Rumney Models LMS/LNER/BR Gunpowder Vans

Introduction

This set of instructions covers Rumney Models kit PC.55. This is designed to build into an accurate model of an LMS, LNER or BR Morton brake Gunpowder van. The kit is a mixed media affair and includes many 3D printed components as well as an etched 'under frame' and detailing parts. There are various options for the kit so you can create and accurate model of the vans at any point in their life. These options include RCH or BR axleguards, Independent or Morton brakegear as well as two different arrangements of vacuum brakegear. These options are summarised as follows:

- PC.55A - Unfitted Independent brake - RCH axleguards - LMS and LNER vans as built
- PC.55B - Unfitted Morton brake - BR axleguards - Early BR vans as built
- PC.55C - Morton vacuum brake - BR axleguards - Vans built new by BR with vacuum braking - lots 2544, 2689 & 2872 only
- PC.55D - Retrofitted Morton vacuum brake - RCH axleguards - BR retrofitted vans
- PC.55E - Retrofitted Morton vacuum brake - RCH axleguards - LMS and LNER retrofitted vans

Due to the way the kit is set up parts are only included to model one of the above options. This option must be chosen when ordering.

A note on roofs. When new they were all flush riveted and smooth (unlike the GWR built wagons where the rivets were more like a snaphead type). Over time the rivets could lose their close fit and so the roof would appear to be 'riveted'. This 'riveting' was subtle and I have not attempted to include it in the kit. It would be wrong for fairly new vans and if etched the rivets they would be vastly overscale.

General Notes

This is very much a composite kit with both etched and 3D printed parts. The kits have been designed to that as much of the construction for the etched components can be done before fitting the printed parts. It is possible to solder small parts close to printed ones, but you need to be very quick or you may risk damaging them.

Read through the instructions first and familiarise yourself with the components. Drawings and photographs taken during the construction of the test etches are included to attempt to make my waffle clearer. Note that not every single photo may be of your particular kit but suitably illustrate the item in question. Parts are numbered on the fret and I've tried to do this in build order. There are lots of missing numbers, this is down to me trying to come up with a standardised parts list.

Prototype Notes

By the 1920s British Gunpowder vans were basically built to a common RCH drawing. The GWR, always wanting to be different, modified this slightly, but those built by the LMS, LNER and BR were essentially the same save for differences in axleguards, brakegear and latterly the addition of vacuum braking. Early LMS wagons to diagram 1665 were rated at 7 tons but these were later upgraded to 11 tons which is what everything else was built to carry. They were never numerous, but they were long lasting. The following is a summary of the wagons built that are covered by this kit. I have grouped the information to be relevant to the various kit options that are offered.

LMS built vans - All built unfitted with Independent brakegear (Kit PC.55A)

Diagram 1665 - Built 1923-33 - 95 Wagons - Random number - Lots 27, 109, 415 & 709
Built 1936-39 - 65 Wagons - 701000-64 - Lots 923, 1027 & 1200

Diagram 2093 - Built 1943-48 - 35 Wagons - 701065-99 - Lots 1337 & 1474

LNER built vans - All built unfitted with Independent brakegear (Kit PC.55A)

Diagram 22 - Built 1925 & 1944 - 5 Wagons (1926) - 147507-11 & 20 Wagons (1944) - 260928-47
The wagons built in 1944 were actually built by the LMS at Wolverton to their diagram 2093 and under lot 1349 for the LNER.

BR built vans - Unfitted Morton 2 shoe brakes (Kit PC.55B)

Diagram 1/260 - Built 1954 - 40 wagons - B887000-39 - Lots 2490 & 2499

BR built vans - Vacuum fitted Morton 4 shoe brakes from new (Kit PC.55C)

Diagram 1/260 - Built 1955/6 - 80 wagons - B887040-119 - Lots 2544, 2689 & 2872

These vans had the vacuum cylinder in a conventional position, mounted so that some of it was within the underframe. They had an unusual arrangement for the vacuum cylinder actuator which was of much heavier construction than usual and had its own built in 'safety pillar' that made absolutely sure there was no chance of it causing an accident if it failed. BR obviously decided the arrangement wasn't worth continuing with as it didn't feature on the retrofitted vans that followed.

Large numbers of unfitted gunpowder vans, though by no means all, were retrofitted from the mid-1950s. All were given Morton 4 shoe vacuum brakes with the vacuum cylinder slung completely underneath the underframe. LMS and LNER vans were converted **(kit PC.55D)** as well as BR unfitted examples **(kit PC.55E)**.

In addition to all this variety at least one LMS built van (M299042) was given through vacuum pipes and screw couplings whilst retaining its Independent brakegear.

As far as I can make out withdrawals of the unfitted wagons began in the 1960s. Vacuum fitted vans (including LMS built wagons) lasted into the 1980s.

References and Further Reading

The LMS Wagon - R J Essery & K R Morgan - David & Charles Publishing
An Illustrated History of LMS Wagons Volume 1 - R J Essery - OPC or Noodle Books (reprint)
Wagons of the Early British Railway Era - David Larkin - Kestrel Railway Books
Wagons of the Middle British Railway Era - David Larkin - Kestrel Railway Books
LNER Wagons Volume 4B - Peter Tatlow - Wild Swan Books

All the above have useful information on Gunpowder vans including more detailed build information.

Twilight of the Goods - Don Rowland - Wild Swan Books

This only has a couple of photographs of unfitted wagons taken in the 1959/60 but they are useful as I haven't found that many portrait photos of the vans around from that period.

Paul Bartlett's Photographs - https://paulbartlett.zenfolio.com/

A wonderful resource. Bear in mind though that it is a record of wagons in (primarily) the 1970s, not generally earlier.

3D Printed Parts

This kit includes high quality 3D printed parts. They are produced using the latest stereolithography technology to cure photosensitive resin. They have been thoroughly cleaned and then cured to produce the parts you have. As they are cured by a certain wavelength of light there is the possibility that if left exposed to light for a prolonged period of time the parts may go brittle. This is not unlike some plastics. To avoid this please consider the following:

- Do not leave unpainted resin parts exposed to direct sunlight for any length of time. Store in a dark place.
- Make sure all 3d printed parts are properly primed and painted.
- If the kit is not intended to be built for a while, consider priming the printed parts before storing.

If these points are followed, then the printed parts will be fine. However, if you leave them for several years on a south facing windowsill, then you might have end up having problems with them…

The printed parts are pushing the boundaries of what is currently possible with the printing technology. Whilst they have been road tested and tweaked for strength where necessary some still feature very thin walls and should therefore be handled with care. Parts have been left on the supports they were printed with to help prevent damage to them before use. They will need removing from the supports and cleaning up. When removing them from the supports and cleaning them up please note the following:

- Parts should be removed from the supports using a pair of flush cutters or a piercing saw with a fine blade (size 6/0 is recommended). Only use flush cutters, one side of the blade needs to be straight, so it makes a |/ shape. Cutters where each blade forms a \/ rather than being completely flat on one side should be avoided as they may cause damage. I tend to mostly use a piercing saw.
- If using cutters, the place to cut them is where the support meets the part. Often this is right against the printed part. This is the designed in weak point. Avoid the temptation to cut the supports away from the printed parts as this may damage the parts. If using a piercing saw, then the closer you cut to the part the less you will need to clean up. Be aware of the following point though:
- The material files/sands and cuts with a saw blade very easily, almost too easily. Go slowly and take care. When cleaning up, wet and dry paper is recommended, preferably with a little water to contain any dust. You can also use fine files.
- The material does not cut that well with a knife blade. Whilst not so brittle that it will crack as soon as look at it, it may fracture if you try and cut it with a blade. I can't imagine why anyone would want to try and slice the prints, but I thought I'd say it anyway. You can however use a sharp scalpel blade to pare away material if needed.
- Due to the process used to produce these parts they may need fettling to fit, i.e. parts may come out slightly oversize.
- Holes will almost certainly need opening out. Use a sharp drill or a cutting broach. Smaller holes for things such as brake lever guards and door springs will almost certainly appear as an indentation rather than a hole.
- Dispose of the waste support material responsibly. At this time, it cannot be recycled.

Fixing the printed parts in place can be done using either cyanoacrylate (superglue) or epoxy glue. I have used both successfully. In both cases makes sure the printed parts and what they are being attached to are free from any grease. I have found that in both cases the glues can provide a good bond with the brass parts, so much so that the parts can break rather than the joint if you try to remove them. I put this down to the surface of the parts being not entirely smooth so there is something for the glue to key to.

The printed parts need no special cleaning before painting. A wash with a cream cleaner to remove any grease will be sufficient. Like plastics avoid using things such as cellulose thinners as this may damage them. IPA will be fine as this is what is used to clean them after printing.

It is recommended that etched parts that attach to printed ones, such as steps and brake lever guards, are pinned in place using 0.31mm wire to produce a strong join. The etches are designed to easily facilitate this.

Etches

Check all holes before removing parts from the fret. The drawing process for etching if you use a CAD program as I do is extremely accurate but the actual etching process itself not an exact science. If the fret is slightly over etched, then there is no problem but if they are under etched the holes will need enlarging. I find that this is easiest to do before removing parts from the fret. The hole sizes will be noted at the appropriate points. Use an appropriate drill or a tapered reamer.

Remove one part at a time from the fret.

The instructions will assume that tags connecting parts to the fret will be cleaned up on removal of a part unless it is specified specifically in the instructions not to.

Very important:
All fold lines are through 90° with the fold line on the inside unless stated otherwise.

This means that when I say fold something up the folds should be made through 90° with the fold line on the inside. If the fold is to be done in any other way I will say so.

Everyone has their own soldering methods. I now use an Antex 50W temperature controlled soldering iron with predominantly 145° solder and La-Co paste flux.

Tools

The following tools may be useful when constructing the wagon:

- A selection of drill bits including 0.3mm, 0.4mm, 0.5mm, 0.6mm (vacuum cylinders), 0.85mm (BR axleguards), 1mm, 1.45mm (for Oleo buffers) and 2mm
- A selection of tapered reamers in the range 0.3mm-1mm and 2mm
- A smooth jawed vice
- A selection of needle files
- A piercing saw with fine blade (size 6/0 recommended) or a pair of flush cutters
- Wet and dry paper (800 or 1200 grade)

Technical

The suspension is individual springs made from 0.008" steel guitar wire soldered to the etched spring/bearing carriers. For this you will need a suitable flux. I use Carr's Black label. If the finished vehicle is weighted to 50g with the weight evenly distributed then this will produce a spring deflection of 0.5mm. Don't be tempted to up the gauge of spring wire. Even moving up to 0.009" springs will have a significant effect on the spring deflection. Also don't over weight the wagon or the springs will not have enough upwards movement before they hit the axleguards. Think of the 50g total as an ideal weight but also a maximum. There are notes on weighting the wagon in the part of the instructions that deals with assembling the body.

Materials list

You will need several sizes of wire are needed to build the underframe. Eileen's Emporium are good source for these, and they do a mixed sizes pack if you don't want to buy large quantities.

0.31mm - Brakegear, tie bars, brake lever guards, hopper handles, ladders, steps
0.4mm - Brakegear safety loops
0.5mm - Coupling hook retention pins
0.6mm - Vacuum cylinder piston
0.8mm - Brake cross shafts, vacuum pipe
1mm - Construction 'pins'

You may find thin walled microtube useful for a vacuum pipe (0.8mm x 0.4mm - you can then pin sections of it together using 0.4mm wire) if required and to retain spring metal buffer heads (0.7mm x 0.5mm). Both of these sizes are produced by Albion Alloys under their Precision Metals range. These should be available from Eileen's and can also be found in good model shops.

Appropriate 3D printed buffer housings are included but you will need metal heads and springs to complete. For spindle buffers both MJT and Wizard Models do 13" buffer heads with 1mm shanks, and for Oleo buffers Wizard do 13" buffer heads with 1.45mm shanks.

If you wish to use rigid buffer castings the those produced by Lanarkshire Models & Supplies are recommended. Also, if you want sprung Dowty or self-contained types then this is where you will need to look. Codes are given in the notes below.

Buffers Notes

The vast majority of unfitted wagons and those built new by BR with vacuum brakes had 1'6" 4 buffers (LMS B003). Early LMS wagons were fitted with screw couplings and had 1'8½" 4 rib (LMS B004). Some of these 'new build' vacuum braked vans got 1'8½" Oleos and screw couplings, probably in the late 1960s/1970s.

Retrofitted wagons had more of a mix but all were 1'8½". Oleos (LMS BP01) seemed to be very popular but some had 1'8½" 4 rib (LMS B004). Dowty (LMS BH02) and self-contained (LMS B012) could also be seen. The one type associated with retrofitted wagons that I haven't seen are those with the extended collars.

Couplings

Early LMS wagons seemed to have had screw couplings as did all the retrofitted vans no matter what their provenance. These are available from Rumney Models, code B.96.

Other unfitted wagons were built with 3 link couplings except those built in 1944 for the LNER which had GWR type Instanters. The vans built new with vacuum brakes had BR type Instanters.

Coupling hooks and Instanter links (both types) are included in the kit, but plain links will be needed complete. Brassmasters now supply links for those not wishing to make their own.

Wheels

You will also need 3'1½" 3 hole disc wheels from your favourite manufacturer to your chosen 4mm gauge along with bearings. If you are using pinpoint bearings a waisted type such as that marketed by Alan Gibson (their code 4M63W) would be ideal. If you are using Exactoscale products, then you can also use parallel axles and either 2mm or 1.5mm parallel bearings. If you are using the later, you will need some 2mm x 1.5mm tube to act as a sleeve over the bearings.

Transfers

Cambridge Custom Transfers do a numbering sheet for the wagons in the BR era with pre-1964 lettering. This is CCT code BL147 which covers BR, LMS and LNER built wagons.

HMRS sheets, LMS Goods Insignia and LNER Goods Insignia, include elements for Pre-Nationalisation vans cover by this kit.

Modelmaster Jackson Evans say they do several sheets that include bits for Gunpowder vans though I don't what's on most of them as images are not on their website and I haven't ordered any. It's possible some may cover the post 1964 lettering style.

Contact details for the above suppliers can be found at the end of these instructions.

Parts List

Parts with numbers are on the larger 0.010" thick sheet as are those lettered X, Y & Z.
Parts numbered A-D are on the smaller 0.12" axleguards fret and are marked in bold.

0.3mm Axleguard Fret

A - Axleguards
B - Spring Carriers
C - Washers
D - Coupling Hooks

0.25mm Main Fret

1 - Top plate
3a - Brakegear vees (Morton) - BR Built
3b - Brakegear vees (Independent) - LMS & LNER built
4 - Vacuum Cylinder Vees (Standard type) - **BR new build VB - lots 2544, 2689 & 2872 only**
4b - Vacuum Cylinder Vees (Low slung cylinder) - **Retrofitted**
5 - Underframe stiffeners

7 - Dummy vacuum pipe couplings

9 - Vacuum cylinder safety loops

10 - Axle keeps
11 - Tiebars

12 - Brakegear safety loops
12a - Brakegear safety loop for low slung vacuum cylinder - **Retrofitted wagons only**
13 - Vacuum cylinder actuators
13b - Combined brake cylinder actuator and safety stand **- lots 2544, 2689 & 2872 only**
- i - Safety stand
- ii - Vacuum cylinder actuator

14 - Solebar/headstock bracing - 2 types
- 6 Rivet - BR vans
- 7 Rivet - Pre-Nationalisation vans

15 - Corner plates

16 - Secondary vees (Independent brakegear)

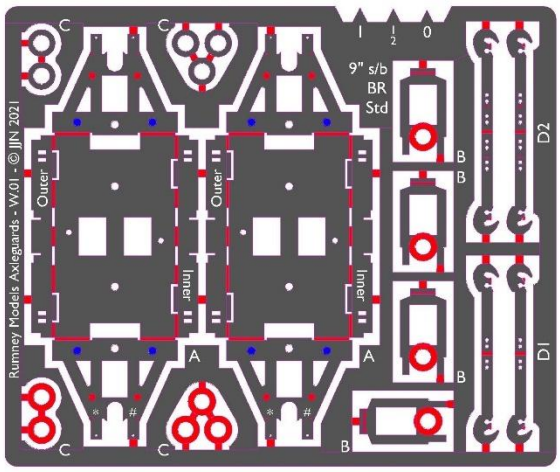
17 - RCH brake lever guards
18 - RCH brake lever guard stays
19 - Morton brake levers
20 - Independent brake levers

26a - Sprung buffer retainers
26b - Washers for buffer spring retainers
27a - BR Instanter Link
27b - GWR Instanter links

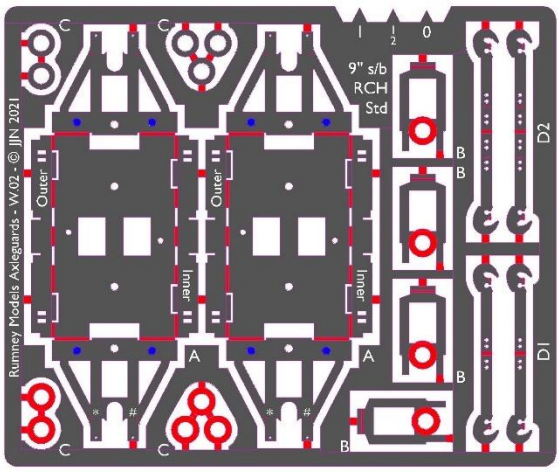
28 - Lamp irons
29 - Chalk boards - 2 sizes

