MISCELLANY *MODELS*

I keep all of my instructions under review and it is likely that these will be updated in the future; thus, please check for most up to date instructions at www.miscellanymodels.com

Rolling Stock 3 – Highland Railway dia 51 Full Brake

March 2019 edition

Prototype

These 46 foot long full brakes were constructed between 1911 and 1917 at both the company's works at Lochgorm and outside contractors, RY Pickering. They represented the final new construction full brakes for the company and matched the contemporary cove roof designed being introduced for mainline use. Although the first was withdrawn at the end of the 1920's, they lasted in revenue service into the BR era being withdrawn in 1951, at least one received M prefix BR numbers and one made it into department stock as an engineer's van so it probably lasted even longer.

It is fair to say there are gaps and uncertainties about all Highland vehicles as there is limited prototype information and our knowledge about these are no different. It is certain that there were differences between batches. Where I can I have sought to provide some supplementary etches to allow the sliding doors to be modelled although I would caution that these were replaced with cupboard doors partway through their lives. What has not been offered is a variant shown below with three toplights between the ducket and the left door as it is possible that the doors/lookout are located slightly differently.

There were probably six vehicles and the known vehicle numbers were:

HR nos: 77, 78, 79, 81, 82 & 83

LMS first nos: 7440, 7441, 7442, 7444, 7445, 7446

LMS second nos: 336698 (renumbered 31847), 33699 (renumbered 31952), 32898, 32899 & 32897

The first batch was fitted with gas lighting but these, and all further construction, were fitted with electrical lighting. As constructed, some or all were left without corridor connections but it appears all were subsequently so fitted. However, corridor connections were removed from them – some (Nos 31847 & 31952 for certain, possibly also others) had this was taken off during revenue service and those that were pressed into department service all had the corridor connections removed. The model can be constructed without the corridor connections with a modicum of filling.

As constructed, lower footboards were fitted to the full length of the coach and bogies but these were cut back over time and to differing degrees. The lookouts were initially smooth finished sheet metal but subsequent repairs were completed with horizontal boarding. There were also a variety of positions for the vacuum pipework to the solebar, being above and below the footboard. The vehicles were fitted with steam heating in addition to vacuum brakes.

Components

A	Underframe main body (1 no)
B	Solebar outer (2 no)
C	Upper Footboard (2no)
D	Battery Box Inner (1 no)
E	Battery Box Outer or Framing (1 no)
F	Main sides (2 no)
G	End pieces (outer) (2 no)
H	End pieces (inner) (2 no)
I	Footsteps (16 no – note these are spread on several sheets)
J1	Door hinges and droplights for single door with droplight lowered (2 no)
J2	Door hinges and droplights for single door with droplight raised (2 no)
K	Queen posts (4 no + 2 no spare)
L1	Door hinges and droplights for double door with droplight raised (3 no)
L2	Door hinges and droplights for double door with droplight lowered (3 no)
M	Ducket sides (4 no)
N1	Flush ducket fronts (2 no)
N2	Slated ducket fronts (2 no)
O	Sliding door (4 no)
P	Sliding door ironwork (4 no)
Q	Sliding door lower runner (4 no)
R	Buffer beam inner reinforcement pieces (4 no)
S	Corridor connection mounting plate (2 no)
T	Corridor Connection Outer Cover (2 no)
U	Corridor Connection jig for prongs (1 no)
V	Corridor Connection Scissor Outers (4 no)
W	Corridor Connection Inner (2 no)
X	Roof mid profile pieces (2 no)
Y	Roof end profile pieces (2 no)

Z	Lamp irons (4 no)
AA	Main roof (1 no)
BB	Lower Footsteps (2 no)
CC	Footstep & queenpost base pieces (6 no + 2 no spare)
DD	Vacuum cylinder arms (4no + 5 no spare – there was room!)
EE	Brake operating arms (4no + 1 no spare)
FF	Gas cylinder straps (4no)
GG	Under footstep vacuum pipe supports (8no)
HH	Sliding door upper runner (2 no)
II	Ducket lamp recess part 1
JJ	Ducket lamp recess part 2

Required to Complete

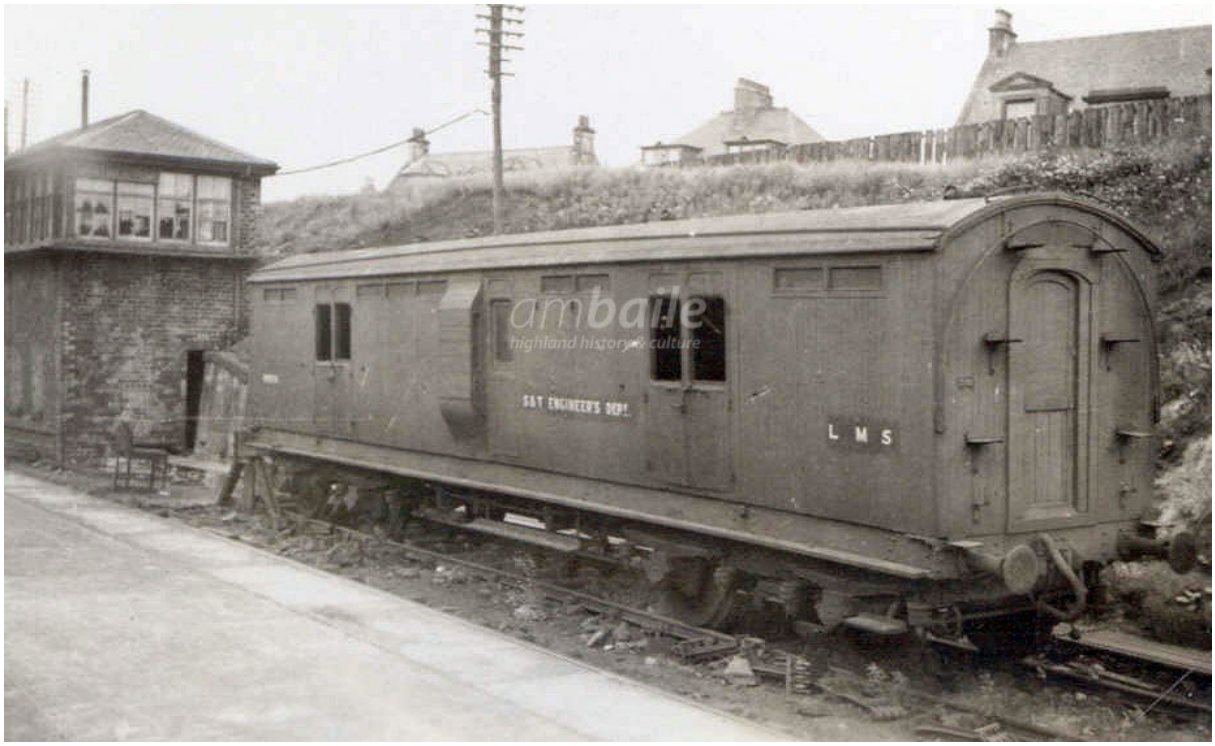
a *Rod for trusses and brake actuation rod* – 0.6mm brass or nickel silver – Eileen's Emporium or similar
b *Rod for brake runs* – 0.5mm brass or nickel silver.
c *Rod for battery box support rods* – 0.3mm brass or nickel silver
d *Rod for bodyside handrails* – 0.4mm brass
e *Rod for rainstrips* – 0.5mm nickel silver
f *Vacuum Cylinder and brake compressor* – several sources but I suggest the NER cylinder & compressor from 51L Models
g *Dynamo* – several sources, including 51L, 247 Developments
h *Vacuum pipes connectors* – several sources including Blacksmith (my preferred because they are cast brass), Comet/51L, 247 Developments or use guitar wire (32 gauge wire wound)
i *Buffers* – Kean Maygib LMS Standard sprung buffers (KM443)
j *Coupling hooks* – Exactoscale
k *Roof torpedo vents (4no)* – Branchlines, 51L or 247 Developments but I use Lanarkshire Models
l *Gas lamps* (4no) – Miscellany Models or 51L – only for the gaslit version
m *Rod for vacuum pipe to the solebar* – 0.8mm brass or nickel silver
n *Gas cylinders* – 51L
o *10 BA bolts and nuts (4no short and 2n long for the bogie fitting)* – Eileens Emporium and others

