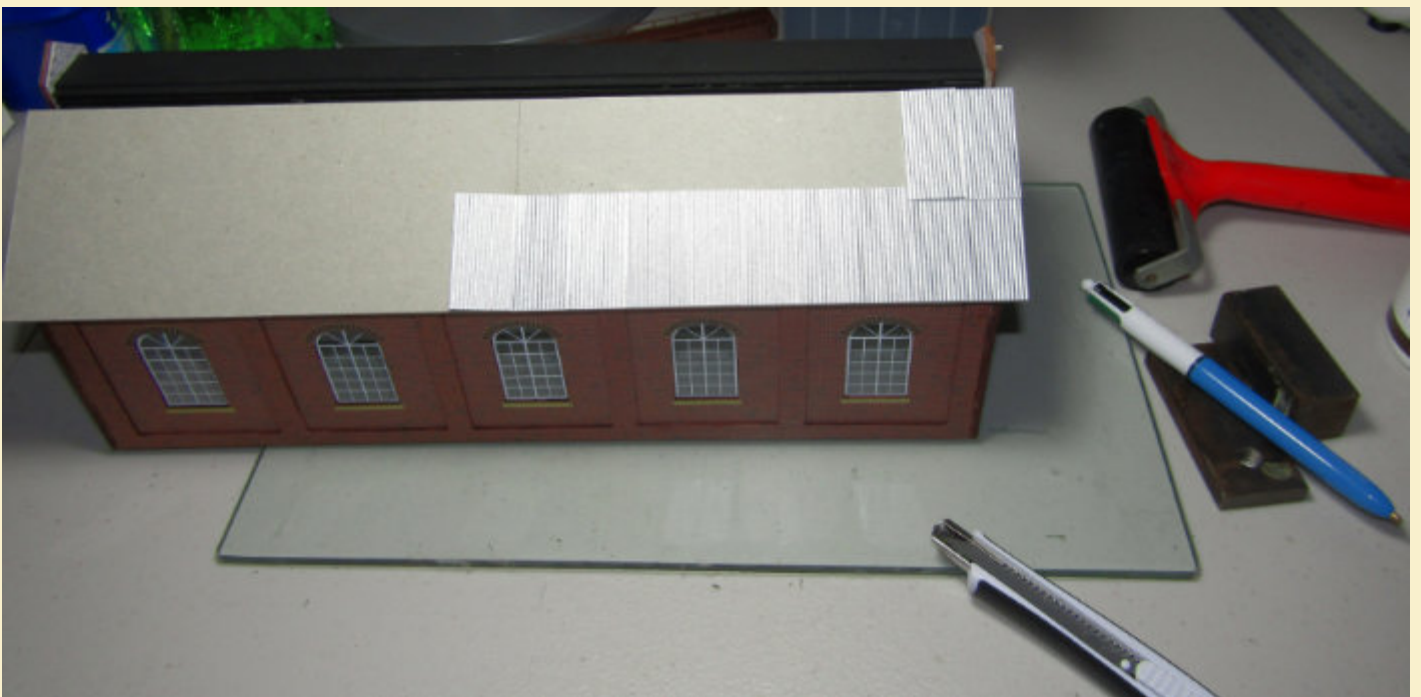




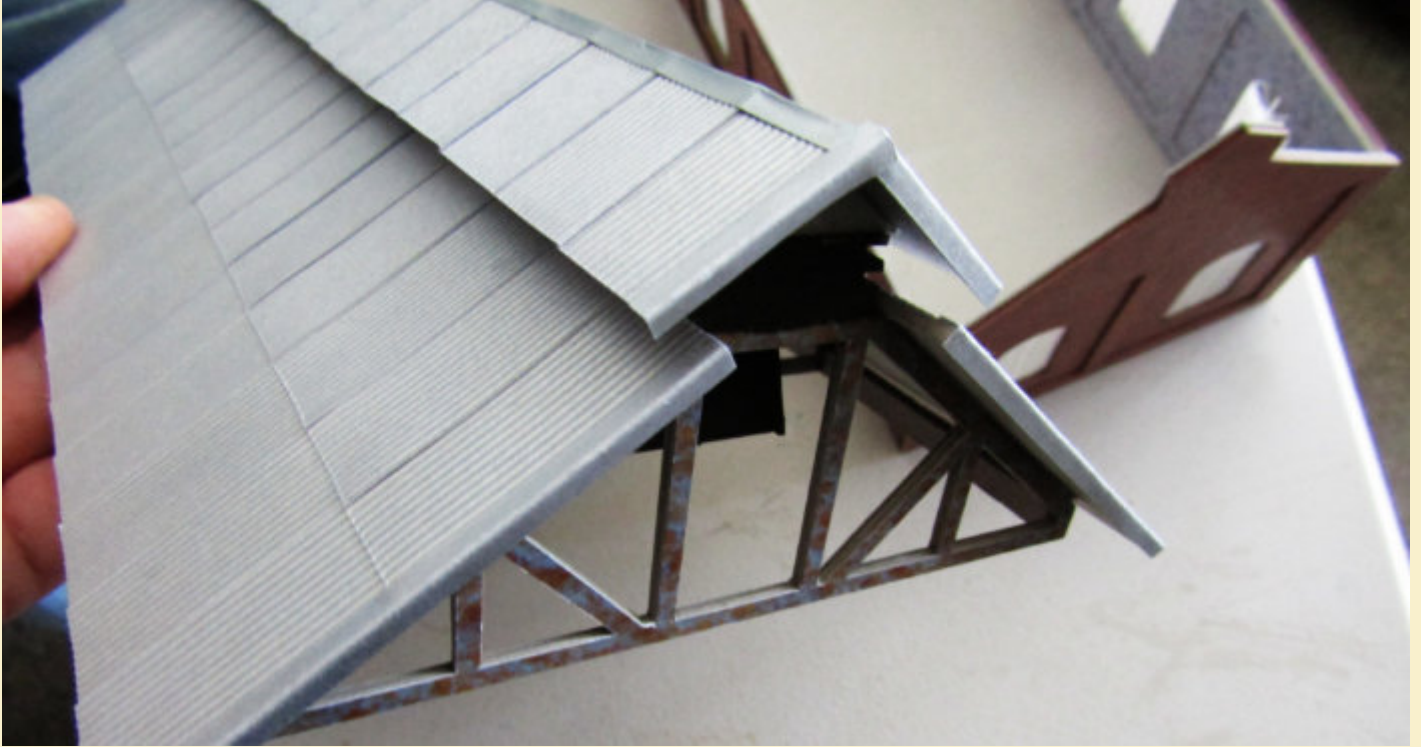
A quick check to make sure the roof fits properly now that the panels are glued in place. It is also a good opportunity to check that it can be removed and replaced without too much jiggling. This internal view of the model is quite satisfying thanks to the addition of the roof trusses. There is more work to do here to “dirty” the walls and make it look more used. Lighting has to be fitted and this will be easy enough using LEDs in a warm colour to replicate the old tungsten lights used in these buildings.



I cut the Kangaroo Hobbies corrugated card into smaller strips and attached them individually using PVA glue. The strips made it easy to overlay each piece creating a more realistic look to the roof. The trick is to start laying the strips at the bottom of the roof with the second strip above overlapping as shown. Using the tool in the photo I carefully lifted the overlap to emphasize the edge of the sheets. The roof is yet to be weathered and this will enhance the overall look of the model.



The completed roof showing the top stage covering the vent. I have finished off the edges and pitch with flashing. All that is left to do now is the guttering and down pipes and some weathering and some extra detailing which I will write about in a future article. The finished model is quite large being 340mm long, 150mm high and 145mm wide. Although I have hand made a number of model buildings over the years this one was different in the sense that the void area was quite large and some thought had to go into the design to ensure the structure was strong enough to avoid falling in on itself. I am quite pleased with the result so far and look forward to adding the details and weathering.



PN

009

***pacifc*national**  
***queensland***

IRP CP BP MREQ

MREQ BP CP IRP

USE ONLY 45L WITH MOSE BAGS  
FOR CP, BP, IRP

USE ONLY 45L WITH MOSE BAGS  
FOR CP, BP, IRP

22

22