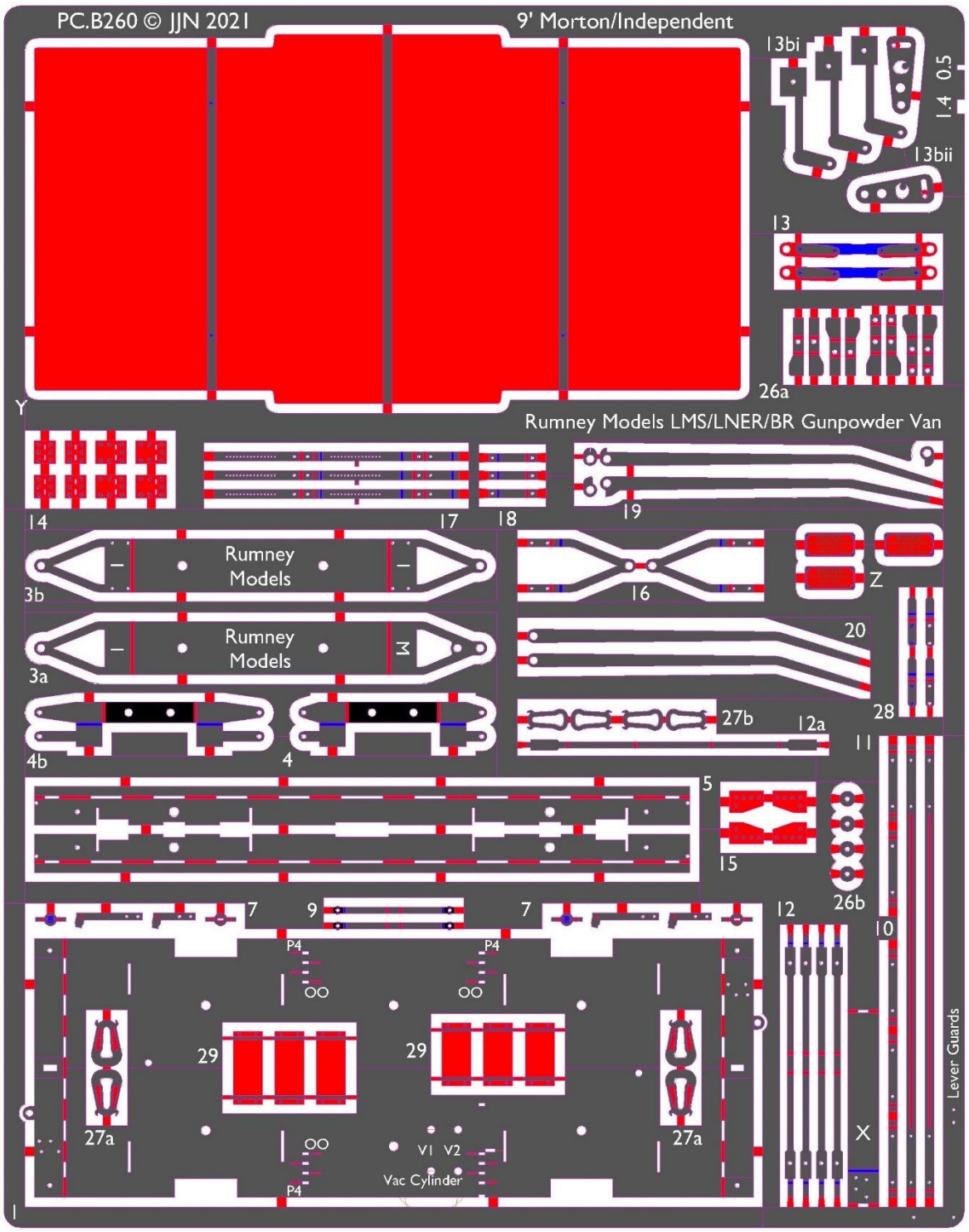
X - Lamp iron/dummy vacuum pipe coupling drilling jig
Y - Roof
Z - Notice plate for doors

W.01 - BR Standard



W.02 - RCH Standard




PC.B260 © JJN 2021
9' Morton/Independent
13bi
13bii
14
0.5
13
26a
Y
Rumney Models LMS/LNER/BR Gunpowder Van
14
17
18
19
Rumney Models
3b
16
Z
Rumney Models
3a
20
28
4b
4
27b
12a
11
5
15
26b
12
10
7
9
7
P4
P4
OO
OO
29
29
27a
27a
OO
V1 V2
Vac Cylinder
P4
X
Lever Guards
1

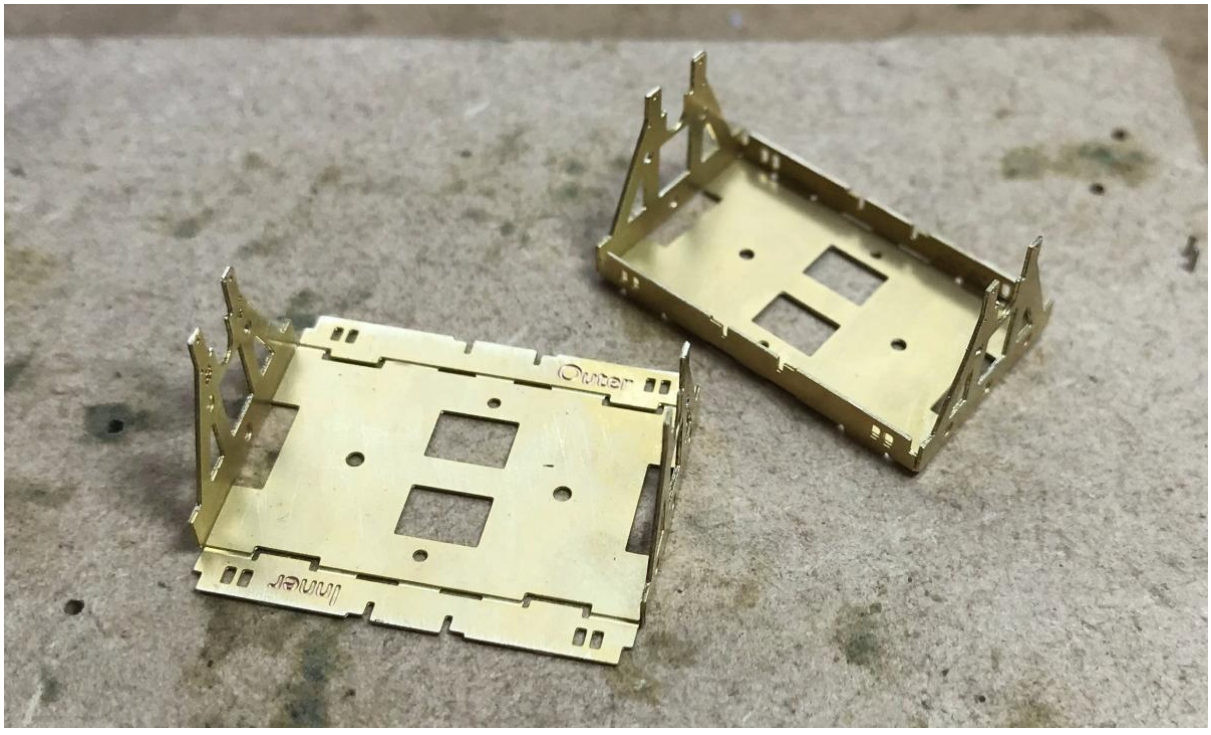
Construction

The etched underframe broadly follows standard Rumney Models practice. Axleguards and vees are separate parts to easily cater for the variations covered. I've tried to arrange things so there is as little think about in terms of part orientation as possible. Vees are handed, for example, so that they are the correct way around for the vacuum cylinder. As much soldering as is possible is done before fitting the 3D printed parts.

The 'Under Frame'

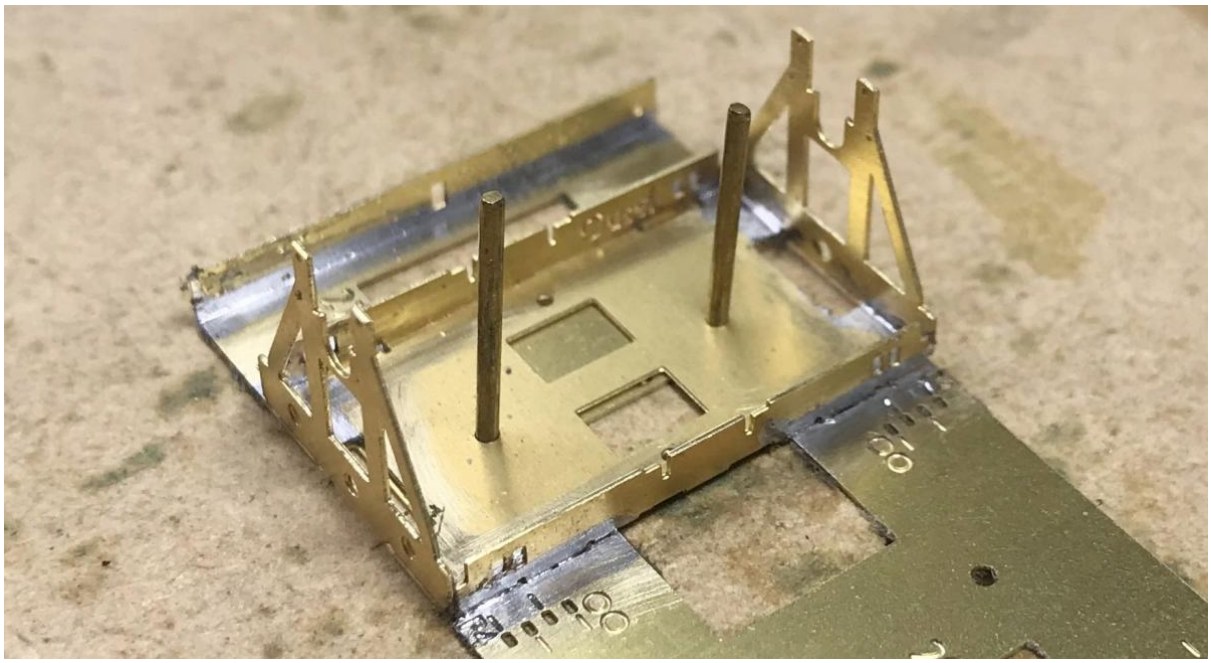
Remove the top plate (1) from the fret. Remove the Instanter links and chalk boards from the middle of the top plate and put in a safe place. Make sure that the 6 larger holes in the middle of the part can accept 1mm wire (though make sure the fit isn't loose). Similarly, if fitting a vacuum cylinder make sure the pairs of holes marked v1 (BR 'new builds') or v2 (retrofitted vans) can accept 0.8mm wire. There are little hoop brackets at each end of the top plate to fit vacuum pipes into. If you are building an unfitted van or don't wish to make your own pipes, it's best if they are removed now. Fold up the ends and reinforce with solder. These will eventually sit behind the headstocks.

Next turn you attention to the axleguards (A) on the smaller fret. Note that there are two small half etched holes on the axleguards, one is marked with a * and the other with a #. Drill through the ones marked with a * with a 0.3mm drill. Make sure the small holes in the very bottom of the axleguards can accept 0.31mm wire and, if fitting BR type axleguards, drill out the larger half etched holes on the axleguards with a 0.85mm drill. You will need to check photographs for the correct arrangement as it varied. Makes sure the two holes in the middle if each axleguard are a nice tight fit on 1mm wire and then remove from the fret. Fold the axleguards, taking care to make sure they are at 90° to the base and then fold up the cross bracing marked inner or outer. Reinforce the fold lines with solder.

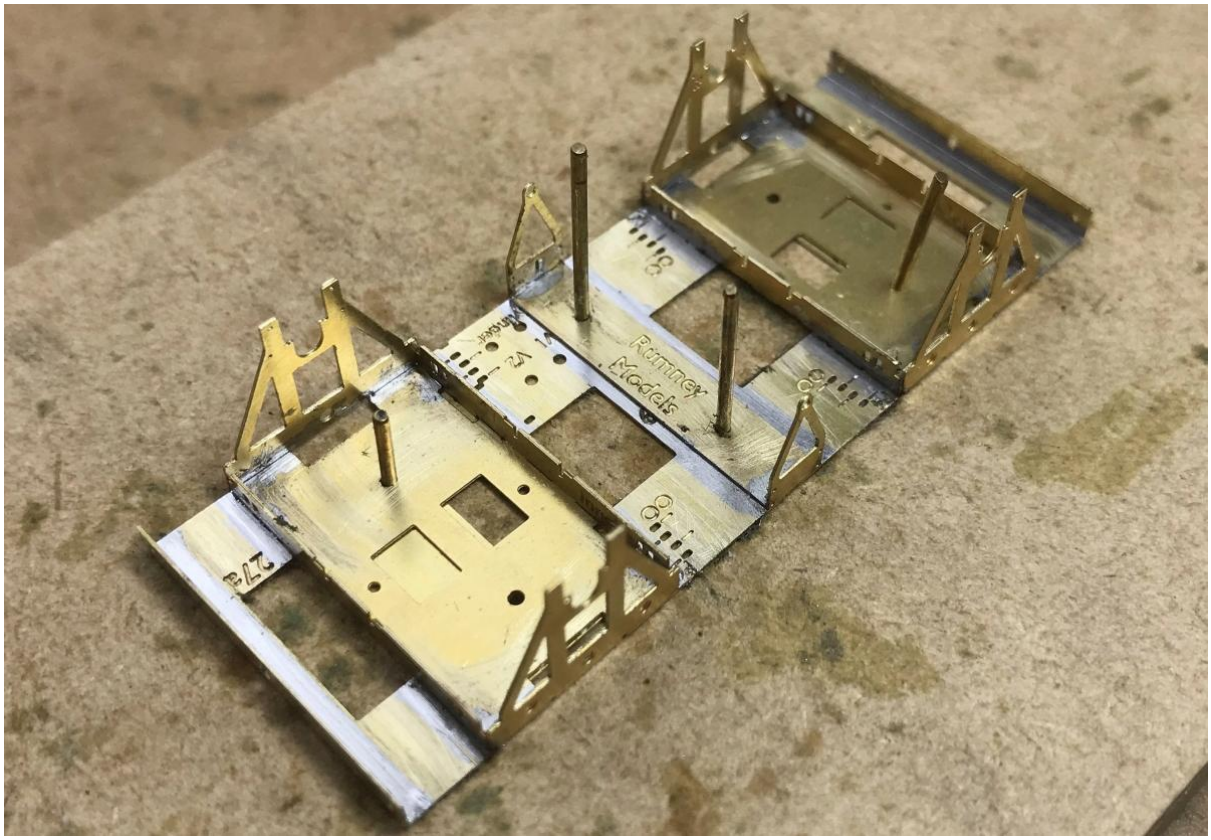


Use the larger 1mm holes in the top plate to drill 6 x 1mm holes into a scrap piece of wood or mdf. You will use this as a jig to fit the axleguards and vees. Pin the top plate to the wooden jig using short lengths of 1mm wire ‘pins’. Make sure you put a chamfer on the ends of these wire ‘pins’ when you cut them to make sure the sharp edge is removed.

Fit the axleguards, one at a time, using these ‘pins’ to aid alignment. There is a correct way around to fit the axleguards. The side marked outer should face towards the headstocks and there are tabs on the axleguards to make sure this happens.



When you are happy with the fit of the axleguard solder it to the top plate. Repeat for the other end.

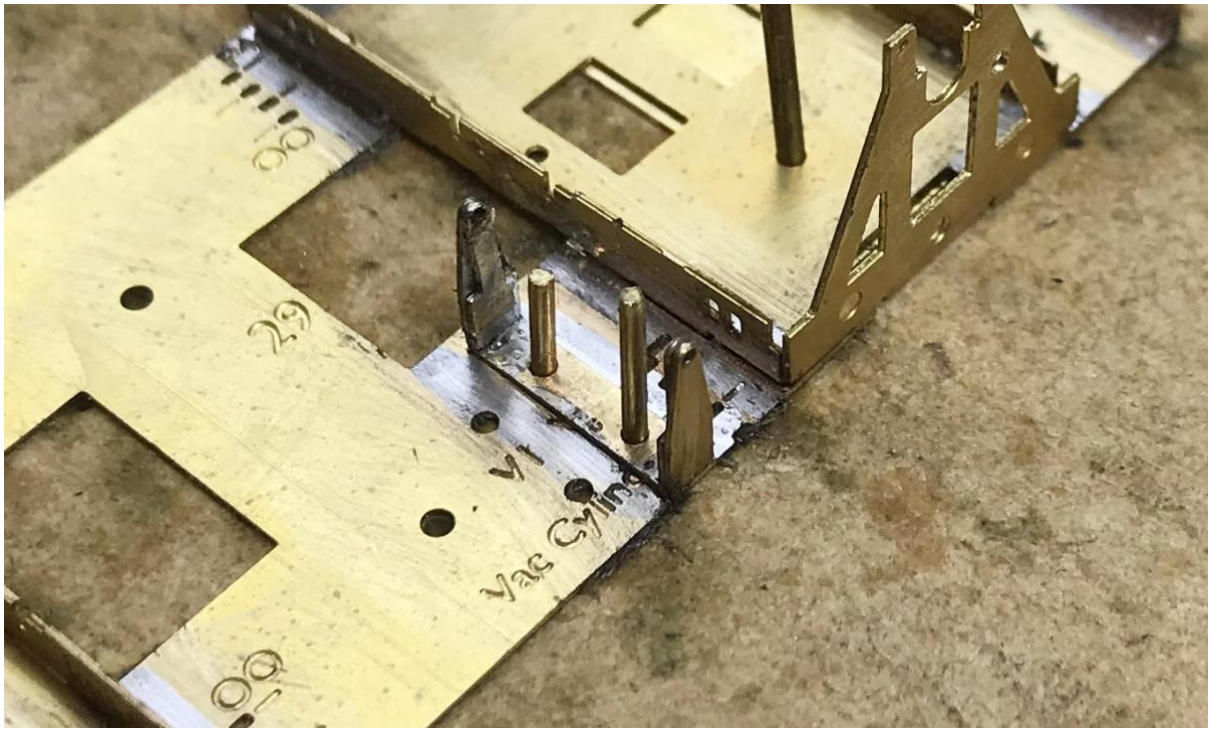


Make sure the holes in the brake vees of your choice (3a - Morton (BR Built and retrofitted) or 3b - Independent (LMS and LNER unfitted)) can accept 0.8mm wire and the holes in the middle of the spacer part can accept 1mm wire. Make sure the later are a nice tight fit. Remove from the fret, fold into a C shape making sure the folds are through 90° then reinforce the fold lines with solder.