References

Highland Railways Carriages and Wagons; Peter Tatlow, Noodle Books; 2014; ISBN: 9781909328136

Highland Railway Liveries; Howard Geddes & Eddie Bellass; Pendragon; 1995; ISBN: 1 899816 02 X

Official picture of a sliding door version, with a cut out ducket with a lamp in it (note the absence of corridor connections which were only provided after they had been in use for some time on at least some vehicles).



Taken in June 1949, at an unknown (but Caledonian) location.

A model of the sliding door version in Highland livery

Instructions

General

1. Do please read these instructions through before starting to use these components. As this is not a full kit, there are items that are described out of sequence with these instructions as work is related to items that are not covered in these components.
2. These instructions are dynamic and where improvements to them are made, they will be updated. The up to date instructions can be found at https://miscellanymodels.com/
3. Most of these components need to be soldered together and I have suggested that you utilise a number of different temperature grade (or melting point) solders. For those of you who are not that familiar with soldering, there are some good guidelines here: https://www.clfinescale.co.uk/copy-of-c-l-product-diagrams
4. The key to good soldering is to keep the metal clean, apply plenty of heat for a short period of time and use the right solder and flux. Whilst it is possible (and at times preferable) to use cored solders or electricians solders (which is what you will generally find in a DIY store) you will find it much easier to use proper jeweller's or modeller's solders. Solders from Carrs (https://www.phoenix-paints.co.uk/products/carrs) or Eileen's Emporium (http://www.eileensemporium.com/) are a good places to start.
5. There are different approaches to how to approach the soldering of kits such as this and many of you will have your own thoughts. If you are a beginner, it is probably best to treat 145º solder as your base line (the number refers to its melt point) and then use lower/higher melt solders where I have suggested.
6. When cutting components from the etches, it is important not to bend or distort the part. Thus, scissors or snips are not generally appropriate. Instead, use a craft knife/sharp chisel and cut onto a firm base (wood or similar) or use a piercing saw.
7. Fold lines are always on the inside of the bend for 90º bends. Thus, the item is bent into the half-etched line; best done with bending bars or in a smooth jawed vice (pliers are OK for small pieces).
8. Items that are folded through 180º are the opposite. In this instance fold away from the etch line. It is best to do this in two movements; get it to 90 – 120º in the first movement in bending bars or similar and then complete the bend by clasping this shut between a vice or pliers.
9. All of the holes should be etched slightly undersized. This is because the etch process is a little variable so it can over etch and an undersized hole is much easier to deal with than an over sized one! Thus, the holes will need to be opened out slightly either with a broach or with the appropriate sized drill in a pin vice. Take care when doing this, especially with the broach, to make sure that the hole is to the correct size – use a piece of wire to the correct diameter and continue until it is a tight fit. On the same basis, the slots for the tab and slot connections might be tight. They can be opened up by sliding a scalpel blade down them.
10. The instructions have been conceived such that the main bodyshell is finished first, then the main parts of the underframe and then the roof before coming back to add the more delicate details to the body and underframe.
11. Instructions for the bogies and corridor connections are separate as these are also used for other things.

Basic Body Sides - Cupboard Door Version

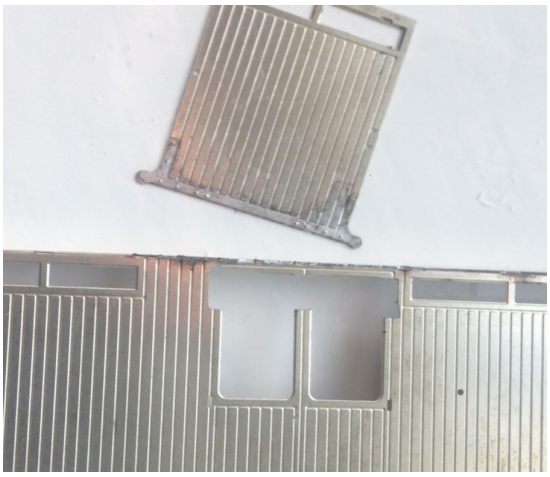
12. If the cupboard door version is being modelled, before doing anything else to the body some additional holes for handrails need to be drilled out from the main body sides (***part F***). These are a half-etched pip on the inside of the body side for each hole and these need to be drilled before assembly or the forming of any bends. This is not necessary with the sliding door version.
13. Although the ends have no tumblehomes, the sides have relatively slight tumblehomes at their bases. Form these with either rolling bars or by using a rolling pin – there are some slight relieving lines to the inside of the etch to assist but it still pays to do this with a bar to help form the curve. If you are doing the latter, this works best on a slightly flexible bottom layer overlaid with a firmer one. I use some folded tea-towels overlaid with some newspaper. Utilise the end pieces (***part G***) or use the jig provided by ***part S*** on the roof fret to check how far the tumblehome curves and check to see that this is consistent down the whole length of the side.
14. Thereafter, fold over the stiffener to the base and head of the side pieces. To ensure that the former folded correctly and to make the forming of the tumble home easier, it is necessary to weaken this slightly by scribing the inside of the halve etched line with a knife to increase the depth of the line with a couple of firm scores (no more). Prior to actually completing the fold, check that the half etch line has a cut to it along its entire length as it is important that this fold evenly along its length so as not to distort the sides. Use bending bars to form the fold and once complete stiffen it with a fillet of solder but take care not to fill the slots that receive the door droplight inner laminates to the top stiffener..
15. The version with cupboard doors and the guard's doors to both versions have droplight sections complete with the door hinges that should be folded over and then inserted in the slots to the sides. It pays not to reinforce the folds in advance of doing this as these are very sensitive to exactly how far they are folded over so need a little wiggling to get them into the holes. The droplights come either with the droplights lowered (***parts J1 & L1***) or with them raised (***parts J2 & L2***) to enable you to decide how you wish to model your vehicle. Once in place solder to secure. Note that the single door droplights are handed and the lowered versions will need a third hinge to be formed by a bit of scrap etch.