In a similar manner to the axleguards, fit to the top plate with 1mm wire 'pins' and solder in place. See image above. Note that there is a correct way around for the vees. This is to ensure the Morton type are orientated correctly in relation to the vacuum cylinder vees.

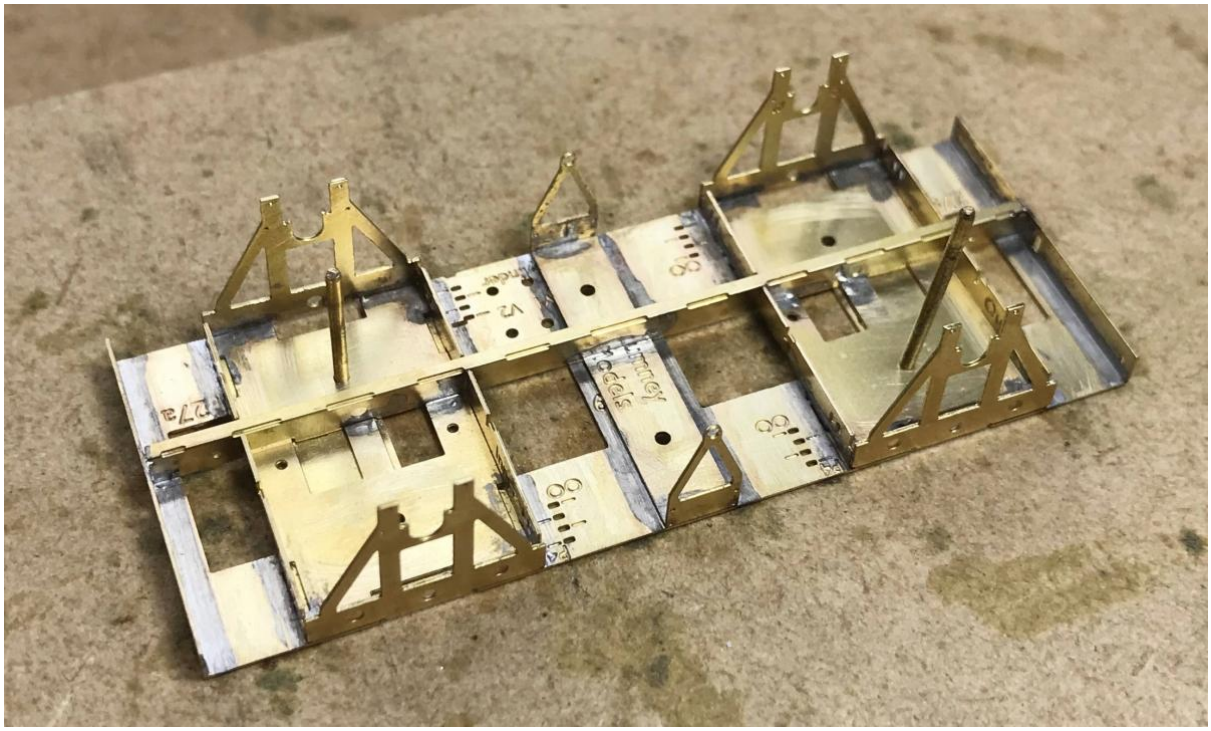
If you are constructing a vacuum braked example, make sure the smaller holes in the outer ends of you chosen vacuum cylinder vees (4a - Standard type (BR new builds) or 4b - Low slung cylinder (Retrofitted)) can accept 0.5mm wire (this will ensure the castings fit) and the larger holes on the spacer part can accept 0.8mm wire.

Fold up the ends so that the T shaped part is behind the triangular one. The fold between them should be through 180° with the fold line on the outside. Make sure the 0.5mm holes are aligned and solder them together. Fold the part up into a C shape and solder the bottom of the ends to the spacer. Fit to the top plate using 0.8mm wire 'pins' and solder in place. As with the 1mm ones make sure you put a chamfer on the ends of the 'pin' when you cut them.



Underframe stiffeners (5) are included and these need to be fitted next. Conventional Rumney Models underframes gain a considerable amount of strength and longitudinal 'stiffness' when the etched solebars are fitted. As we are approaching things differently, I have included the underframe stiffeners to make sure the 'under frame' is a bit more ridged than it would be without them.

Make sure that the holes approximately 4mm in from the ends can accept 0.5mm wire; these will retain the coupling hooks. Remove from the fret and fold into an L shape about the fold line. You can reinforce the fold line with solder if you wish though I didn't worry about this. Fit to the 'under frame' one at a time, with the short side of the L facing outwards from the longitudinal centre. See image below. There are slots in the axleguards to align the stiffeners. Solder in place making sure the top plate is flat against the jig while you're doing it.



We will return to part 7 later but next fit the cast vacuum cylinder (if required). The castings will need drilling in the centre to accept a piece of 0.6mm wire which will represent the piston. You will need to gently ease the vacuum cylinder vees apart to fit the cylinder casting in place. There are cast spigots on the cylinder which will locate into the holes in the vees. Gently close up the vees when the cylinder is in place.

There are some fiendish vacuum cylinder safety loops (9) included for fitting to the cylinders on retrofitted examples only if you wish. Make sure the holes can accept 0.4mm wire before removing from the fret. They need to be folded into a _/_ shape and then can be fitted to cylinder so that the holes on the safety loops fit onto the pair of outer holes on the side towards the centre of the wagon. Solder in place making sure it is as perpendicular to the top of the cylinder as possible. Hopefully the image below gives you the idea.

Spring Carriers

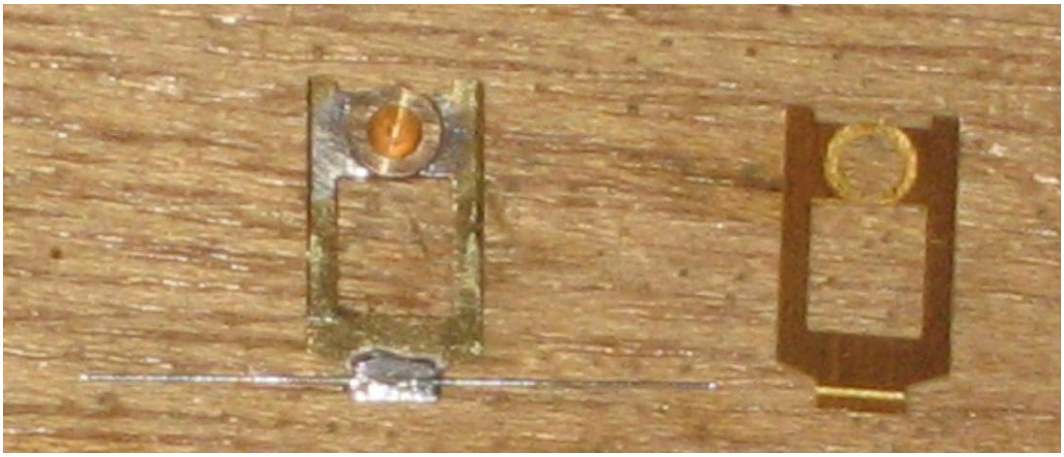
Before we get to fitting the brakegear we will look to assemble to spring carriers (B) and fit the wheels so we can make sure the brakegear is aligned properly.

The spring carriers are designed so that the springing wire is soldered to the carrier using the half etched slot as a guide. They have 2mm holes in them which should be used for pinpoint axles and 2mm OD parallel bearings.

If using pin point axles you may find that the carriers need packing out a little to take up any slop. Bearing washers (C), both half etched and full thickness are included for this purpose. Fit them over the bearing between the spring carrier and the back of the axleguard. There should be a good fit between the axles and the bearings with as little sideways movement as possible. Use a waisted type of bearing. The printed axleboxes are designed for waited bearings and you'll find a standard top hat bearing won't fit. I use Alan Gibson waisted pin point bearings which are nice and deep so you don't have to worry about the bearings being too tight.

Due to the removable nature of the axle guards you can easily use Exactoscale parallel axles and either 2mm OD or 1.5mm OD bearings. If doing so, then you will need to pack the bearings out before soldering them in place due to the length of the axle. Use the bearing washers provided on the opposite side of the spring carriers to the bearing flange. I have built chassis with Exactoscale parallel axles and used one half etched washer and one full width washer to pack the bearing out. This leaves the outer edge of the bearing 0.25mm beyond the axleguard and provides 1mm of bearing surface for the axle. 1.5mm bearings with carriers 38B will need a short length of 2mm x 1.5mm tube soldering in place over the bearings to fit the axleguards properly.

I find the easiest way to assemble the spring carriers is to make a small jig consisting of an off cut of wood with a 2mm hole drilled into it. The spring carrier can then be placed so that the bearing locates through the hole in the carrier and into the wood. The bearing can then be soldered in place. The spring wire can be located in its half etched guide slot and soldered in place using a suitable flux. I use Carr's black label. You are aiming for a spring wire that is 21mm long, located centrally on the spring carrier.

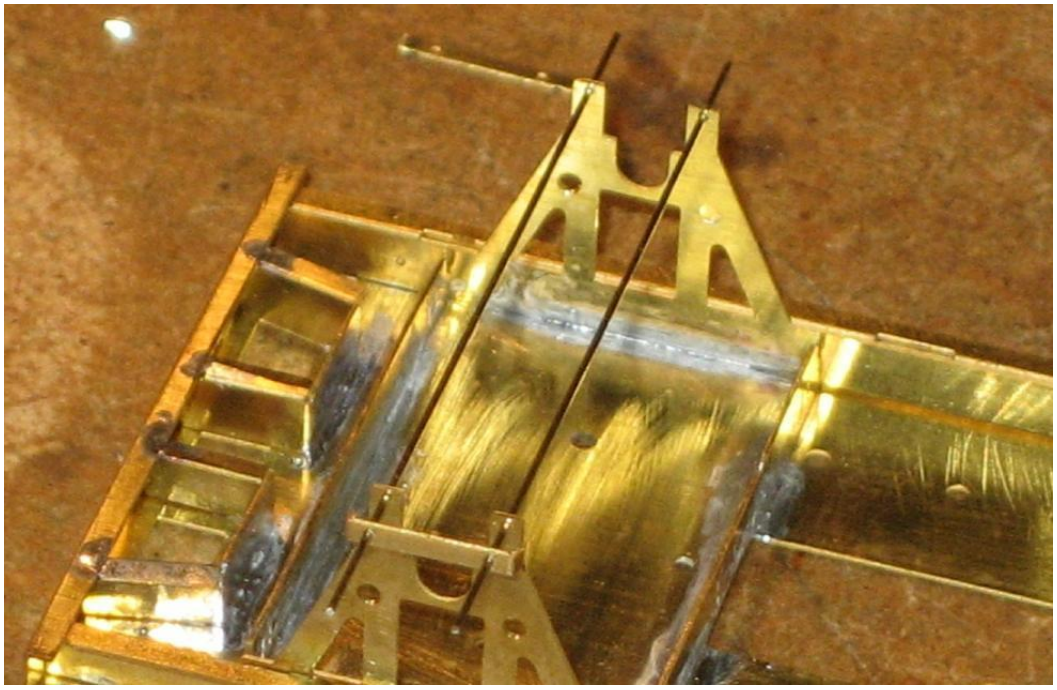


Axle Keeps/Tiebars

Both individual axle keeps (10) and tie bars (11) are included. Unfitted vans had keeps whilst the vacuum brake vans had tie bars. These are designed to be removable if you wish, to allow the wheel sets to be easily dropped out. They can of course be soldered permanently in place but either way you will need to make sure the holes will accept 0.31mm wire before removing them from the fret.

The tiebars are fairly vulnerable, so in order to strengthen them I have included a slot on the back into which you can solder a length of 0.31mm wire. This will make them a lot more robust.

If you are not planning on making them removable then they can be pinned and soldered to the axleguards. Remove from the fret and fold the ends up. Thread lengths of 0.31mm wire through a keep/tiebar and holes in an axleguard and then the corresponding holes on the opposite axleguard. Solder in place. Fit the other keep/tiebar and solder in place. Trim the wire so that it represents bolt heads on the tie bars but extends approximately 0.75mm from the back of the axleguard. These pins will prevent the springs from becoming disengaged from their slots.



If you want to make them removable to allow the axles to be dropped out, then you will need to solder 0.31mm pins through the holes in the keep/tiebars. I find the easiest way of doing this is to use one pair of holes as a jig and drill a pair of 0.3mm holes into a piece of scrap wood. Short lengths of 0.31mm wire can then be threaded through the keep/tiebars locating into the holes in the wood. These can then be soldered in place and filled back to represent bolt heads before folding up the ends.

Fold the ends of the keep/tiebars and locate four short lengths of 0.31mm wire through the holes in the keep/tiebar and into the holes drilled into the wood. Solder the wires in place. If using the tiebars, and solder a length of 0.31mm wire into the slot in the back to strengthen it. Trim the wires back so that there is at least 0.75mm of wire projecting from the back of the axleguards otherwise the spring carriers will be able to fall out of place when everything is assembled. It is a good idea to leave one of the pins in the keep/tiebar as long as possible to give you somewhere to hold them when painting. Remove from the jig and trim the other ends of the wires to represent bolt heads.

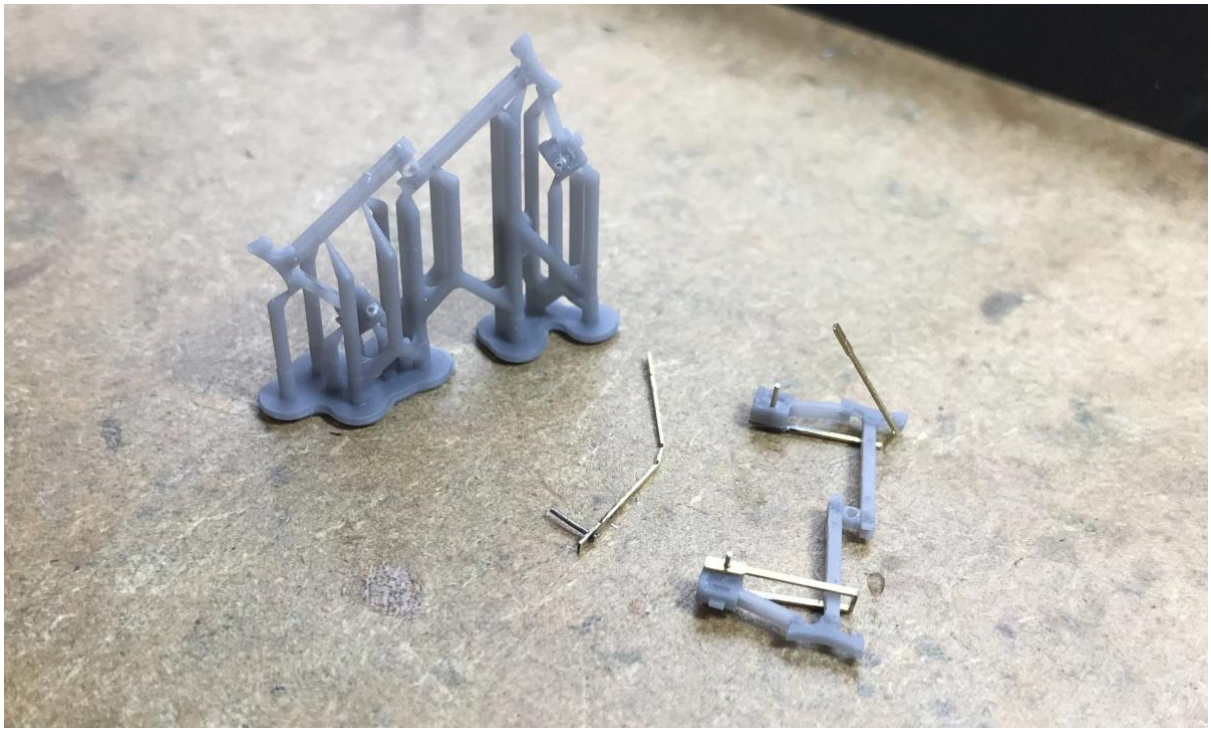
Once the keeps/tiebars and the chassis are painted they can be tack glued together on final assembly. The glued joint can be broken, and the tie bars removed if you find it necessary to remove the wheels at any point.

Brakegear

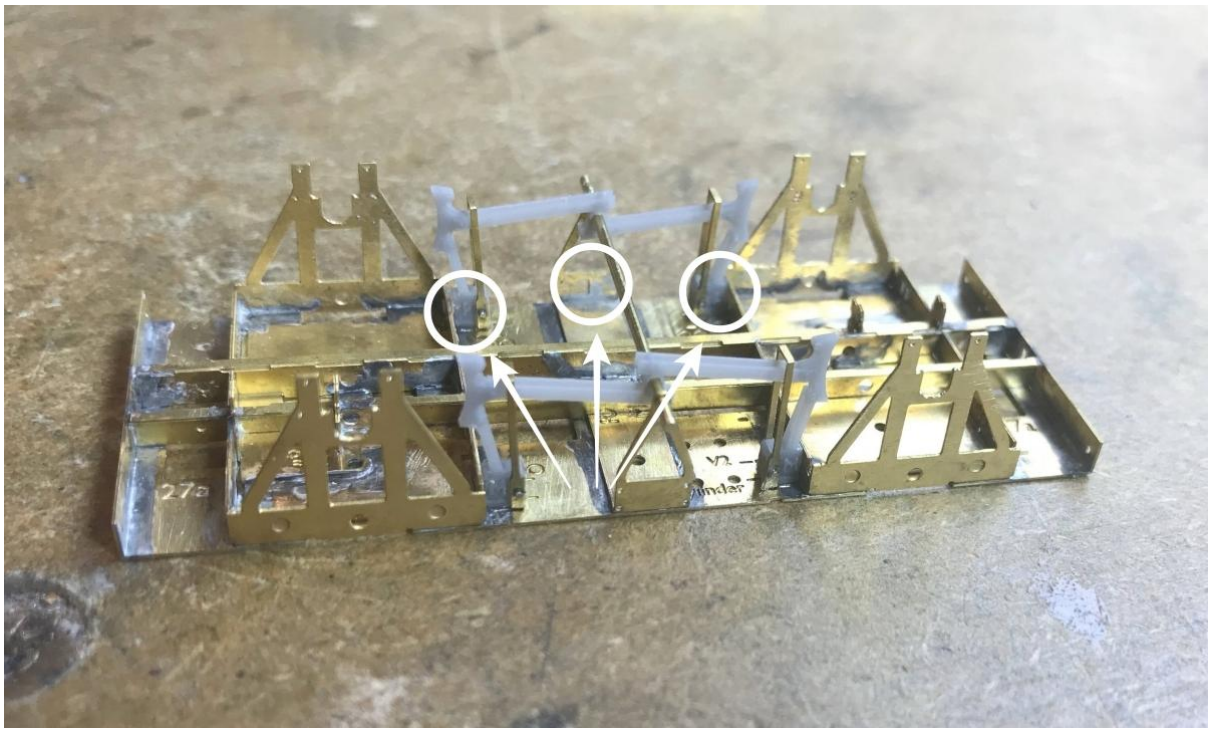
The conventional brakegear safety loops (12) can be fitted in a couple of ways. They can either be pinned to the printed brakegear or fitted separately after the brakegear using the slots in the top plate to aid alignment. I've done it both ways and now always pin them. I find it easier. If you want to pin them then drill four 0.4mm holes into a scrap piece of wood or mdf then insert short lengths of 0.4mm wire into the holes. Remove the outer ends of the safety loops up to the parts with the hole in, pass over the wire and solder together. Make sure the wire is long enough so that there is enough wire visible to pass comfortably through the foot on the printed brakegear. This should be at least 1.75mm. Longer is fine as it can be trimmed after fitting. See image below. If you are constructing a retrofitted van, then you will only need 3 as the safety loop where the vacuum cylinder is of a different pattern.

Before removing the printed brakegear from the supports make sure the necessary holes are opened out with a tapered reamer. It's extremely unlikely that they will be exactly the right size straight out the printer. This is just one of those things with resin printers. The hole through the crank in the middle of the push rods should be able to easily accept 0.8mm wire. If you are pinning the safety loops to the brakegear make sure the holes in the 'feet' at the base of the hangers are drilled through 0.4mm. The brakegear can then be carefully removed from the supports. I use a piercing saw with a 6/0 blade. Go carefully. The part is a bit delicate at this point but once fitted it will be perfectly fine. Clean up the remnants of the support with either a fine file or wet and dry paper (or both).

If pinning the safety loops in place do this now. Insert the pin soldered onto the safety loop through the hole in one of the feet. The safety loop can then be folded up and the other side fitted over the pin. The safety loops can then be glued in place. Don't worry too much about making sure the safety loop is exactly vertical, the real things very rarely were. See image below. If you are constructing a retrofitted van, then make sure you know which foot is going to be by the vacuum cylinder and don't fit a safety loop on it. See next paragraph for instructions on orientating the brakegear.



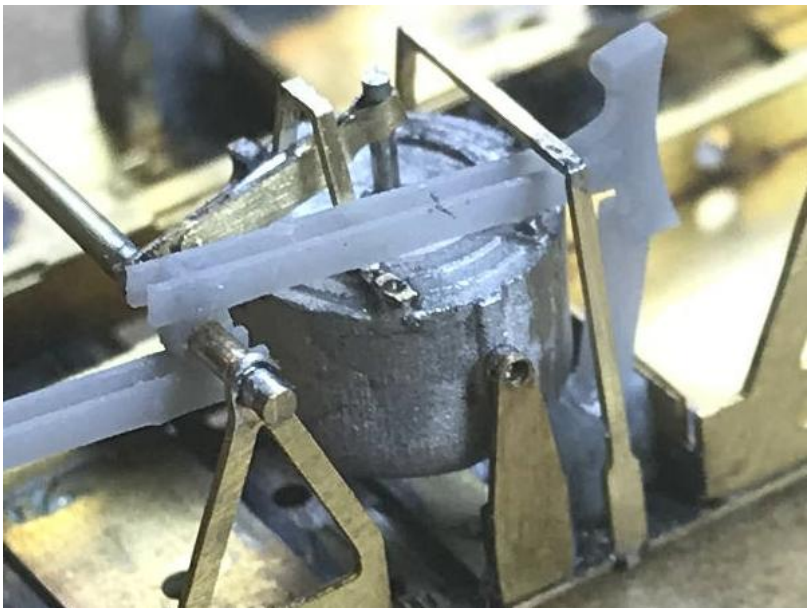
Note that there are letters on the printed 'feet', either and I or an M. When fitting the brakegear in place the visible letters, when viewing the part from the inside of the wagon, should match the letter on the inside of the brakegear vee. If you do this the brakegear will automatically be the correct way around. See image below, the letters in the circles should match.



The brakegear can be fitted in place using the slots in the axleguards and the tabs on the brakegear to align things. Before gluing in place fit a piece of 0.8mm wire for the brakeshaft. This will help keep things aligned. The brakeshaft should be 26.5mm long for Morton brakes and 30mm for Independent brakes. For the latter, I fit one long piece and then cut the middle out once the second set of vees has been added. If you are building an unfitted van, then you can solder the brakeshaft in place to the vees so that there is an equal amount of wire protruding on either side. If you are building a fitted van, then you will need to add the vacuum cylinder actuator to the brakeshaft first. See the next section for details on these. When soldering the brakeshaft in place quick with the iron and don't catch the brakegear. A small amount of superglue can be used to secure the feet in place. Make sure that the brakegear is properly upright first as you don't want it catching the flanges on the wheels. Use the wheels as a guide.

Vacuum Cylinder Actuators

If building a fitted van, you will need to fit the vacuum cylinder actuators and the vacuum cylinder piston (made from a piece of 0.6mm wire) to the brakeshaft before soldering the brakeshaft in place. There are two different types of actuators depending on which arrangement of vacuum cylinder you have. The conventional vacuum cylinder actuators (13) are for use with retrofitted wagons only. Push out the four half etched rivets and remove from the fret. The actuator is designed to be folded around a piece of 0.6mm wire so that the push out rivets are showing on the outside This will form a loop which will go around the piston. See the image below again. Cut a length of 0.6mm wire for the piston. I then solder the actuator to the brakeshaft (quickly) and the actuator to the piston wire. I don't worry about the wire being fixed to the cast cylinder.



If you are building a van that was built new with vacuum brake by BR to lots 2544, 2689 & 2872 then you will now be confronted by the combined brake cylinder actuator and safety stand (13a). This curious thing was (as far as I know) only found on these wagons. It was pretty heavy duty in construction, and I presume was done as an extra safety feature to avoid any chance to the actuator failing and casing an accident. As it didn't feature on the retrofitted vans that followed, I can only conclude that it was a bit over the top.

There are two bits to this strange feature, a safety stand (13bi) made up of three parts and the actuator (13bii) made up of two bits.

First make up the safety stand. Whilst still attached to the fret use one of the three parts that make up the safety stand to drill a pair of 0.3mm holes into a scrap piece of wood. Use these holes and two bits of 0.31mm wire to pin together the three layers. Note that the layer in the middle on the fret has a small tab at the top and this layer should go in the middle of the three. Solder together (including the wire) and then trim the wire so that it protrudes about 0.5mm each side. Fit the safety stand to the top plate using the tab and the slot on provided on the top plate and solder in place. The safety stand should be hard up against the inside of the axleguard.

With the stand fitted the two actuators can be added and soldered in place. The hole at the smaller end needs to be able to accept 0.8mm wire and fits onto the brakeshaft. The hole in the small half etched area fits onto the safety stand. See Fig. 1 below.

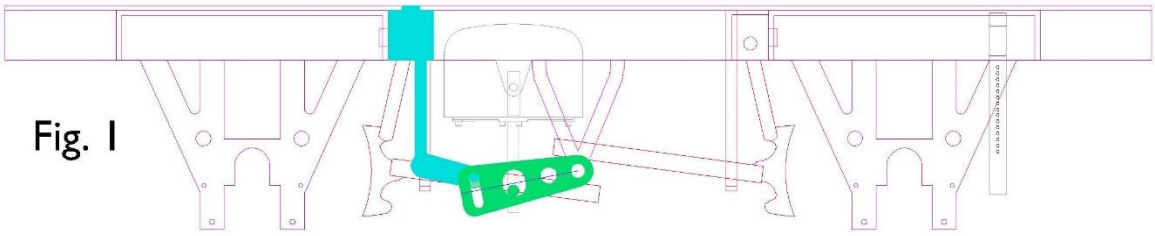
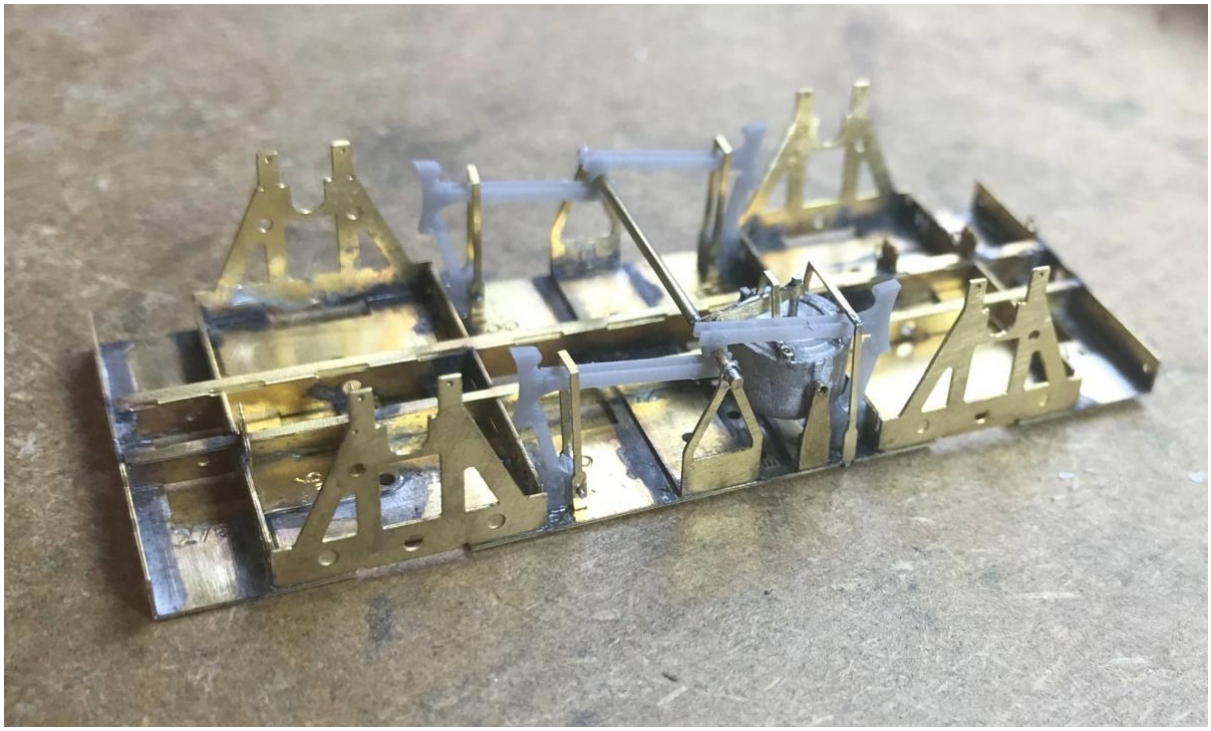


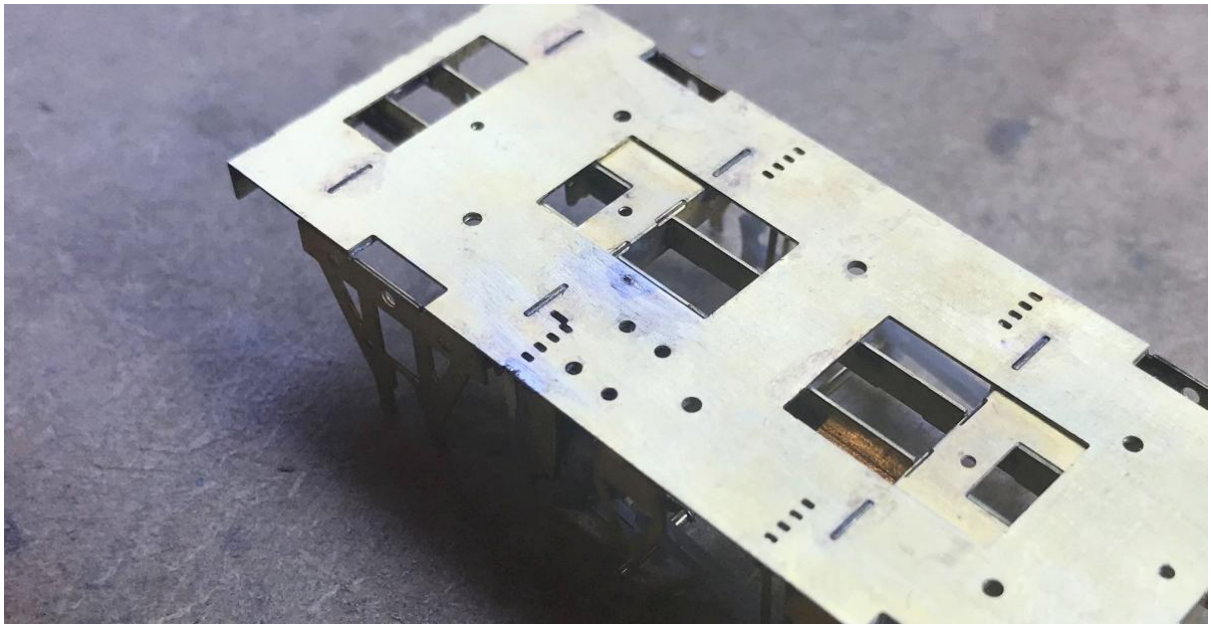
Fig. 1

Brakegear Continued

If you are constructing a retrofitted van then now is the time to add the brakegear safety loop for low slung vacuum cylinder (12a) where the vacuum cylinder is. I found that it was helpful to fold it into a C shape and reinforce the fold lines before fitting.

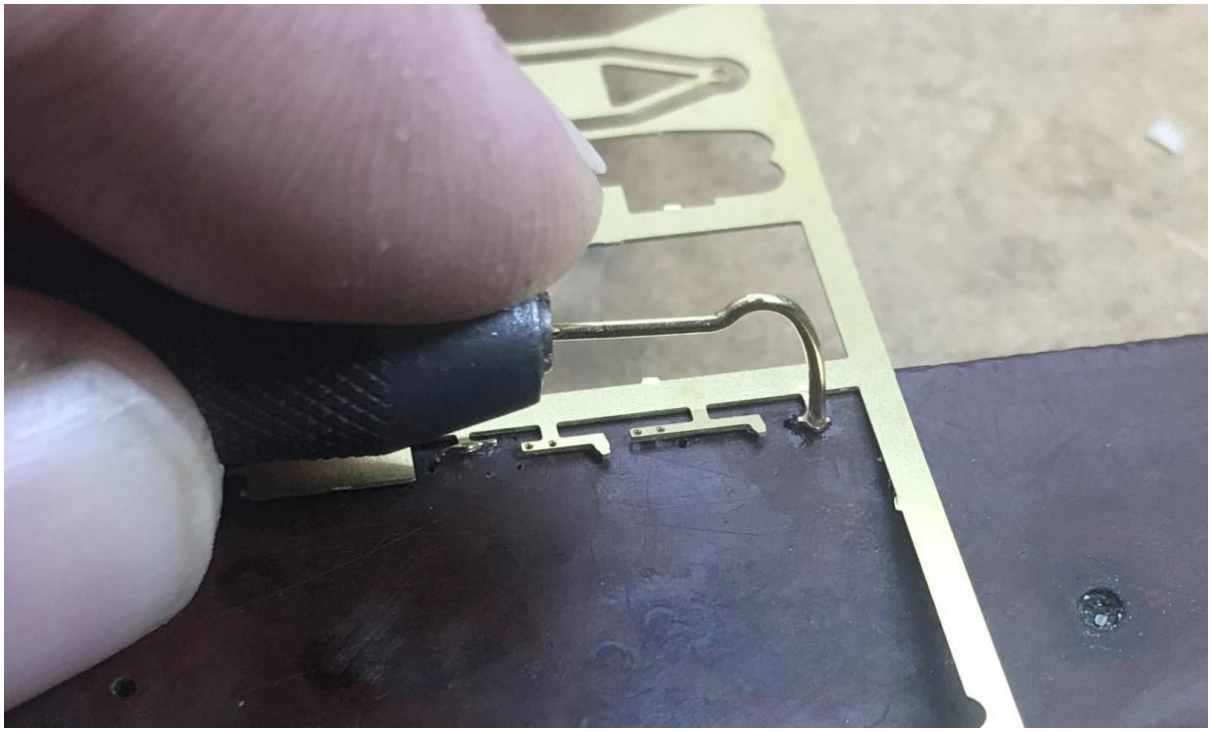


There are slots in the top plate to accept tabs on the safety loop. Solder in place from the above the top plate. Take care not to linger with the iron. See image below.