16. At this stage, do not fit either the handrails, fixing nuts or the guard's lookout ducket.

Body Sides - Sliding Door Version

17. Form the tumblehome and the head and base stiffeners as noted at stages 12 & 13 above. Do not form the additional handrail holes as noted at stage 9 as the sliding door version did not have them.
18. If you are selecting the vehicles with sliding doors, then only the single door (***part J1 or J2*** - depending if you want a lowered droplight) – needs to have the droplights fitted.
19. Thereafter, laminate the sliding door ironwork (***part P***) to each of the sliding doors ***(part O***) – this is best done prior to the fixing of the doors in place. The sliding doors did not have a tumblehome but please note that they are handed, so make sure you reflect this in the assembly of laminates.

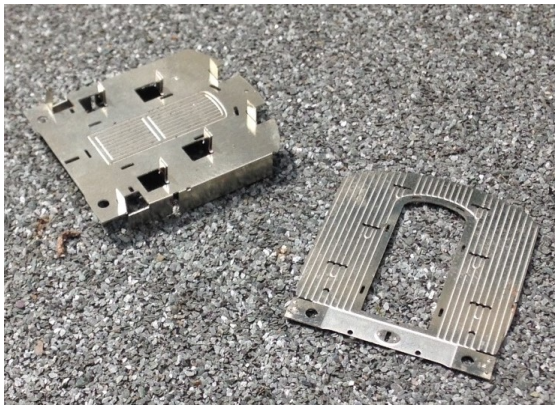
20. Prior to fitting the door, it is necessary to remove some of the body side with a piercing saw where it is visible behind the window of the sliding door. This is sized 18mm by 3mm and starts 1mm below the fold line of the top stiffener. Use the door assembly as a means to determine the size of hole required – the sliding door is centred on the same position as the cupboard doors and is nearly tight to the underside of the roof (use the photograph at p.111 of Highland Carriages & Wagons to see how the window cills relate to each other as a guide). Note, do not remove the remainder of the side in this vicinity as its retention will aid strength of the vehicle.



21. The lower door runner (***part Q***) is set tight to the base of the body side underside of the door s and needs to be set out such that one end matches the door closed position so use the door to locate this. The door should be centrally and slightly overlapping the cupboard doors. The upper door runner is fitted in the same manner. Once these are correctly located, secure the door first and then the runner. The top runner can then be fixed in the same manner.

22. The holes for the handrails are etched through on the door but the holes will not exist below so need to be drilled through.

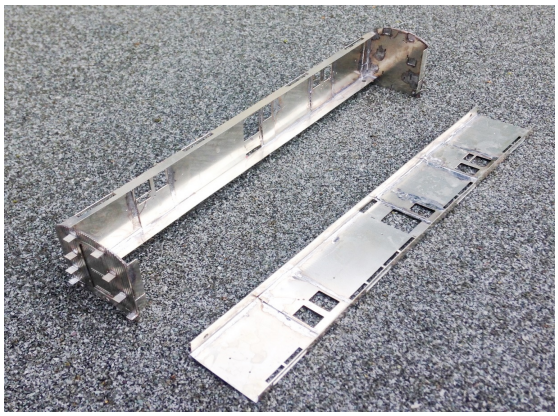
Body Ends and Assembly



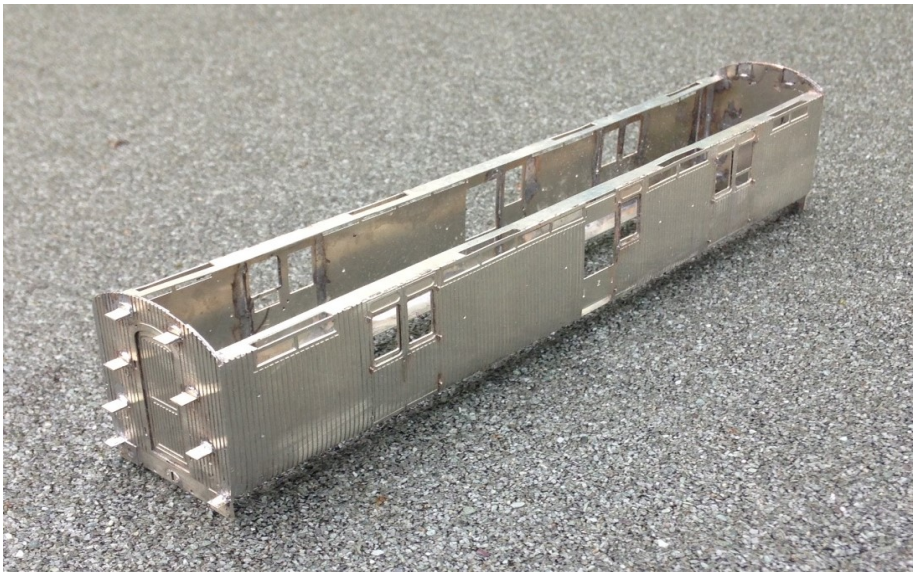
23. Release the end pieces outer (***part G***) from the fret and the components secured to it. Push through the rivet heads to the drawbar plate and the headstock.
24. Repeat for the end pieces inner (***part H***). Also fold the footstep support pieces that project out from the face and the side support tabs so that they project inward. Tin both parts but take care not to allow the solder to yet get onto the fold lines of any of the folded down parts as it is easier to leave them with a bit of flexibility for the next stage.
25. Now slot the outer end over the footstep supports and mate the two parts up. Sweat the tinned solder sides and at this point it pays to reinforce the fold lines of both the side tabs and, particularly, around the footstep supports with additional solder. Take care to ensure that both parts are firmly soldered together and tight to one and the other. Affix all but the lower two footsteps (***part I***) on their supports; leave the lower ones, the lamp irons and all of the corridor connection parts until the ends have been assembled to the sides.
26. Before the final assembly, you need to decide how many pipe connections that you will be fitting. These were fitted with steam heating pipes for a period, but lost these on occasions and when they entered departmental service they probably lost the vacuum pipes too. Holes are etched through on the inner ends

for both and it is necessary to drill through the outer the number of holes you will need – it is much easier to do this before the ends are assembled even though the fitting of the actual pipes comes later.

27. Now offer the first end onto a side – the ends sit inside the extremity of the sides. The stiffening pieces to the end should be just too tight – by 0.2mm - to slip between the top and bottom stiffeners to the sides. Offer them up and determine whether a little needs to be filed from the top of the support of the bottom to ensure that the base lines up between the side and end – file away as appropriate. Secure the end piece to the side – the side should sit outside of the end - by tacking to the stiffeners in the first instance and soldering secure when you are certain they are correctly located.