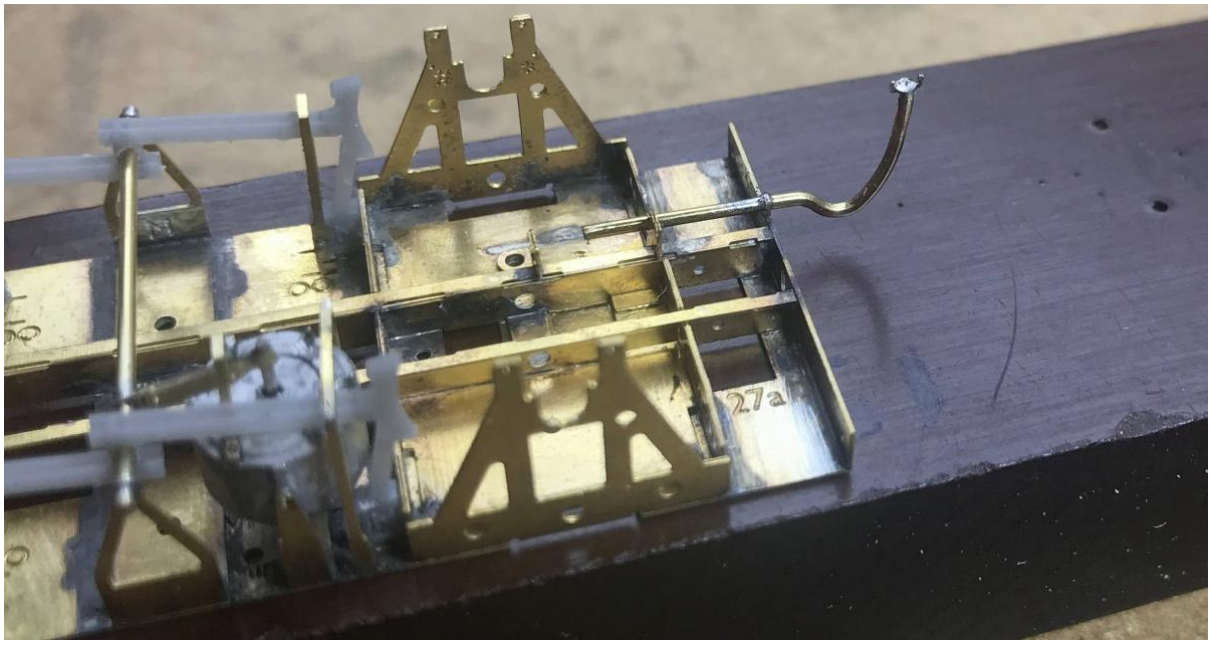


Vacuum Pipes

Vacuum pipes on the fitted vans were of the ‘swan neck’ variety hung under the headstock. I make these from 0.8mm wire, or 0.8mm x 0.4mm tube if I want to make them in sections and pin them together. The top of the bend in the pipe should be about 1.5mm above the bottom of the headstock and the pipe should extend about 6.5mm from the front of the headstock. I have included something on the fret to detail the end of the pipe if you wish. These can be found amongst the dummy vacuum pipe couplings (7). Either side of the two different length brackets there are little circles with ears on that are designed to fold up to represent the pipe connectors. One of these has a slot in which is designed to attach to a bracket, the other is for the end of the pipe. I find that it is best to solder them in place while still attached to the fret. Drilling a couple of holes into a piece of scrap wood or mdf into which you can insert the ears is useful.



The pipe can then be soldered into the small bracket on the back of the headstock. If you want to add the pipe between them then images on pages 24 and 25 show the arrangement I used.

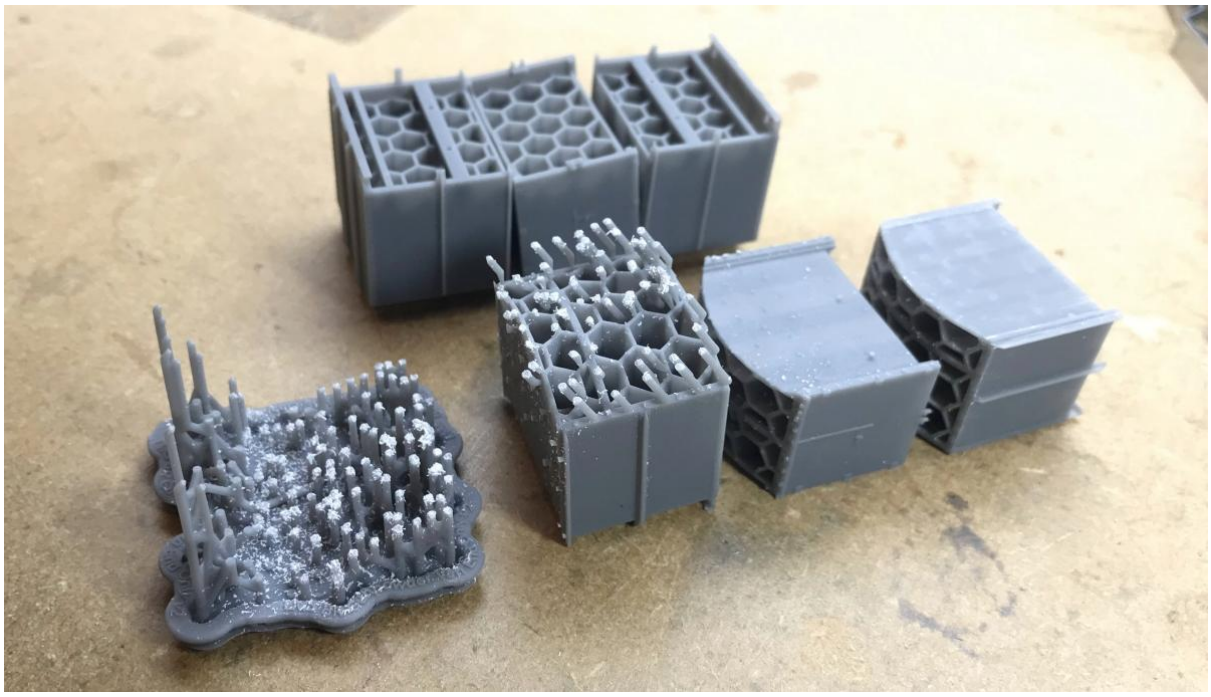


Body

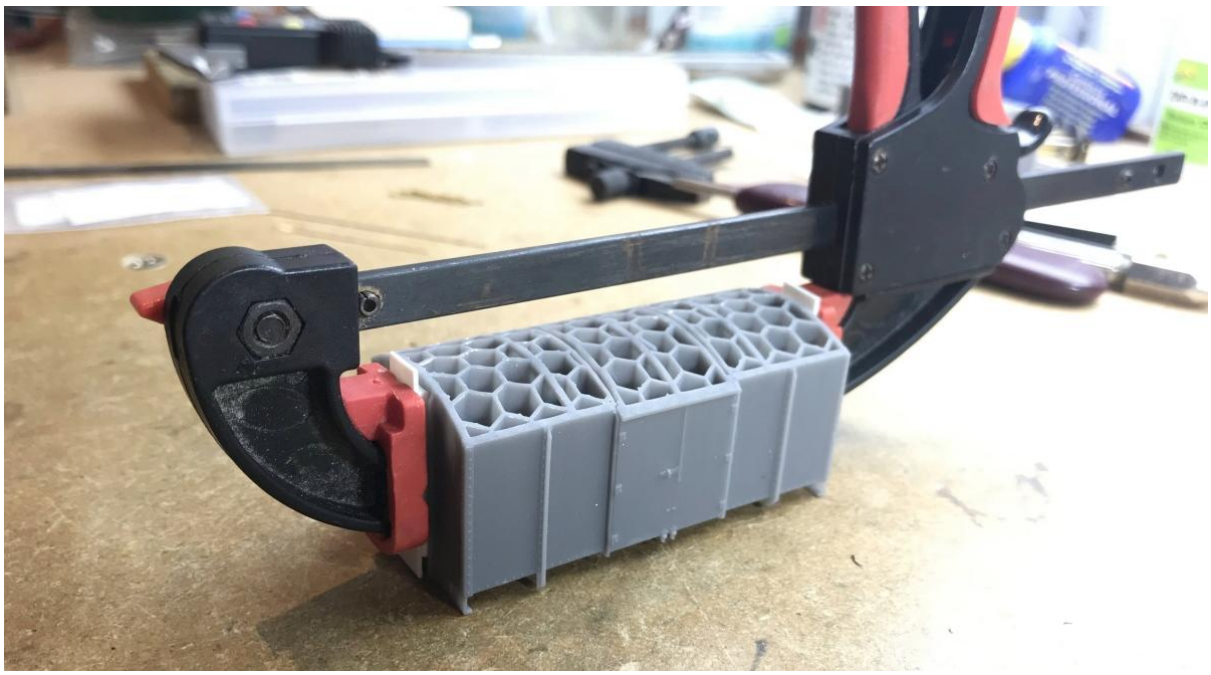
With the ‘under frame’ pretty much there for the time being attention can turn to the body. The three parts of the body will need to be removed from their supports and the two images below give an idea of the tools I used and what to expect when you remove the parts.

I generally use a piercing saw with a fine blade (size 6/0), going carefully and trying to make sure I don’t cut the bit you want. The cured resin cuts easily and it’s not hard to take bits off the part if you’re not careful. One of my three vans has a big gouge under the roof to testify to this!

A pair of flush cutters may be useful (please do make sure the blades are flush on one side and don't form a V. The place to cut with these is up against the part, this is where the built-in weak point on the support is. Please dispose of the waste material responsibly. There's enough plastic in the oceans and it can't be recycled. A sharp scalpel blade made be useful for paring material away and files/wet & dry paper are good for cleaning up the remnants of the supports. If using wet and dry paper a little water is a good idea as a lot of dust can be generated. There two ends are designed to recess into the middle section so care should be taken to clean up these areas properly. A small square file is useful.

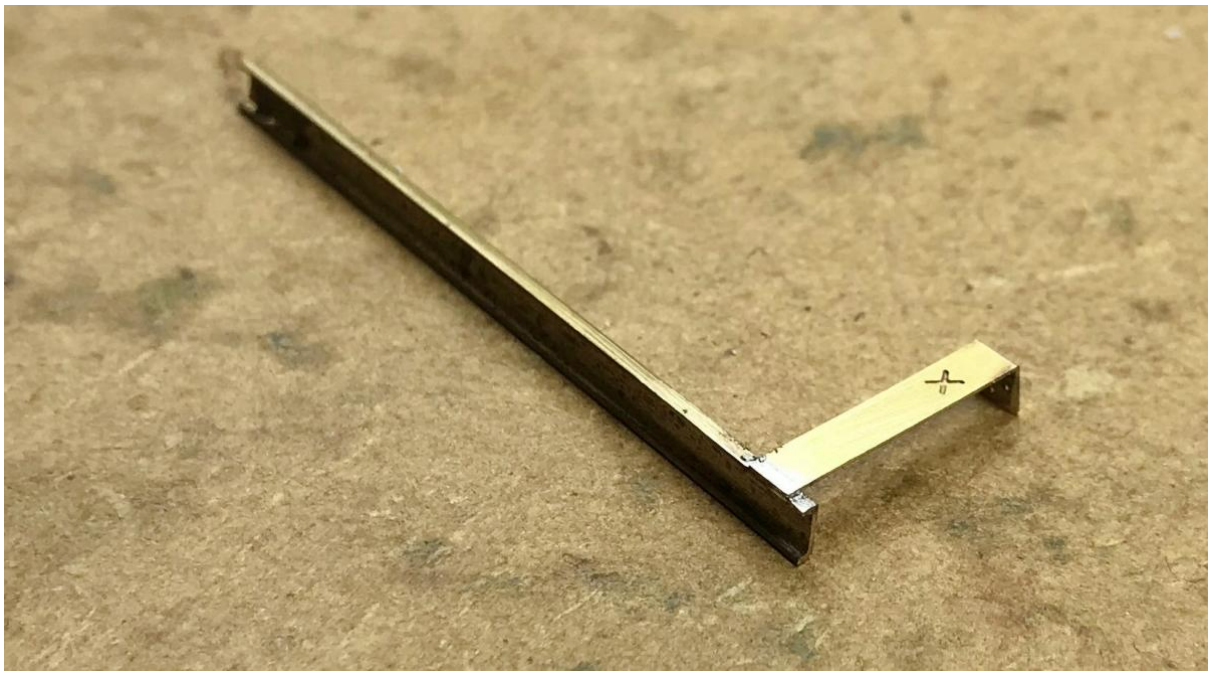


I used epoxy to join the parts together, not fancying my chances of getting the alignment right first time with superglue. Make some spacers from plasticard to fit between the end stanchions so when you clamp the parts together you aren't touching the stanchions. Do the middle and one end first, then add the other end.

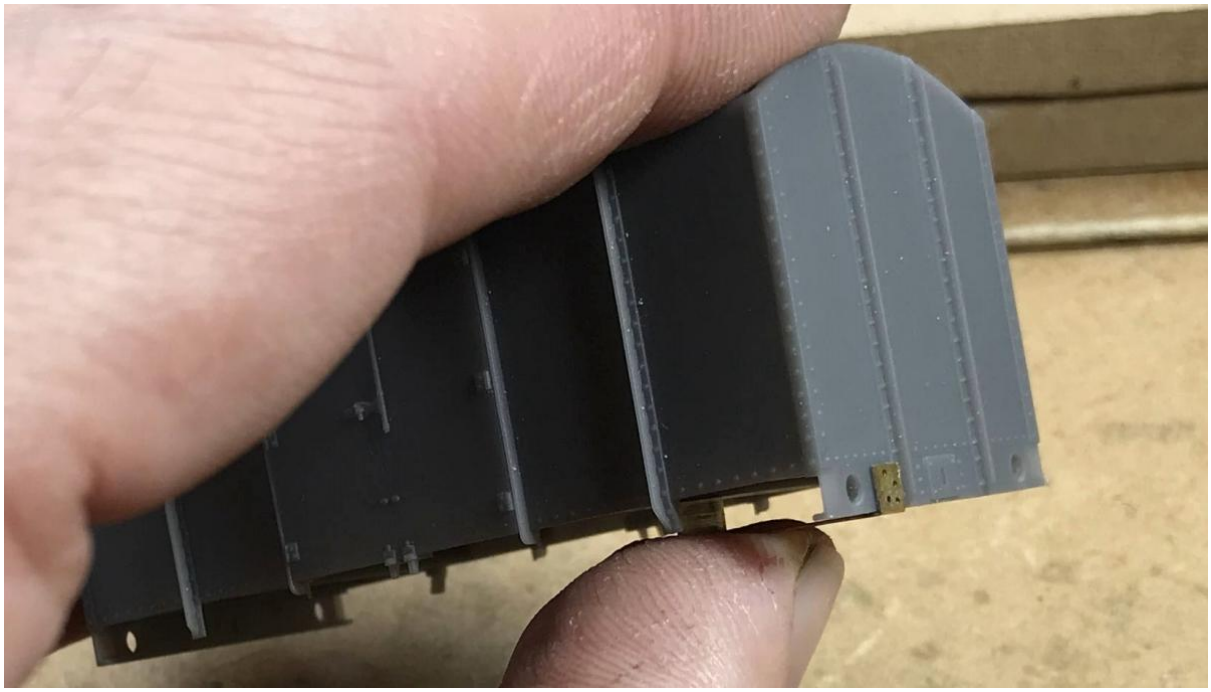


On the underside of the van there four holes which are designed to locate the body onto the under frame. These will need drilling out 1mm.

If you are building a fitted van then you will need to drill holes into the headstock for lamp irons and the dummy vacuum pipe coupling. I have included a jig (part X) to help with this. The jig folds into an L but you will need to add something so that it sits on the printed cross bars under the body that have the 1mm locating holes in. Anything 3mm deep will do. I used a spare bit of channel though bar would do just as well.



The jig can then be placed under the body so that the part with the holes in is up against the front face of the headstock and also up against outside of the left hand end stanchion (this should be the base of the stanchion rather than the web. The use a 0.3mm drill to drill the holes in the headstock. Repeat at the other end.



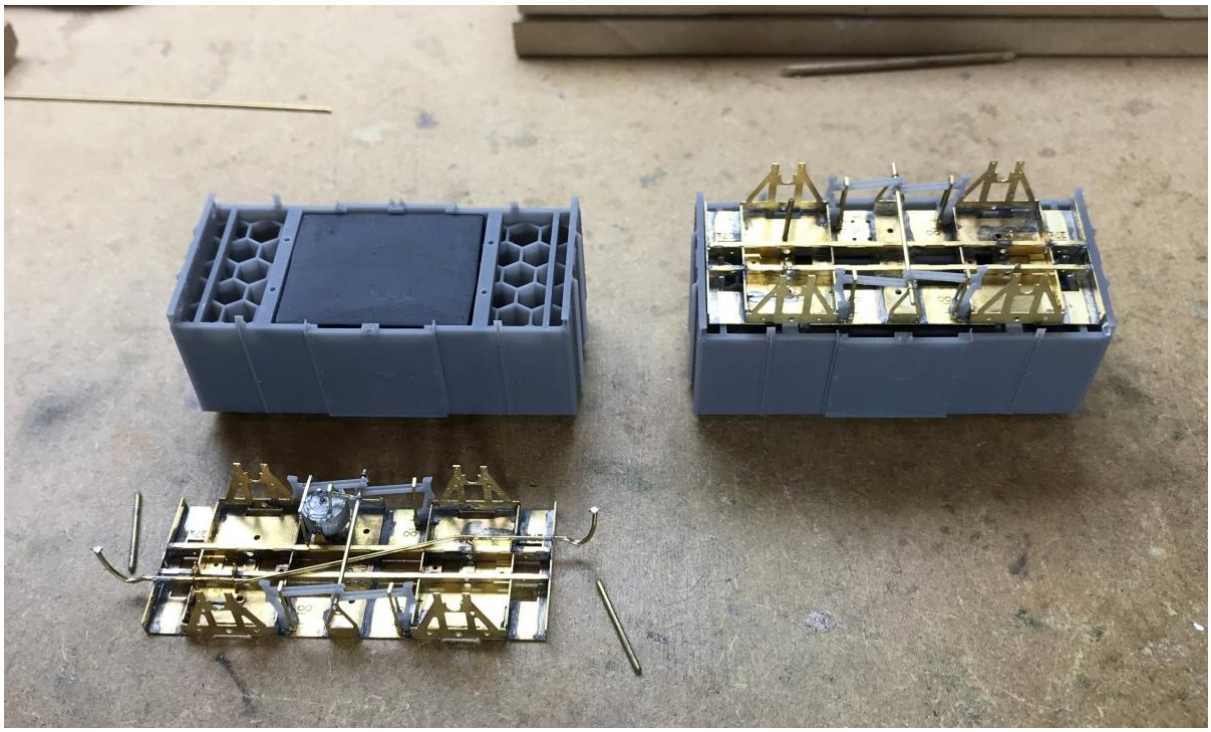
You don’t need to fit the buffers now, but you will need to make sure the buffer housings, whether using the printed items provided or complete cast ones, fit in the headstock. Open out the holes for the buffers using a tapered reamer until a good fit is achieved. If you are using cast buffers you will need to make sure the shank doesn’t protrude beyond the back of the headstock.

When fitting the printed buffer shanks, you will need to check that any steel heads that you use fit properly. You may need to run a 1mm (spindle buffers) or 1.45mm (Oleos) drill through the holes. Go gently and you shouldn’t have any issues. The buffers can be glued in place using either epoxy or superglue. You can do this now or later in the build, it doesn’t really matter.

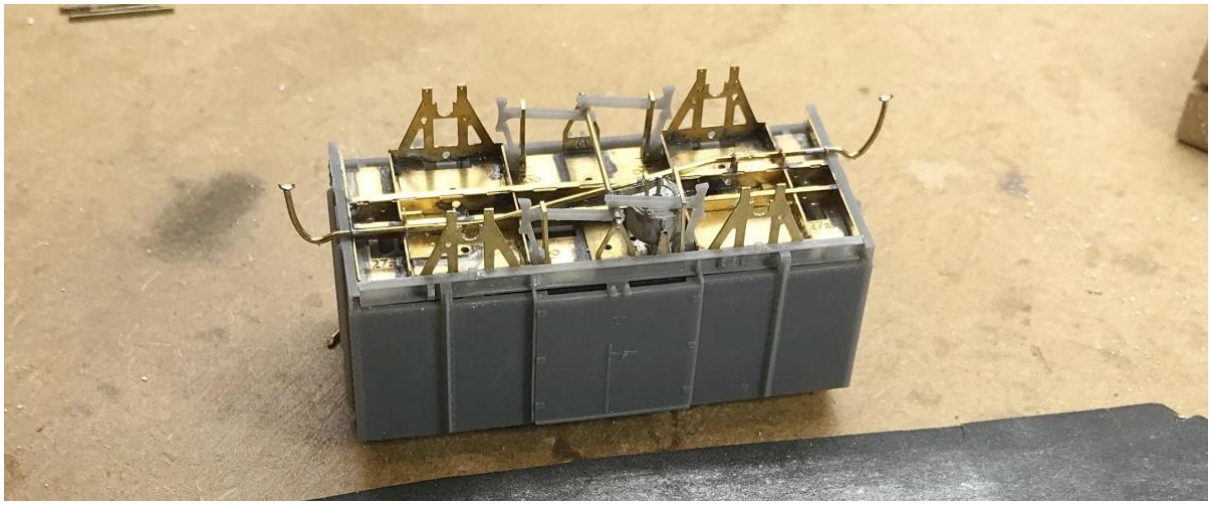
You will note that there are three rectangular recesses in the bottom of the body. These are specifically to take code 3 lead sheet as ballast. I can’t remember exactly what the weight was of the pieces I added but they basically filled up the middle one of these recesses. This gave the vans a sprung mass (so not including wheels and spring carriers) of 45g which is what I aim for now.

I have a thing about lead, having have experiences of it oxidising and expanding despite the fact I don’t ever use PVA glue with it. I now paint every piece of lead that I fit to a model beforehand.

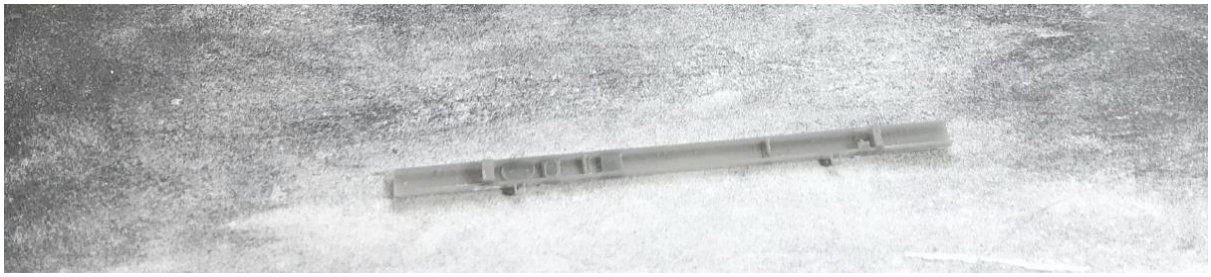
Fit the underframe and the ballast to the body. I used epoxy to fit the under frame in place. Depending on the fit of your ballast you may not need to glue that in place. Use 1mm wire ‘pins’ to locate the under frame in place. This will ensure it is central.



Solebars



With the body and under frame joined together the solebars can be fitted. These will need a little cleaning up before they'll fit. Remove them from the supports and clean up the remnants of the supports. You may find the back of the solebar needs a bit more work so that it fits. I rubbed mine on a piece of wet and dry, going easy and checking on the model as I went along. The resin sand very easily so go easy. The solebar should slide between the side stanchions on the body and the axleguards. You will need to drill out the holes in the brackets for the brake lever guards 0.3mm and the same diameter for the independent vees if constructing an unfitted LMS or LNER van. When gluing in place (again I used epoxy) make sure that they are in place properly and, in the case of the fitted vans, the right way around as one will have rivet detail on for the vacuum cylinder.



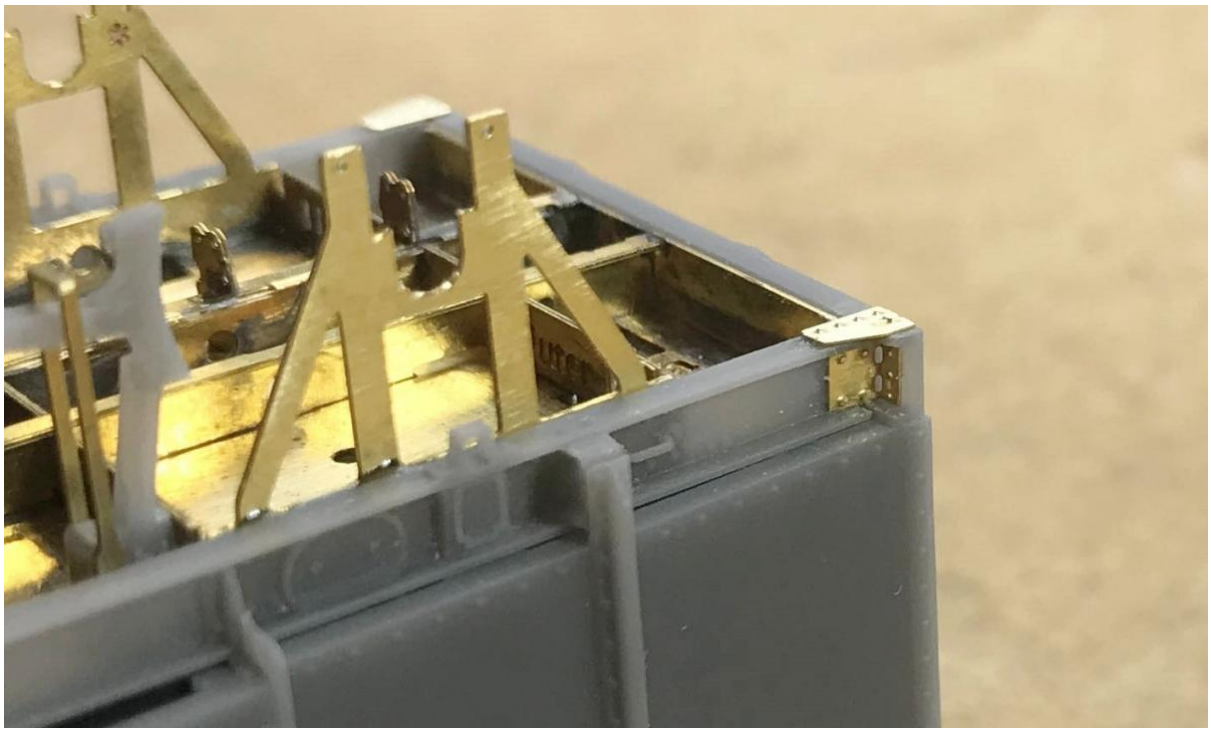
You may find that the solebars bow a bit when they've been cleaned up. The resin can be 'reset' in hot wat to remove the bow. The water should be a little below boiling point, boil the kettle and ten leave it for a couple of minutes. Clamp the solebar to a piece of metal so that a straight edge is maintained, put in a container, and pour over the water. I then leave the part in the water until everything has cooled. The image below shows the arrangement I use.

With the solebars fitted the detailing parts for the corners of the underframe can be added. There are both solebar/headstock bracing (14) and corner plates (15).

The solebar/headstock bracing comes in two types. There is a smaller 6 rivet plate that is for BR vans and a larger 7 rivet plate to fit to LMS or LNER vans. These parts fold into an L and then are fitted on the solebar, up against the back of the headstock. In the case of the larger type, the long edge goes against the solebar. I used superglue to fit them in place.

The corner plates go on the underside of the join between solebar and headstock. The long straight edge goes along the inside of the solebar and the short straight edge along the outer edge of the headstock.

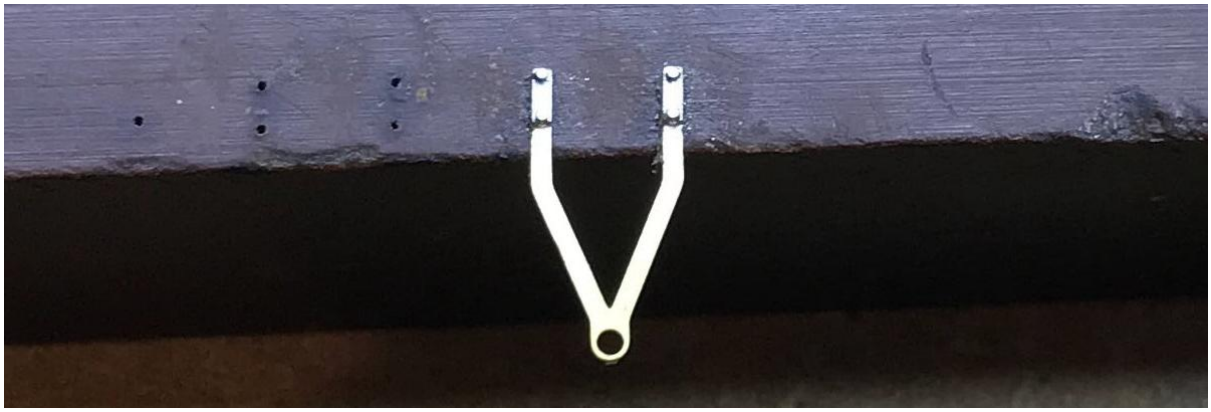
In both cases see the image below.



Secondary Vees for Independent Brake Vans

If you are building an unfitted LMS or LNER van, then you will need to make up the secondary vees (16) for the Independent brakegear. I constructed mine to pin into the solebar.

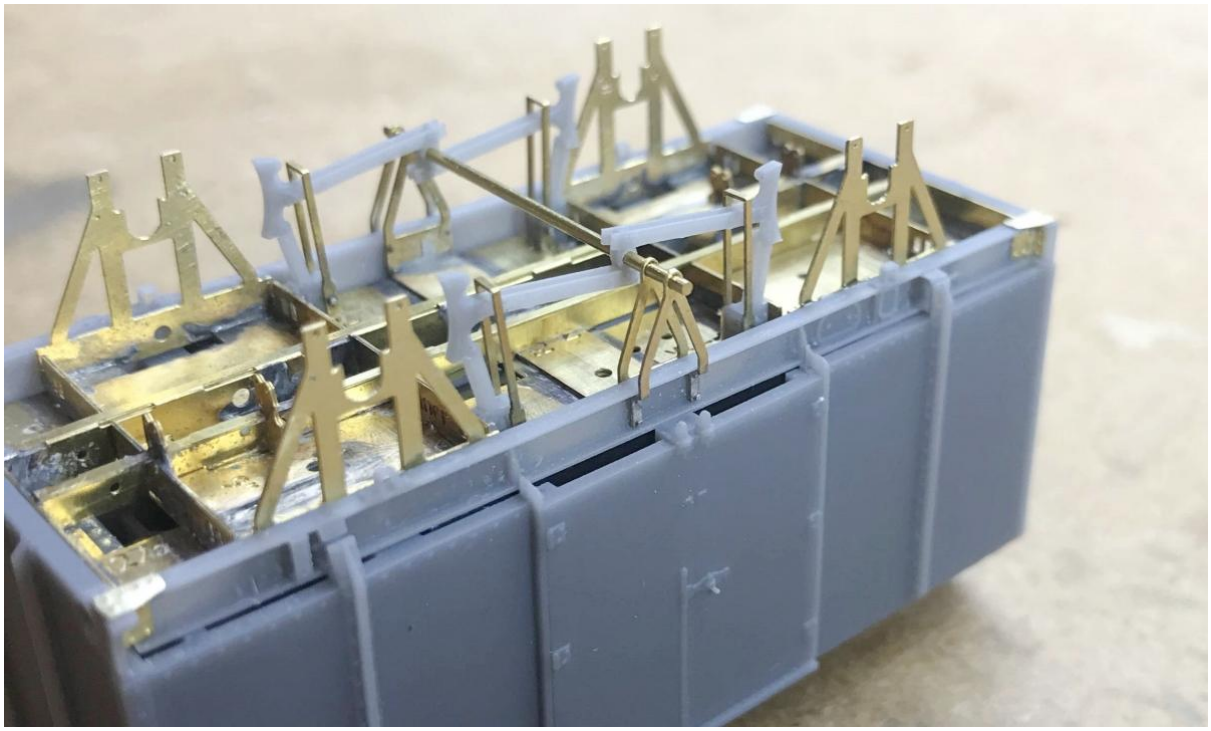
Whilst still attached to the fret use on of the vees to drill four 0.3mm holes into the edge of a scrap piece of wood or mdf. Make sure the large holes can accept 0.8mm wire and the smaller ones 0.31mm wire. Remove from the fret and then use short length of 0.31mm wire to pin a vee to the jig. There are two sets of fold lines on the vee, make sure the ones closest to the holes are facing upwards so they are visible. Solder the wire in place, cut and dress with a file to resemble rivets.



Make the first fold in the vee, using the fold lines closest to the holes. Take care that the fold is through 90° and reinforce with solder.

Make the second fold, again making sure the fold is through 90° and reinforce with solder.

The vees can then be fitted to the van. I used a dab of superglue on the place where the pins protrude through the back of the solebar to secure them at that point and soldered the vee quickly to the brakeshaft.

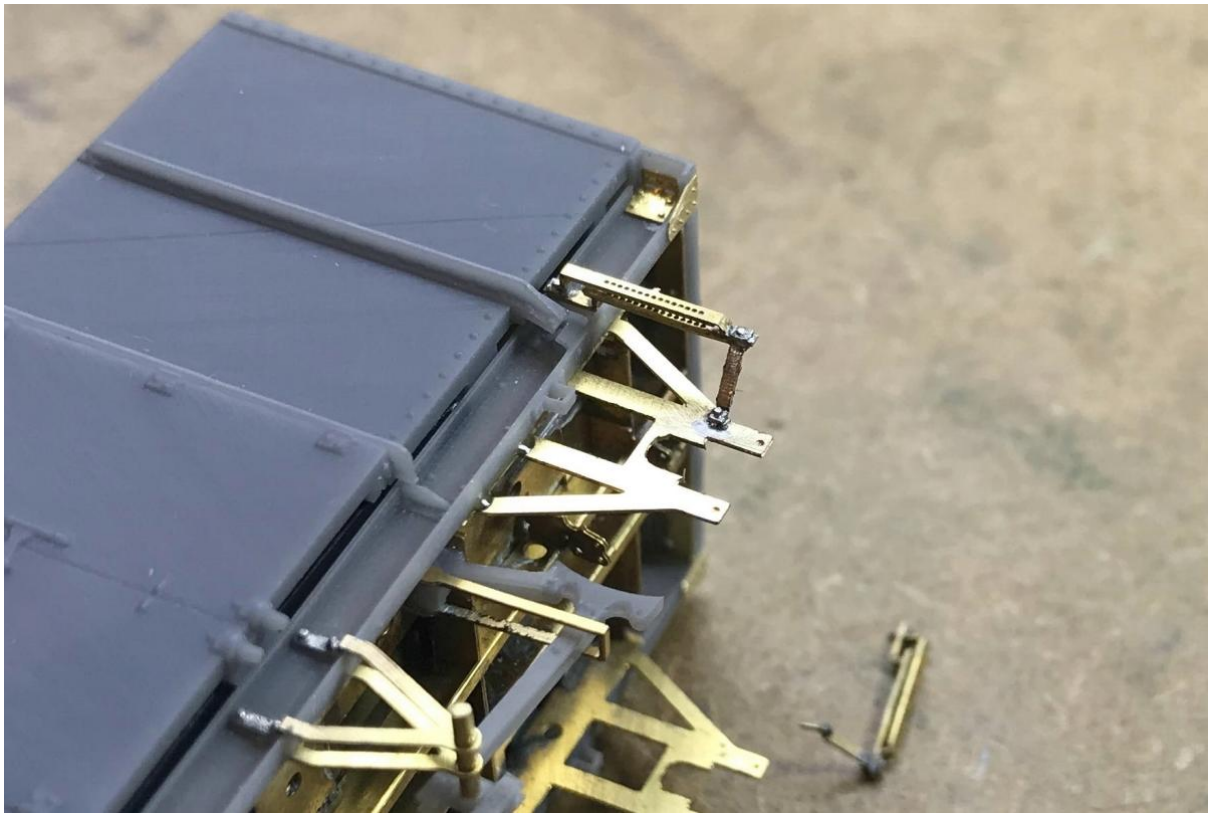


Brake Levers and Guards

The brake lever guards come in two parts, the guards themselves (17) and the stays (18). Make sure the holes in the guards can accept 0.31mm wire and remove from the fret. Fold up the guard as per the image below. There are two folds through 180° with the fold lines on the outside, these are the one between the two long sections and the second one in from the other end. The second and third fold line in from the end with the long section should be made through about 45°. All other fold lines are through 90°. Solder a piece of 0.31mm wire though the hole in the top of the guard. You may find inserting the wire into a hole in some wood useful. Trim to resemble a bolt head on the front and leave about 1mm on the back to pin into the bracket on the solebar.