28. Once assembled, the slightly too long sides will require filing back to be flush with the end pieces but will provide a truly square and “solid” corner. Repeat this for all of the side/end joints and the basic body should look like this.



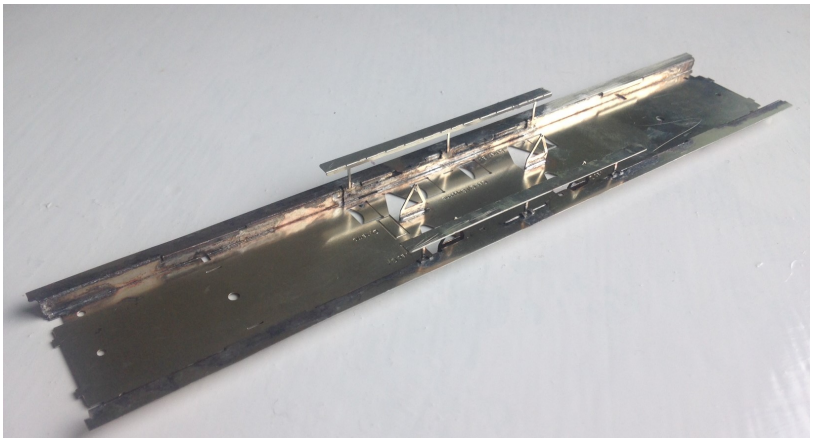
29. To the inside of the buffer beams the buffer beam inner reinforcement pieces can be added (***part R***) note these are handed to reflect the slight dip on the underside of the buffer beam. The laminated pieces will then need filing flush to avoid the layers being visible.
30. 10 BA nuts can be fitted over the holes to the bottom stiffeners, the nut being on the upper face.

Basic Underframe Construction

31. Take the main underframe base (***part A***) and with bending bars bend the solebar inner pieces through 90º (remember the half etch is on the inside). At this stage, do not fold up any of the other detail from the underframe – particularly the tabs at the bogie centres nor put a fillet of solder in the fold line.
32. The solebar outer (***part B***) is laminated to the outside of the inners. Tin both parts and offer them up to each other – the bottom is the face with the rebates in it and take care to get this correctly located and when happy sweat them together. It is best to do this from the centre and work progressively outwards. Now check that it fits inside the body headstocks – it is designed to be too tight, so it is likely that a little easing

with a file will be required. The underframe is secured to the body by 4no 10 BA bolts and should lock tight to the body floor with the solebars flush with the bottom of the buffer beam.

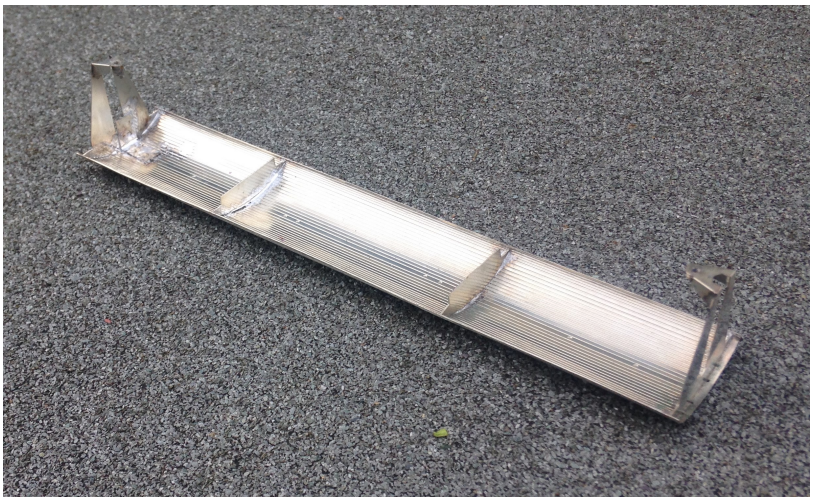
33. The top footboards (***part C***) have some fold over tabs that fit over rebates at the base of the solebar that are designed for them. The tabs with holes, however, are not, folded over and are left projecting into the interior of the underframe slightly. These are designed to be tight over the buffer beams and therefore another test fit is required and a little filed away so that the footsteps slip over the buffer beams.
34. The lower footboards went through many changes in form over the life of the coaches. Originally, they were the full width of the space between the bogies but the footboards to most (possibly all) had their footboards cut down to half-length and at least one had nothing more than a two foot length below the guard's door. Most (again possibly all) had most of the footboards on the bogies removed too. The kit only has the full length lower footboards included so if an alternative is required it will be necessary to cut these back to the desired length.
35. The footboards (***part BB***) have a fold to make to delineate the footboard from its toeboard which needs folding bars or a "hold & fold" to easily form (this fold can be eased by scoring the fold line with a knife prior to folding). The piece then has tabs that engage in slots in the underside of the underframe base to locate them and one in can be soldered in place tight against the solebar inner. If the shortened footboards are to be modelled, it is best to cut these to length prior to assembly and an additional stanchion may need (depending on how short the footstep board is to be) to be formed with a piece of scrap etch. If the shortened footboards are being modelled, they are best strengthened by soldering a piece of 0.35 wire on the inside and folded over onto the underside of the footboard itself.



36. NB: it is important to install the lower footsteps before the installation of the straining rod; so don't jump to this section before completing the predecessor. The straining truss rods are formed of 0.6mm wire which has a pair of queen posts added. The queen posts (***part K***) are wrapped over the truss wires with the half-etched side to the inside of the bend. However, before these are affixed in place slip a 3mm length of thin wall tube over and solder it in the centre of the straining rod to represent the turnbuckle used to tighten the assembly. Wrap the queen posts around the straining rod and offer it up to the underframe to set the posts to the right spacing. Once happy, close the ends of the queen post wrapper and secure with solder – use a high melt to prevent them separating later in the process of fixing them. Check the spacing of the queen posts again (it is difficult to get this right first time) and the truss wire such that they coincide with the holes in the tabs that project from the upper footstep and then make two gentle bends in the wire to form the shape that matches the drawing.
37. Once happy, slot the queen posts in the holes and solder both these and the free ends of the truss wire to the inside of the solebar. The bases of the queen posts are then reinforced with an additional laminate (***part CC***) to represent their fixing plate.