I have arranged for the stay to pin to both the lever guard and axleguard. Whilst still attached to the fret, use one of the stays to drill a pair of 0.3mm holes on the edge of a piece of scrap wood or mdf. Insert a couple of short lengths of wire into the holes. Fit the stay, after having been removed from the fret, onto the wires. You will need to add the guard onto of these wires and everything will need to be arranged as in the image above. The guard goes at the end of the stay with the fold line facing towards the wood. Solder the wire and the guard to the stay. Make sure the guard is as close to 90° to the stay as possible. Clean up the wire to resemble bolt heads. Leave about 1mm of wire on the back of the stay at the end away from the lever guard.

Fold the stay up so that when fitted to the wagon the top of the lever guard is up against the printed bracket and the stay is up against the axleguard with the lever guard perpendicular to the bottom of the solebar. You may find that the hole in the printed bracket on the solebar needs to be opened out a little with either a small cutting broach or perhaps a 0.35mm drill bit. Use a dab of superglue to secure the lever guard to the solebar and glue or quickly solder the stay to the axleguard.



There are two types of brake lever included a set for Morton brakes, including the Morton cams (19) and a set for Independent brakes (20).

Morton Brakes

Make sure the holes in the brake levers and the cams can accept 0.8mm wire. The levers and cams can then be removed from the fret but note that the connecting tab between the non-Morton lever and backing cam should be left intact. Once removed from the fret the connecting tab between the cam and the non-Morton brake lever can be folded through 180° with the fold line on the outside. Solder a short length of 0.8mm wire through the hole in the Morton cam brake lever. This will locate into the top hole on the vee with a pair of holes in. I use a hole drilled into a piece of scrap wood to aid doing this. Once soldered in place trim the wire and file so the end is flat.

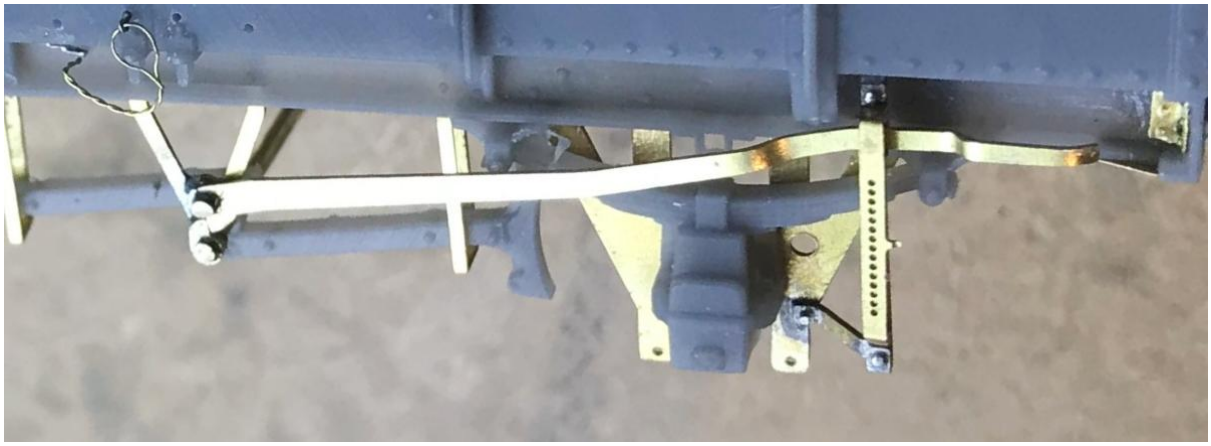
Independent Brakes

Simply make sure the holes in the brake levers and the cams can accept 0.8mm wire and remove from the fret.

Folding and Fitting

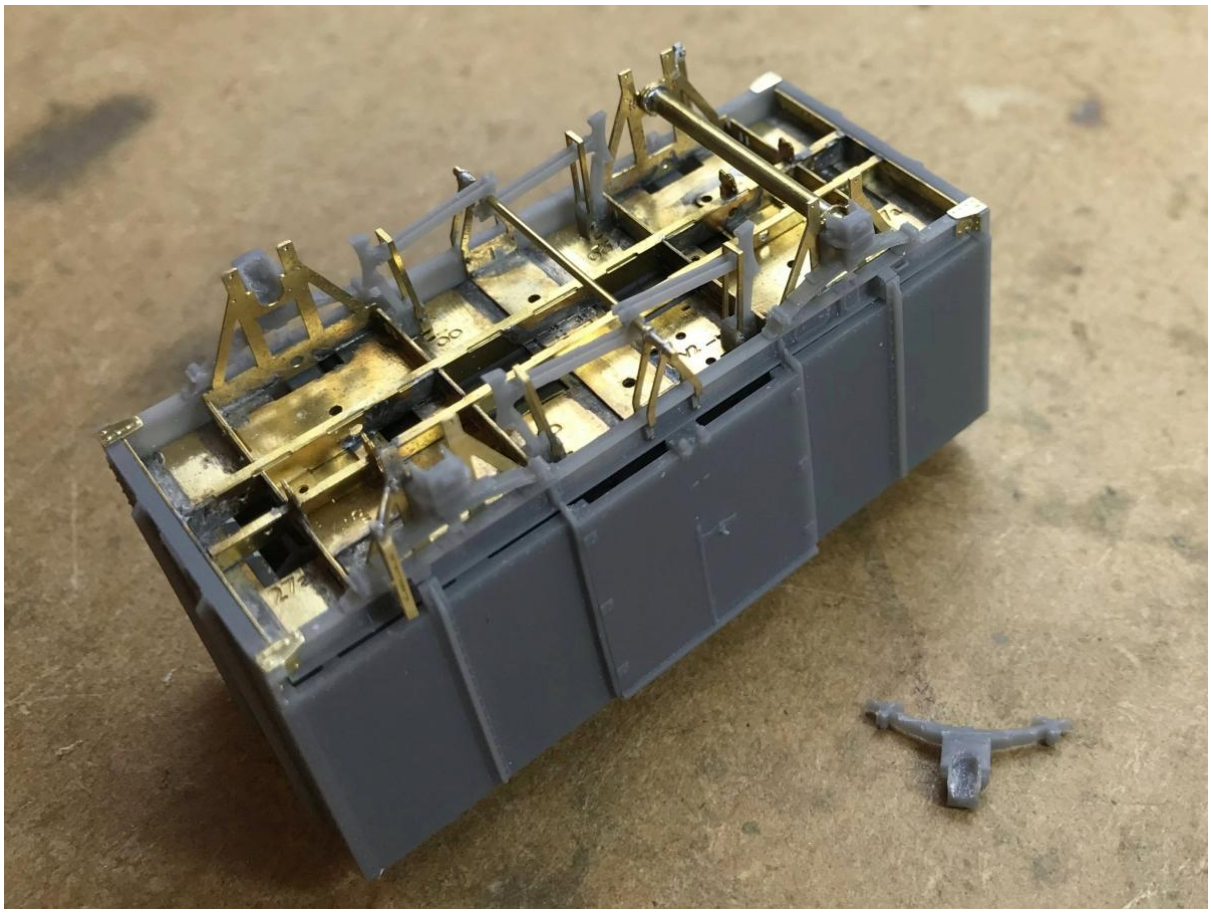
The brake levers then need to be bent up as per the prototype clearing the axleboxes and then cranked for the handle. I occasionally get asked for jigs to help with this but, despite being a big fan of jigs, in this instance I believe that it would actually take longer with a jig. This is because you'd spend an age trying to get the brake lever to exactly match the jig instead of just getting on with the business of folding it up. There should be a bend about 1.5mm in from the point where it meets the vee and enough space to clear the axlebox. The part of the brake lever that goes over the axlebox should be about 3mm from the front face of the axleguard.

Place the unbent brake lever on the model and mark where it will clear the axleboxes. Bend at these points and near the vee. Check on the model and adjust until you are happy with the shape then do the handle. Once you are happy the brake levers can be soldered in place. If using the Morton brake set, solder the Morton cam into place in the lower hole on the appropriate vee. The images below should give you a good idea of how they work.



Springs and Axleboxes

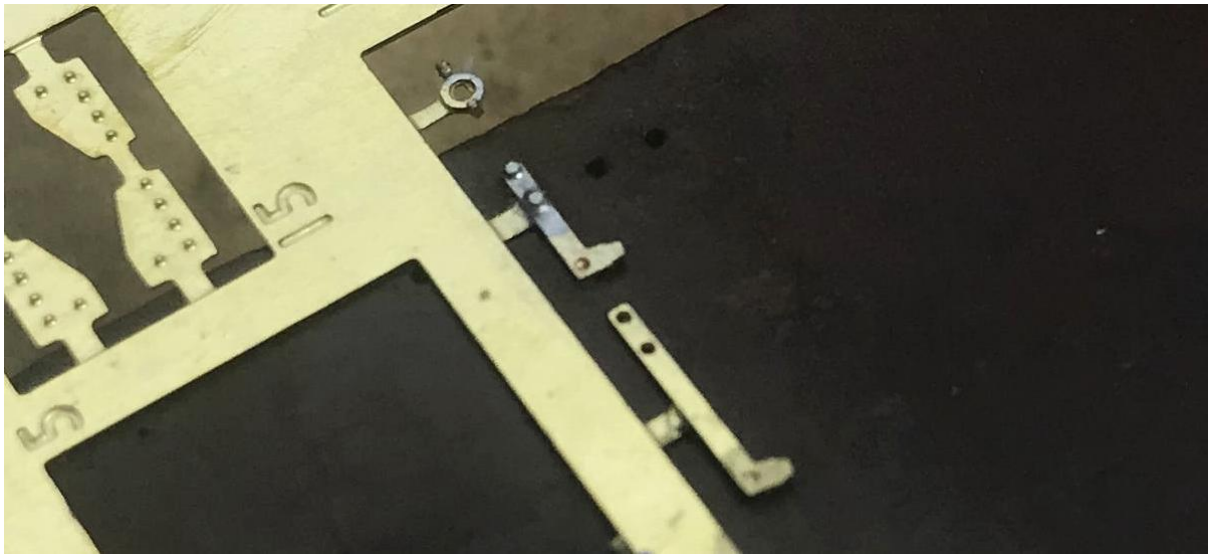
Next fit the printed springs and axleboxes. The rear face of the prints will need cleaning up. The slot shouldn't need any attention but if it does this is best done by carving away material with a sharp scalpel once it's been fitted. I've used both superglue and epoxy with these. I've made a jig, which I found useful, using a length of 2mm OD tube and a couple of washers (C) soldered on as an aid. This fits where the axle goes with the washers against the inside face of the axleguards. Make sure the ends of the tube extend about 0.5-0.75mm outside of the axleguard and the ends are free from any burr from cutting the tube. See image below. This then gives you something to align the springs/axleboxes with and you don't have to worry about where the slots in the prints/axleguards are in relation to each other. When fitting make sure the 'feet' on the springs are hard up against the underside of the solebar.



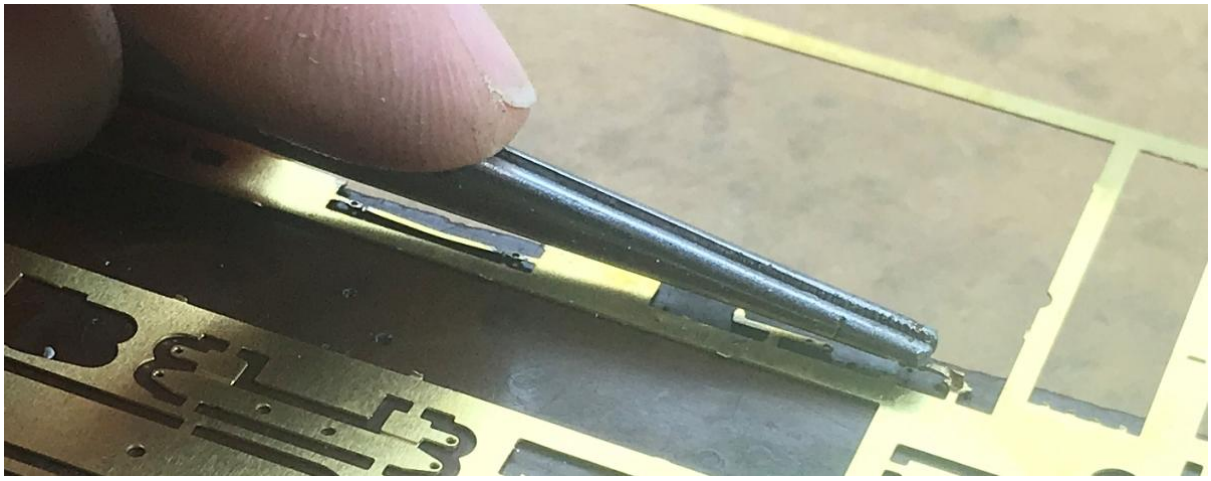
Dummy Vacuum Pipe Couplings and Lamp Irons

If you are building a fitted van, now is the time to fit the remaining detail on the headstock. We have touched on the dummy vacuum pipe coupling (7) before and there are lamp irons (28) as well.

The dummy vacuum pipe couplings come in two parts. There is a bracket which attaches to the headstock and a round head that has 'ears' that fold up. Two length brackets are included though I can only find evidence of the short type being used on the fitted gunpowder vans. Use one of the brackets to drill a pair of 0.3mm holes into a scrap piece of wood or mdf. Insert a couple of short lengths of 0.3mm wire into the holes and fit the bracket, whilst still attached to the fret, over the wires. Solder the wires to the bracket and clean the wire up to resemble bolt heads. See image below.



Press out the half-etched rivets on the bracket and remove from the fret. Twist the base of the bracket through 90° so that the interface with the head faces away from the rivets. Whilst still attached to the fret, fold up the ears on the head and insert these ears into a pair of small holes drill into a scrap piece of wood or mdf. This bracket can then be soldered to the back of the head (the side with no half-etched area). There is a tab and slot to aid location and use a pair of self closing tweezers to hold the bracket whilst soldering the two parts together. See image below. Remove the part from the fret and clean up the connecting tag.



In a similar manner the lamp irons need fitting with 0.31mm wire so that they can be pinned to the headstock. You should get the idea by now. Solder the wire to the lamp iron whilst flat and then fold up and reinforce the fold lines with solder.

The dummy vacuum pipe coupling, and lamp irons can be fitted to the headstock. You may need to open the holes that you drilled in the headstock out a little using a small cutting broach or perhaps a 0.35mm drill. When you're happy with the fit, glue the parts in place.

Roof

Now is probably as good a time as any to fit the roof (Y). This will need rolling to shape. Use a suitable piece of bar to roll the roof trying to get it to match the curve in the top of the body as closely as possible. The sides of the roof can be tricky to curve. A trick I picked up to make it easier to do this is to tape the edge you want to curve to your rolling bar using masking tape. This stops the roof springing away from the rolling bar and remaining flat. When you are happy with the fit glue the roof in place. I used 12 hour epoxy and a couple of elastic bands to keep it in position whilst the glue dried. If you used 5 minute epoxy you could hold it in place until dried.

Door Chains and Padlocks

You will need to add representation of the door chains and also the padlocks, as I forgot to add the latter to the CAD model before I printed the bodies. As I understand it gunpowder vans were supposed to be locked though I have seen the occasional one without a padlock, presumably these were empty? The position of door chains varied, and the lower ones almost always hung down below the body. These are not going to be possible 3D printed and I'm not putting them in the wrong place, so it means the thin wire needs to come out to add them. Small pin vices come in very handy for these.

I made my chains from 41swg soft brass wire, and I will refer to this size in the instructions though I think you could probably use something a little thicker, maybe 38swg wire? It must be soft though, hard wire such phosphor bronze will be a nightmare for these (I've tried, not pliable enough). They are fitted to the model using 0.3mm holes drilled into the body.

Padlocks can be fashioned from the bottom of the spare lamp irons and pinned in place.

The image below gives you an idea of the kind of thing required.

Padlocks

As mentioned above I created them from the bottom of spare lamp irons with a piece of 0.31mm wire soldered into the lower hole, filed flush on one side and then the lamp iron etch cut off above this. A loop of 41swg wire was added to the back so that it gives the impression of the shackle. The shackle goes through clasp on the door lock so you don't need a complete loop. I step soldered these using 183° solder for the 0.3mm wire pin and 145° solder for the shackle.

The image below is not the best but you can just about make out the loop of wire at the top. The image above, though smaller, perhaps gives a better idea.

There is a representation of a closing pin on the doors which will need taking off if you're modelling a van locked with a padlock. Use a sharp scalpel blade or chisel blade to do this. Leave the clasp detail on. Drill a 0.3mm hole so that the padlock fits just below the door lock clasp.

Padlocks could be seen on their own but often they were secured to the door with chains. We will move on to chains in a minute but the position of the chains, when they existed, varied. Sometimes they were fixed just above the door clasp and sometimes on the locking bar running vertically along the inside of the right hand door. Prototype images are useful but make sure they are of the correct period for the era you're modelling. Things came off over time. I have also included some (hopefully) decent photos of the arrangements I used on my three vans at the end of this section. My modelling period is 1964.