Roof

38. I have not managed to find a preformed roof for this vehicle as it is a little narrower than most coaches but if you do find one it is worth using it as forming the roof is likely to be the most challenging part of this kit due to the various different radii of curves. To try and assist, the underside of the roof (***part AA***) has a series of half etch grooves to it. These have the effect of easing the bending process but does leave very slight lines on the top surface – thus once the shape has been formed it is necessary to file the top surface to get a smooth curve. The lines are very minor and this is not difficult or time consuming.
39. The best way I have found to form the curves of the roof is not to attempt to anneal or soften the metal at all. Instead, use rolling bars or a rolling pin to form the main curved sections to the centre of the roof. The extremities are much sharper in curve than the central section and need to be clamped in a "hold and fold" to bend these over. Use the roof mid or end profiles (***parts X & Y***) as a template to check the curves as you make them. The end result will have ridges on it and these are then filed back to achieve a smooth top surface.
40. The mid cross braces (***part X***) are then soldered into place – there is no particular location for these to be located except that they should miss clashing with any of the windows, duckets or roof fitting locations.
41. The end cross braces (***part Y***) and securing mount is then folded up and, importantly for these parts, stiffened with a bead of solder. 10 BA nuts can then be soldered to the top surface of these and subsequently a tap run through to ensure that the thread remains free. They can then be secured to the ends of the roof by first tacking them into place to ensure that they are in the correct location before finally fitting them.
42. Now that the basic shells of the three main components of the model – the underframe, the body and the roof - are formed, it is sensible to have a trial assembly to ensure that they all go together. In particular, check that the roof is held snug against the sides (I hate seeing a gap as it destroys the illusion of the model instantly!).



43. Thereafter, the rain strips are formed with 0.5mm brass or nickel silver rod. It takes some care to set this out neatly but it is best to start at the centre, getting the location of this correct and then to work outwards, 10mm or so at a time (definitely to not make the gaps very large as the wire expands as it is heated to solder and will distort). The centre of the arc is 6mm from the edge of the roof and it comes down to 2mm at the ends. Once it is in place and secured properly with solder along its entire length, file the top surface flat and clean up the solder joints – it will then look as if it is part of the roof.

44. The holes for the roof vents can be formed - these are marked “V” on the underside of the etch, do not drill out those marked “G” unless you are making the gas lit version. The size of the hole will need to be determined by the form of ventilator you are using.
45. The final stage of the roof is to solder in place the grab handles to the ends (0.35mm wire) and the roof vents.

Supplementary Roof Elements for the Gas Lit Version

46. As I have not been able to find any pictures that show the gas lit version of this vehicle, where the gas lights go is simply guesswork and the locations shown have been derived from the relatively similar dia 50 full brakes. Therefore, to construct the roof for a gas lit versions, proceed as noted above but in addition to forming the holes for the ventilators, also drill out the holes for the gas lamps that are marked “G” on the underside of the roof piece. Size to suit the version of the gas lamps you have selected and fit these.
47. I cannot confirm whether the gas feed pipes were routed on the surface of the roof or below but it seems likely to be above. If you believe it is the former, then you can run some fine wire across the roof with short spurs to each fitting – it does look atmospheric if you do this – see this Casserley picture http://tour-scotland-photographs.blogspot.co.uk/2015/05/old-photograph-railway-station_21.html

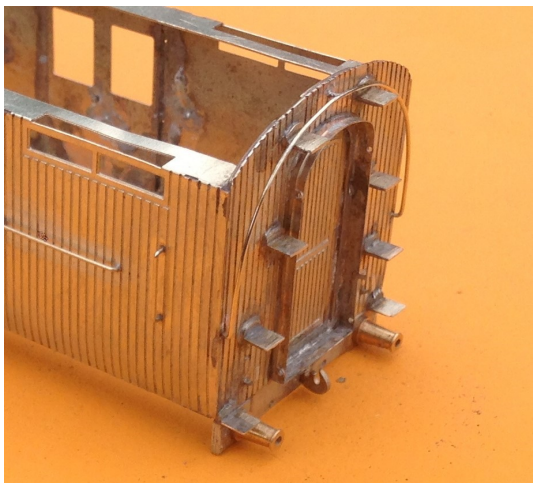
Guards Lookout Duckets & Body Detailing

48. Once the basic assembly of the body and roof has been completed the guards duckets can be fitted utilising the side pieces (***part M***) whose tabs slide into the slots in the sides – take care to get these properly perpendicular to the body sides or the fronts will not fit properly. The sides with the small holes to the side go adjacent to the guard’s door, as the holes are for the handrail. Do a trail assembly before soldering as the tabs might need a tad of filing to get them to fit comfortably.
49. Thereafter there are a choice of three possible fronts – the flush ducket front (***part N1***) were replaced with timber planked fronts (***part N2***) in the late LMS era but for much of the HR era they had a cut out to take a lamp. If the early version with the cut out for the lamp is required, the base and side pieces on the main body side needs to be raised and secured with a fillet of solder. It was not possible to provide a front piece to the ducket with the cut out already formed as it makes the bending of the curves inconsistent. Thus, it is necessary to use part N1, form the various curves and then cut the cut out with a piecing saw.
50. The fronts need to be pre-bent before fitting, the sharp curves to the top of part N1 have half etched lines to the rear face to assist and it is best to start at this face. Use straight edged pliers or a bending jig to ease the curves into it; repeatedly checking against the side pieces to confirm that the right curves are being generated. The surface of the ducket front should be, at the very base of the ducket and the head, flush with the adjacent timbers so it may be necessary to easy the top and bottom stiffeners slightly to achieve this.

51. Thereafter, solder into place and ensure that there are no bends to the front face from the half-etched lines by filing any bumps. If the later version is to be used, the process is the same but the etched lines go on the outside to represent the plank lines.
52. The front pieces in both instances are made fractionally too wide and a bit more too tall to enable them to be filed back flush with the sides once fitted but before fitting them check that they sit neatly into the rebates as the top/bottom of the coach sides, trimming back slightly if necessary.

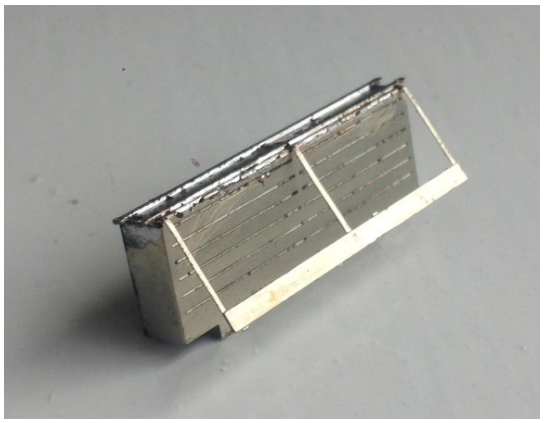
53. If the early version with the cut out for the lamp is required, then the base and sides to the cut out (***part II***) need to be introduced from behind and an internal cover to the cut out (***part JJ***) placed on top before the ducket front is fitted. It is not possible to provide the ducket fronts (***parts N1 or N2***) with this cut out as they do not fold so easily. Thus, repeat the forming of the curves and once happy, cut the whole for the cut out to suit. The base and sides will stick above this and once the cover is soldered in place, they can be filled back flush.
54. Once the duckets are in place, affix the handrail (from 0.4mm brass) on the side that will be next to the guard's door.
55. Once the duckets are in place, it is possible to install a stiffening across the top stiffener pieces to the sides to prevent the sides being crushed. This is not provided in the kit but can be formed with some scrap edge but take care not to fowl the location of the roof cross braces.
56. The arrangement of handrails varies both over life of these vehicles and also between the door styles. It is necessary to compare against available photographs to determine the right mix. The handrails to the doors and door handle are best formed with fine hard brass wire; I use 0.4mm – this allows you to scrape the paint off it to create a brass finish that these had (slip a piece of paper behind as you are doing so to protect the remaining paint). As none of the lining runs across the handrails, it is sensible to affix these now or they can be left until after painting, The equivalent handrails to the end and the longer handrails to the sides are best installed now and with nickle silver – this takes paint better than brass, This has a central post at the top that is first affixed and trimmed back to the right length and to which the main handrail needs to be soldered.
57. Lamp irons (***part Z***) are slotted through from the inside of the ends and solder into place. It is easier to do this with the arm projecting 90o through the end piece and only folding over the lamp irons once it is soldered into place.