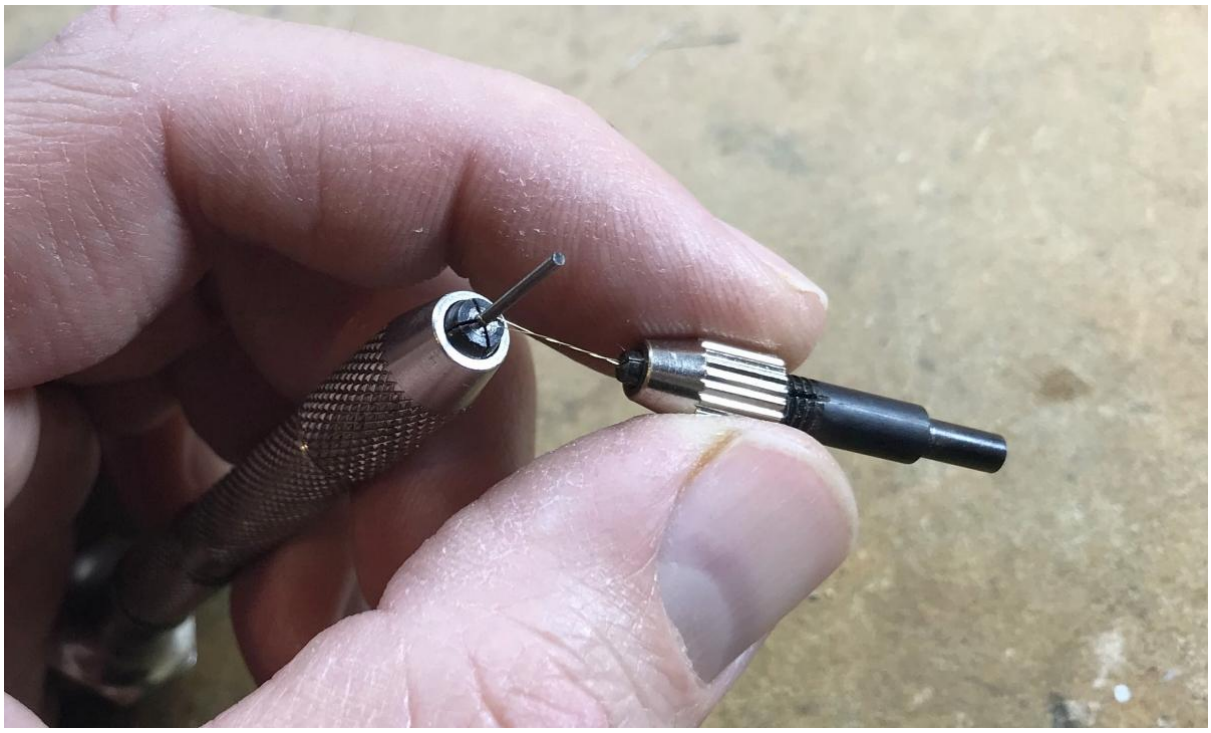
Chains

I formed the chains from short lengths of 41swg wire. These usually had a securing ‘pin’, again made from 41swg wire soldered to it to enable the wire to be pinned in place on the bodyside. This is how I did them.

Cut a length of 41swg wire 40mm long and bend into a U shape using a pair of round nose pliers placed in the middle of the wire.

Clamp the two ends of the wire together and solder them so they don’t come apart.

Fit the ends of the loop you have just soldered together into a pin vice. Then, in another pin vice, fit a suitably sized drill bit so you only have the shank visible. I used a 1.5mm diameter drill bit for the lower chains and a 1mm diameter drill bit for those around the door clasp. Fit the loop over the drill bit and then rotate the end of the wire around until it is tight up against the drill shank.

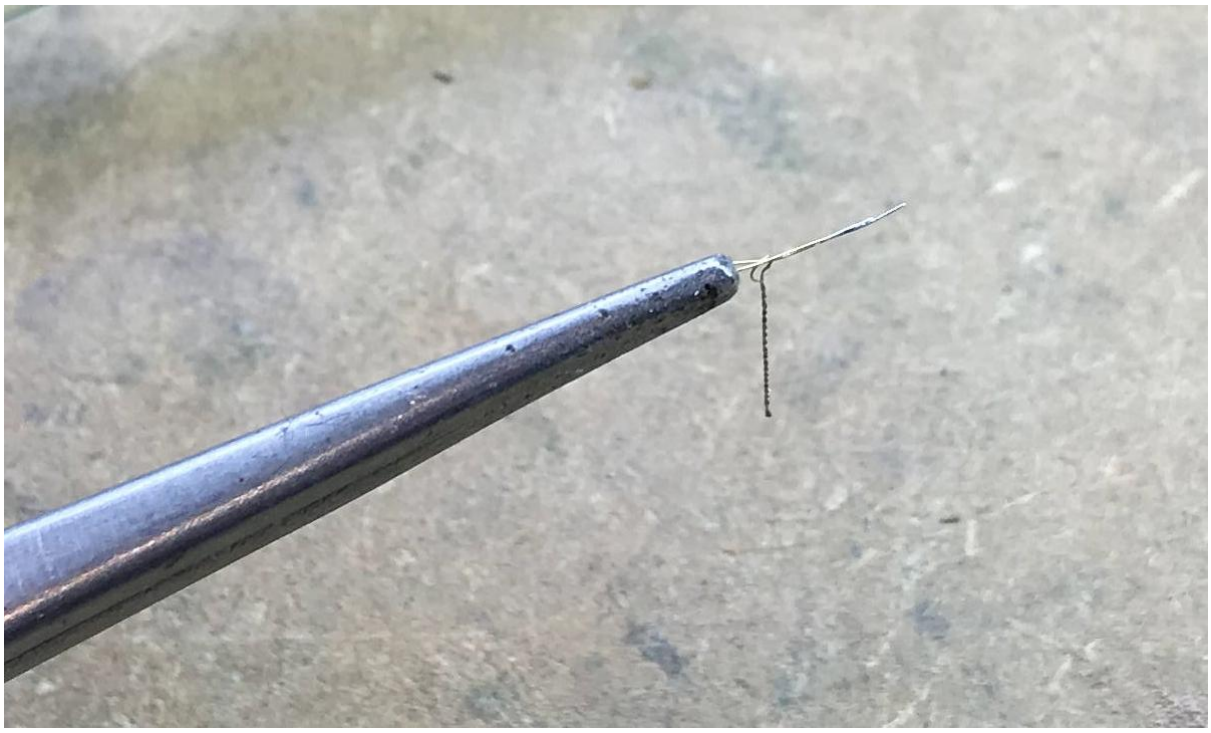


Run a little solder along the twisted wire.

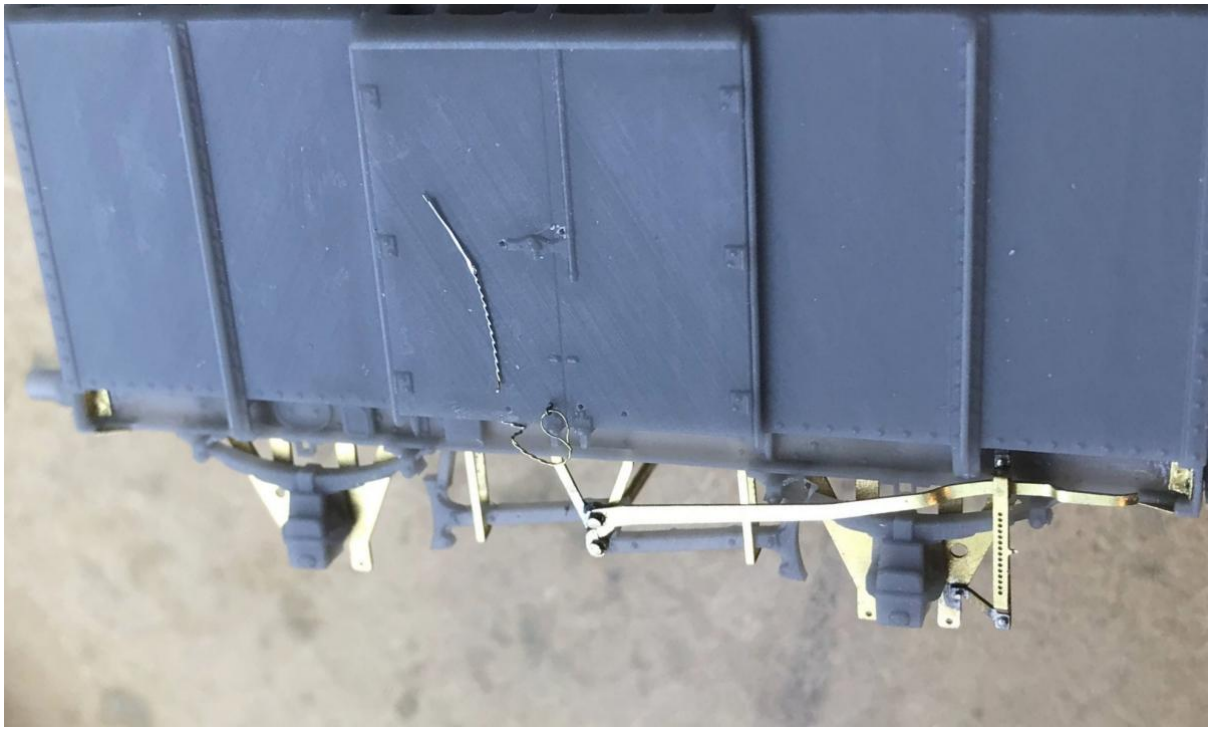
Cut the end off.

In order to create a ‘pin’ for the loop fold a 15mm length of 41swg wire in half about the middle.

Fit this wire onto the loop in your chain. Solder the ends of the wire together as before. Then, holding the end of the chain where it joins the loop, twist the wire whilst holding it in a pin vice until tight up against the chain. Solder the two together so that the pin is about half way around the circle on the chain.



The pin can then be fitted into a hole drilled in the body side and the chain cut to length and fitted into another hole or, in the case of the lower chains on LMS and LNER vans up under the body. A little glue can fix things in place.



The position of these chains did vary so try and find some photos of vans in your period if you can. The following show the arrangements I used on my three vans.

LMS Unfitted - Lower chains fixed under body, padlock on chain and secured from above, representation of clasp pin hanging on chain.

BR 'New Build' fitted - Lower chains fixed to body, no padlock, door clasp pin in place with chain and secured to the end of the door clasp. Wagon modelled empty.

BR retrofitted - Lower chains fixed to body, padlock on chain and secured to locking bar, representation of clasp pin hanging on chain from the end of the door clasp.

Chalk Boards

Some vans got fitted with chalk boards (29). There are two sizes included. The larger size go on the side of the van and the smaller on the end. Check photos for position and glue in place.

Notice Plate

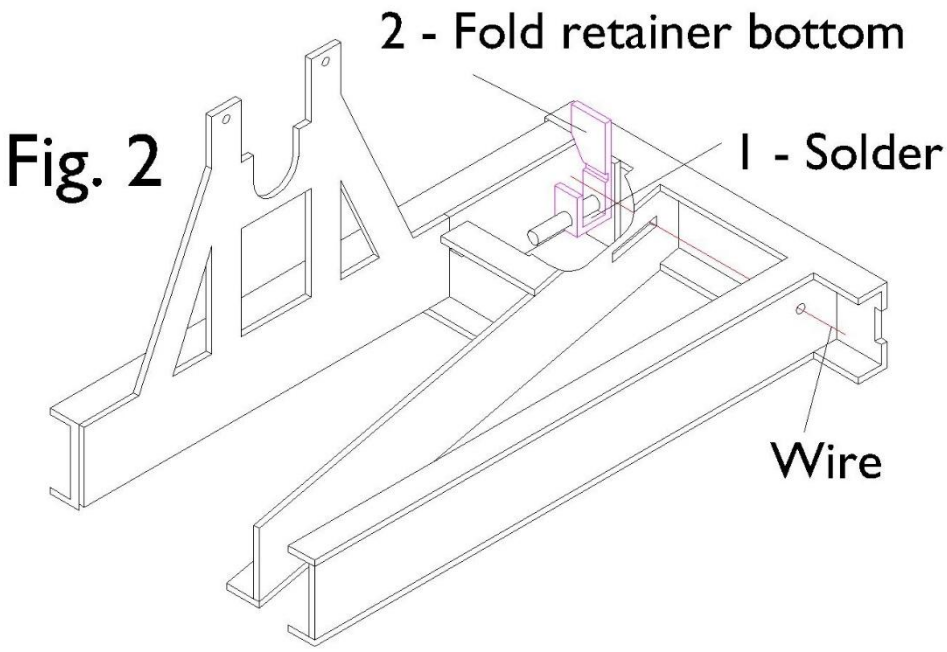
There was a notice plate (Z) attached to the doors on these vans. It read: 'Notice. No unauthorised person is allowed to open these doors'. There are three of these included. I've done my best with the writing given the thickness of the brass used in the kit. The raised parts of this sign seemed to have often been picked out in white. Mine will go on once painted.

Buffer Springing

I have included my buffer springing arrangement with the kit. This consists of sprung buffer retainers (26a) that are deigned to be soldered onto the shanks of metal buffer heads once they have been fitted. A length of guitar wire is then fitted between the backs of the solebars and through the holes in the ends of the underframe stiffeners (5). This wire then bears against the retainers and a tab folds over the top to stop the retainers and the wire becoming disengaged. Washers for buffer spring retainers (26b) are included for fitting between the retainer and the back of the headstock to ensure the wire is always under tension.

To fit the buffer retainers, remove from the fret and check the fit of the buffer head shanks in the holes; adjust if necessary. Also check the fit of the shanks in the washers, preferably before removing from the fret. Fold the buffer retainer into a C shape leaving the top (the wider part) unfolded for the moment. Place the buffer head shank through the buffer housing on the wagon and then slide the retainer onto the shank though the holes first having fitted a washer. Hold the retainer bottom with a pair of self closing tweezers and solder in place so that the head of the buffer is either 6.8mm (retrofitted vans) or 6mm (everything else) from the face of the headstock. Use very little flux or you may encounter problems with the shank rusting. Once the retainer is firmly soldered in place you can fold the top over. Note that there is a correct side to fit the buffers. The retainer bottom comes with a wedge on one side which should face towards the solebars. This will prevent the buffer retainer from rotating sufficiently for the wire to become disengaged. Fig.2 below is nicked from another set of instructions but gives you the idea.

The gauge of the spring wire necessary may vary depending on your train lengths but 0.011” is a good place to start. It maybe that you personally want a harder or softer wire in which case simply replace with a heavier or lighter gauge of guitar wire. Be aware though that the spring rate will change rapidly with the change in gauge. If you fit something like 0.008” wire then there maybe virtually no springing effect, conversely if you fitted 0.015” you may find that you might as well have made the buffers rigid. Guitar wire of suitable gauges can be had in single strings from good music shops.



Couplings

Coupling hooks (D) are provided on the axleguard fret. These are designed to be folded double and soldered together. Once assembled the hook can be dressed to better resemble a casting with rounded edges. There are two lengths on the fret D1 and D2. You will need D1. Once assembled make sure the holes are able to take 0.5mm wire.

Two types of Instanter link are provided. There the BR type and a GWR type. The latter was fitted to the LNER batch built in 1944. The former was fitted to the BR 'new build' vacuum braked vans built to lots 2544, 2689 & 2872.

The other unfitted wagons had 3 links.

You will need links. Brassmasters sell some blackened chain which is ok though maybe a little malnourished. You can also make your own using 0.45mm wire. John Hayes gave a good account of how to do it in his book The 4mm Coal Wagon published by Wild Swan.

Retrofitted wagons had screw couplings. These are available from Rumney Models (code B.96).

Painting

I generally use Halfords grey primer in a tin through an airbrush with cellulose thinners to prime just about everything, including plastic and printed parts. The primer is synthetic and has no adverse effects on the types of plastics used on RTR railway models and kits. The cellulose thinners used evaporate so quickly that they don't have time to attack the plastic. You can then put your choice of paint over the top including cellulose. Don't use the red oxide in a tin on plastic though as it won't adhere, and the paint will just come off.

This primer is great, and I can't recommend it highly enough, the only disadvantage is that there is no 'build' in it at all, so it won't fill any minor imperfections. As the 3D printed parts won't be completely smooth, you may want something with a bit more body to it. I generally don't like the lack of control with rattle cans but as far as these things go the Halford grey primer is very good. Warm it up a bit (though not exceeding the limit specified on the can) and make sure you shake it for the full 2 minutes. Use light passes.

Liveries

These followed standard wagon practise. Wagons in the BR era were either grey (unfitted) or bauxite (fitted). Post 1964 some may have been painted into freight stock brown. LMS and LNER vans were grey. Solebars would be black except for pre-nationalisation LMS vans which appeared to have been grey as per the body.

Finally

Hopefully you have enjoyed the build and it has been more fun than opening a box from a Canadian company manufactured in China. I'm sure the chains were a bit of a challenge but hopefully the kit has fulfilled the aim I had when designing it, by having all the finesse of the etched kit that proceeded it (but didn't make it off the CAD program) but quicker to put together.

Justin Newitt - May 2022.

Suppliers List

Rumney Models (screw couplings)
www.rumneymodels.co.uk

Eileen's Emporium (brass wire and tube)
Unit 19.12 Highnam Business Centre
Newent Road
Gloucester
GL2 8DN
www.eileensemporium.com

Lanarkshire Models and Supplies (cast buffers)
9 Nairn Avenue
Blantyre
G72 9NF
www.lanarkshiremodels.com

MJT (buffer heads)
Dart Castings
17 Hurst Close
Staplehurst
Tonbridge
Kent
TN12 0BX
www.dartcastings.co.uk

Wizard Models (buffer heads)
PO Box 70
Barton upon Humber
DN18 5XY
www.wizardmodels.ltd

Brassmasters (coupling links)
PO Box 1137
Sutton Coldfield
West Midlands
B76 1FU
www.brassmasters.co.uk

Alan Gibson Workshop (wheels and bearings)
PO Box 597
Oldham
OL1 9FQ
www.alangibsonworkshop.com

Scalefour Society and EM Gauge Society
Stores (Exactoscale wheels and bearings)
www.scalefour.org
www.emgs.org

Cambridge Custom Transfers (transfers)
6 Roseland Gardens
Bodmin
PL31 2EY
www.cctrans.org.uk

HMRS (transfers)
HMRS Museum & Study Centre
Midland Railway Centre
Butterley Railway Station
RIPLEY
DE5 3QZ
https://hmrs.org.uk/