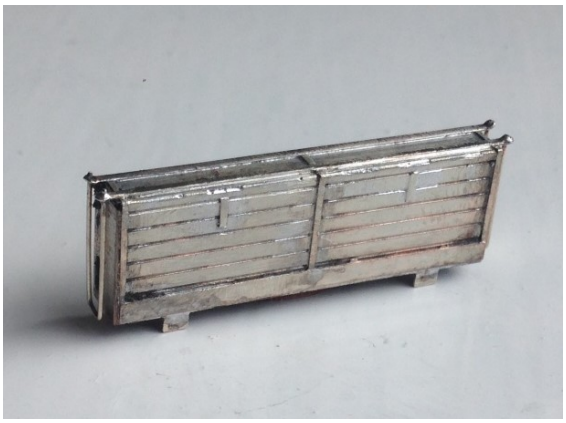
58. The buffers can now be affixed to the headstocks – I use Keen Maygib sprung buffers and the chassis has rebates to allow the springs to correctly operate. It is only after the fitting of the buffers that the last of the footsteps should be fitted.
59. The pipe connection fittings can now be fitted in the holes already formed; either with cast brass fittings or wire wound guitar wire. As the picture of the HR liveried version shows, there was a vacuum pipe that appeared to rise above the buffer beam (how I am not sure how as it would clash with the corridor connection!) and a steam heating pipe below. Latterly at least the steam heating was removed and I have modelled mine with the pipes both coming off and then below the buffer beam.



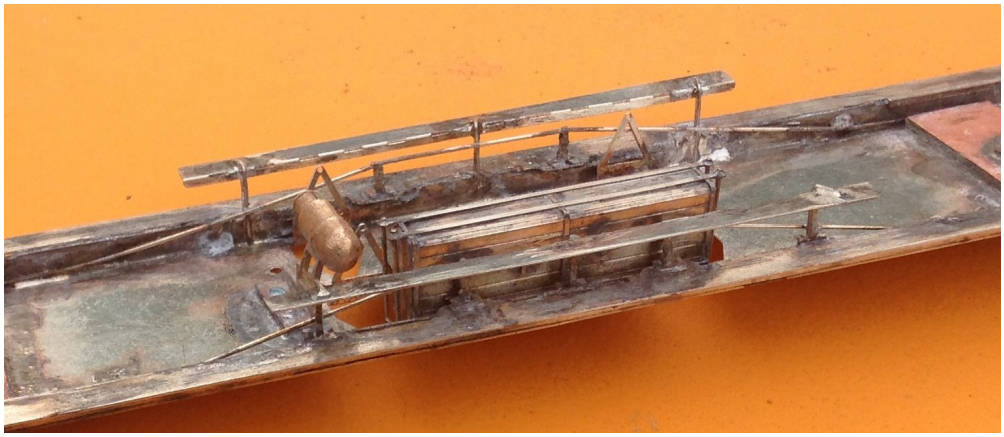
Underframe Detailing Electrical Lit Version

60. The coaches had more than one arrangement of battery boxes. The kit provides a single large box off centre but there were at least some that had a pair of battery boxes and one that had a single battery box centred. It is therefore possible to substitute what is provided with alternatives – check the photographs (so far as it is possible) for prototype details.
61. The battery box inner (***part D***) is provided as an etch that folds up into a box. Note that the front and rear are a little wider than the ends when they are folded down, so are designed to be filed back to make them square.
62. The battery box frame (***part E***) is a separate etch that wraps around the initial box, centred both to the front and sides. It is best to start by affixing the underside and get this correctly located before then folding down the front and soldering this in place (as shown in the left photograph). There are fasteners to the bottom of each side of the box and this can be made with a small offcut from the etch – use one of the half etch tags; approximately 2mm long. There are wire hangers to either end that are formed of 0.3mm wire bent into a U shape with the ends passed through the eyes in the frame and cut back once soldered in place. There are slots – in two possible locations - in the underframe for tabs in the battery box inner to help locate this.

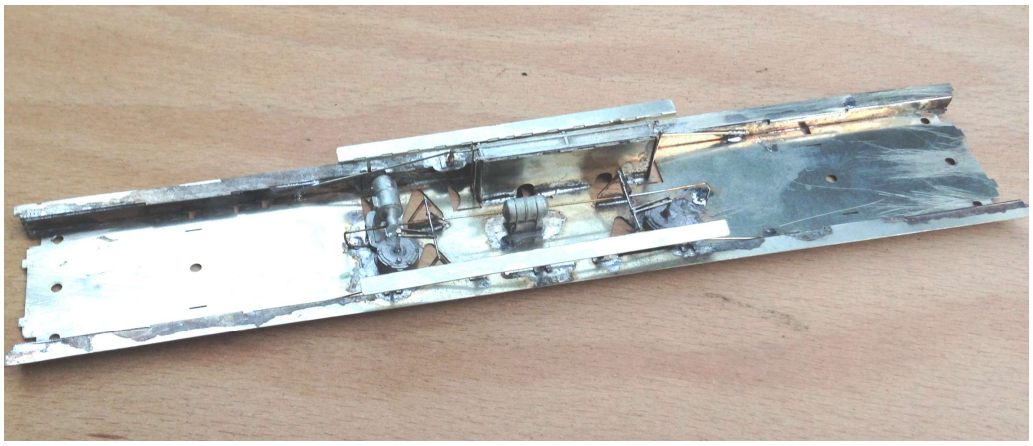




63. A dynamo is located in the position indicated by the half-etched rebate on the underframe pan. A representation of the drive belt leading to the wheel axle can be added with a scrap piece of etch if you wish but make sure it does not foul with the operation of the bogie.



64. The brake rods are supported on V hangers that fold out from the underframe pan and are formed of 0.6i"mm rod. Depending on whether the vacuum cylinders you are using has an actuating arm you may wish to use one pair of operating arms onto each of the brake rods but do not secure at this stage. Instead, first fit the vacuum cylinders to their mounting holes and then fit a plunger to the centre of these. Now offer up the first to operating arms (***part DD***) and secure in place such that they clasp the plunger at its head.
65. The remaining two operating arms (***part EE***) – the shorter ones - clasp the brake rods that run along the length of the underframe to each of the bogies. This rod is also formed of 0.7mm brass and it meets the brake compressor which goes centrally behind the battery box.



66. Although not there at the time of their initial construction, these coaches accumulated a pipe running down the side of the solebar (I think only to one side, but I am not certain of this). The location was typically underneath the solebar but it was also above the footboard on one occasion. This is formed with 0.8mm rod and the brackets (***part GG***) are wrapped around it and soldered to the rear of the solebar.

Underframe Amendments for the Gas Lit Version

67. The bulk of the underframe is constructed as described above but neither the battery box nor the dynamo are required and these stages should be skipped.
68. Instead a pair (probably, I have seen no photographic or drawing evidence to confirm this, there might have only been one) gas cylinders are located in approximately the same location as the battery box. A pair of supports for each is included as part of the etch underframe and are marked on it – these are folded through 90°. The gas cylinders can be made from 8mm brass tube or bar. The ends have a convex dishing

to them but are rebated into the ends a little which probably takes a lathe to form or the 51L GWR gas cylinders are a good representation of the same.

69. The cylinders are held in place with straps (***part FF***) that wrap around them and down the sides of the supports. There is a slightly enlarged whole to the underframe through which the straps can be passed through. It pays to secure one side in and solder it in place on the support, then offer up the cylinder and then wrap the strap around this and the other hole.

Corridor Connections

70. As built (at least some of) these were not provided with corridor connections, although the frame for the door was provided. Late on in life, and certainly by the time they were taken into departmental stock, they had lost the corridor connections. If you are modelling the coach in this period you will only need to infill the slots for the corridor connections and your coach is ready for its bogies and painting.
71. If you are going to model the corridor connections, then please see the separate instructions for the construction of these.

Bogies

72. There are also separate instruction sheets for the bogies.
73. As built the bogies had full length footboards, but over time these were often cut back to merely being at the extreme left end when viewed from the side.
74. As built, at least some of the coaches were not fitted with corridor connections but seem to be fitted with a frame in the coach end and door ready to receive them. It is thus presumed that they were fitted fairly soon after construction. Towards the end of their lives, these were removed in at least some cases.

Painting and Finishing Touches

75. See below for livery details.
76. There is a lot of debate as to what the correct colour references for the paints might be and I will be a little shy in getting fully locked into these but I use:
    a. Precision paints; dark highland green with a few drops of yellow in it;
    b. Precision paints; LMS crimson lake but again with a few drops of yellow in it

    It is fair to say, however, that these colours on the prototype were not completely colour fast so they will have changed over time and that is before it got covered in smoke and soot!

Livery

Item	*HR Livery*	*LMS Period I & II Livery*	*LMS Period III Livery*	*BR Livery*
Roof including lamp tops and ventilators	White lead; although this will have discoloured to a dirty black very quickly.	Grey between the rainstrips; black outside of these; although these will have discoloured to a dirty black very quickly.	Grey discolouring to a dirty black very quickly.	Grey discolouring to a dirty black very quickly.
Sides and ends	HR dark green Droplights were varnished mahogany.	Crimson Lake but the ends converted to black from 1936. Some may have had straw lining, single line around the main panels to the side – this is the LMS Non-Passenger Stock livery and the best guess of the arrangement is as the equivalent TPO shown on page 122 of Highland Carriages and Wagons.	Crimson Lake., black ends No lining	Maroon No lining
Lettering/ Insignia	HR and the vehicle number below on the ducket “LUGGAGE” to the left of the ducket, “GUARD” on the passenger door and “VAN” to the right of the door. There was no insignia.	Vehicle number to the right of the right luggage doors, “LMS” to the left of the left luggage doors. Some may have had rectangular panels below the luggage doors probably in grey. There was no insignia.	Vehicle number to the right of the right luggage doors, “LMS” to the left of the left luggage doors. Some may have had rectangular panels below the luggage doors probably in grey. There was no insignia.	Vehicle number to the right of the right luggage doors, with an “M” preffix Some had rectangular panels below the luggage doors probably in grey. There was no insignia.
Handrails & door handles	Door handles polished brass although this will have tarnished quickly; handrails either brass or black	Polished brass although this will have tarnished quickly	Polished brass door handles (although this will have tarnished quickly) and black painted handrails.	Polished brass door handles (although this will have tarnished quickly) and painted handrails.
End steps and handrails	Black; the handrail may have been white on some.	Black	Black	Black
Solebars	Black	Black	Black	Black
Buffer beams and buffer shanks	Green	Black	Black	Black
Below solebar ironwork	Black Builders plate in black with white lettering.	Black Builders plate in black with white lettering.	Black Builders plate in black with white lettering.	Black Builders plate in black with white lettering.
Stepboards	Untreated wood but would discolour to close to black	Untreated wood but would discolour to close to black	Untreated wood but would discolour to close to black	Untreated wood but would discolour to close to black
Wheels	Black with white rims although this will have discoloured to a dirty black very quickly	Black	Black	Black
Lamps	Signal red.	The lamp rebate were infilled by the LMS era, any lamps were on the lamp irons to the ends and were white.	The lamp rebate were infilled by the LMS era, any lamps were on the lamp irons to the ends and were white.	The lamp rebate were infilled by the LMS era, any lamps were on the lamp irons to the ends and were white.

Cupboard door version; with full footsteps

Sliding door version; with full footsteps and cut out for a lamp on the ducket

The former now painted in LMS livery.

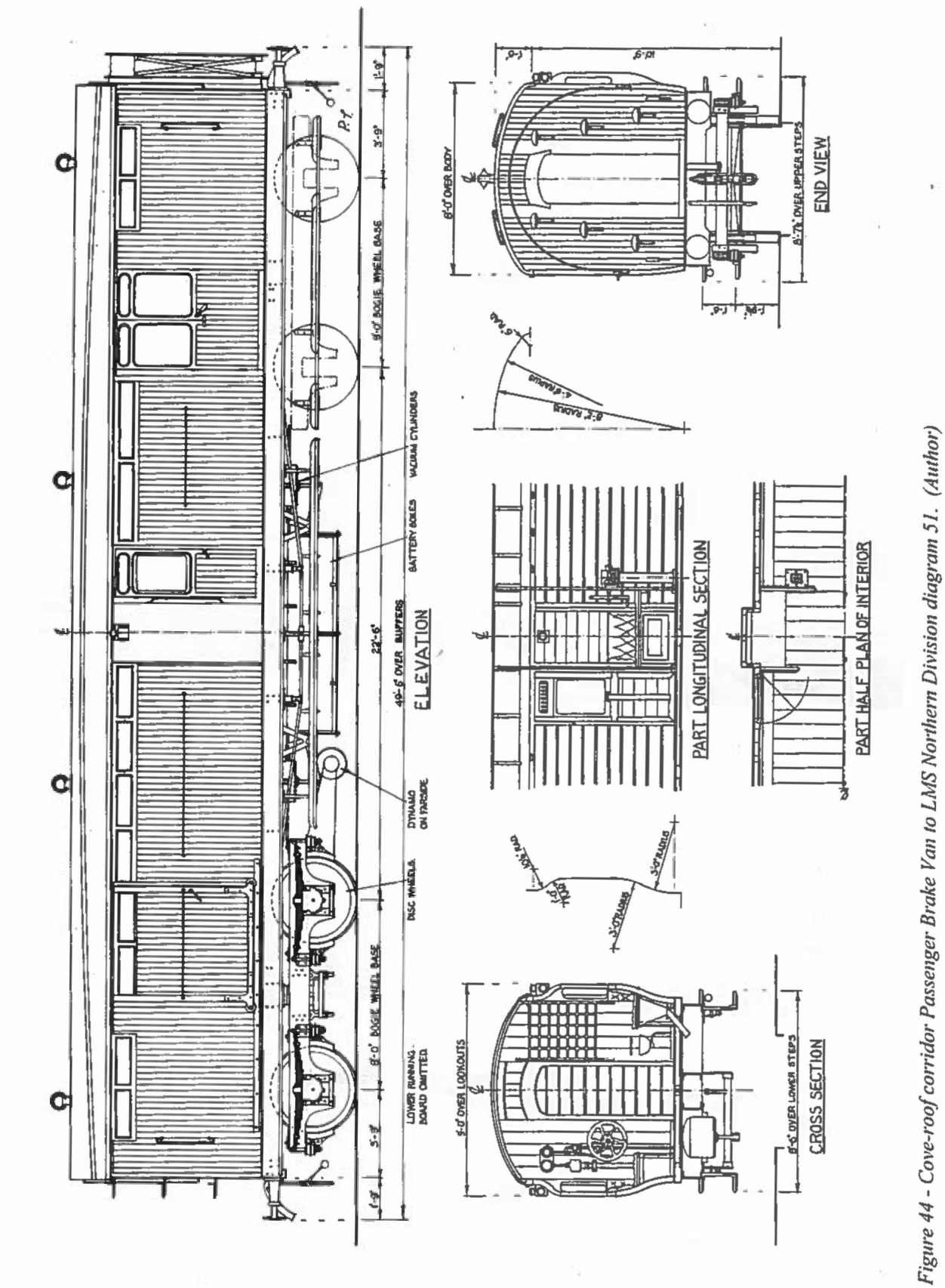
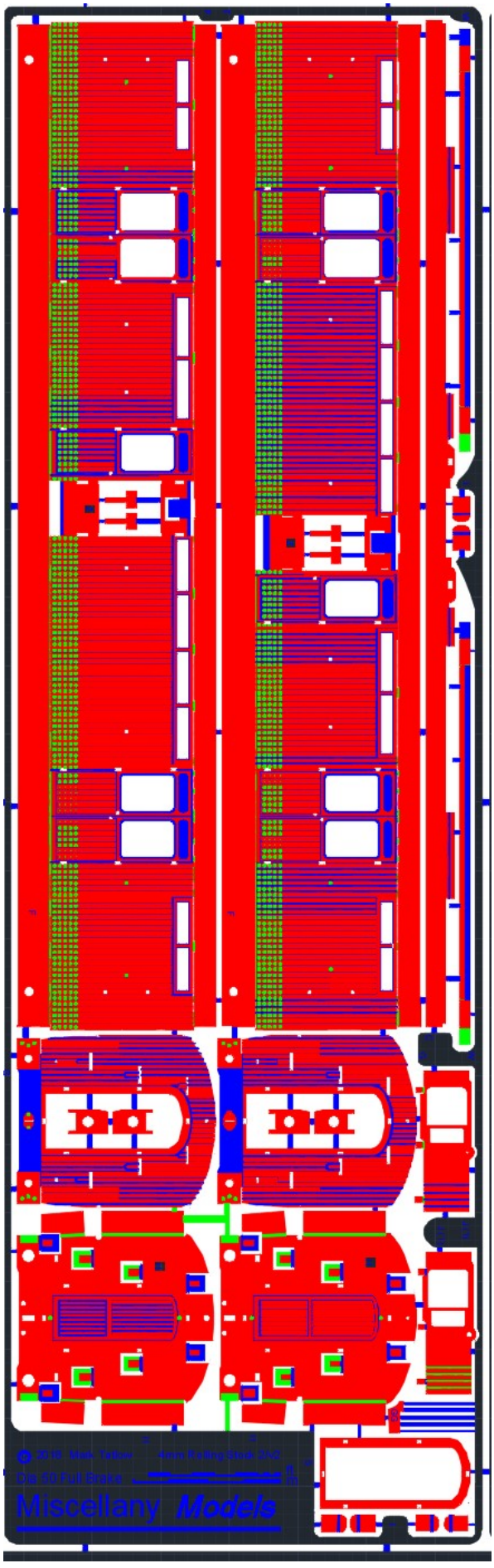
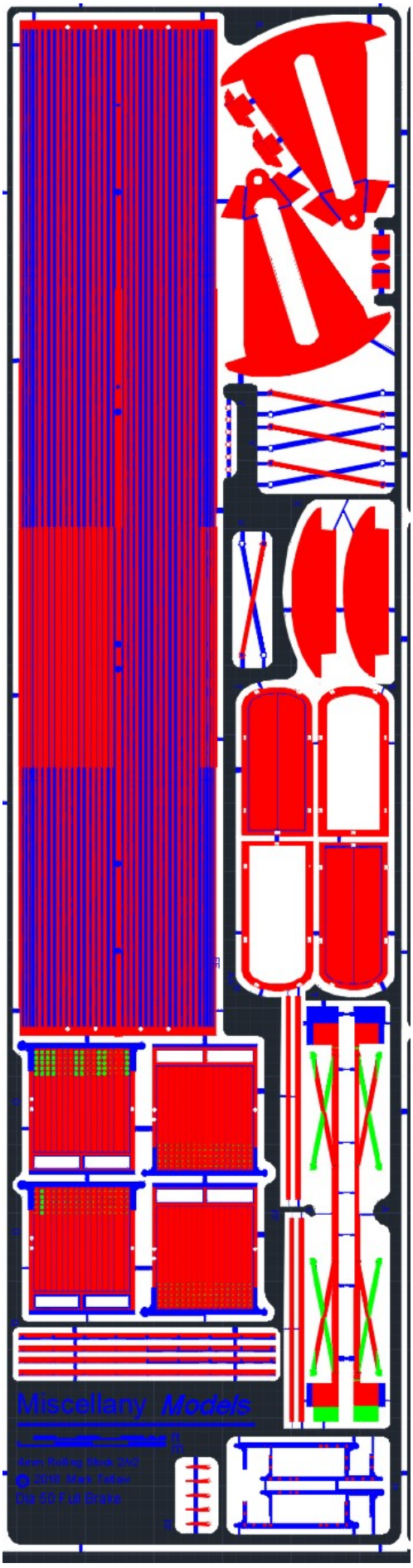


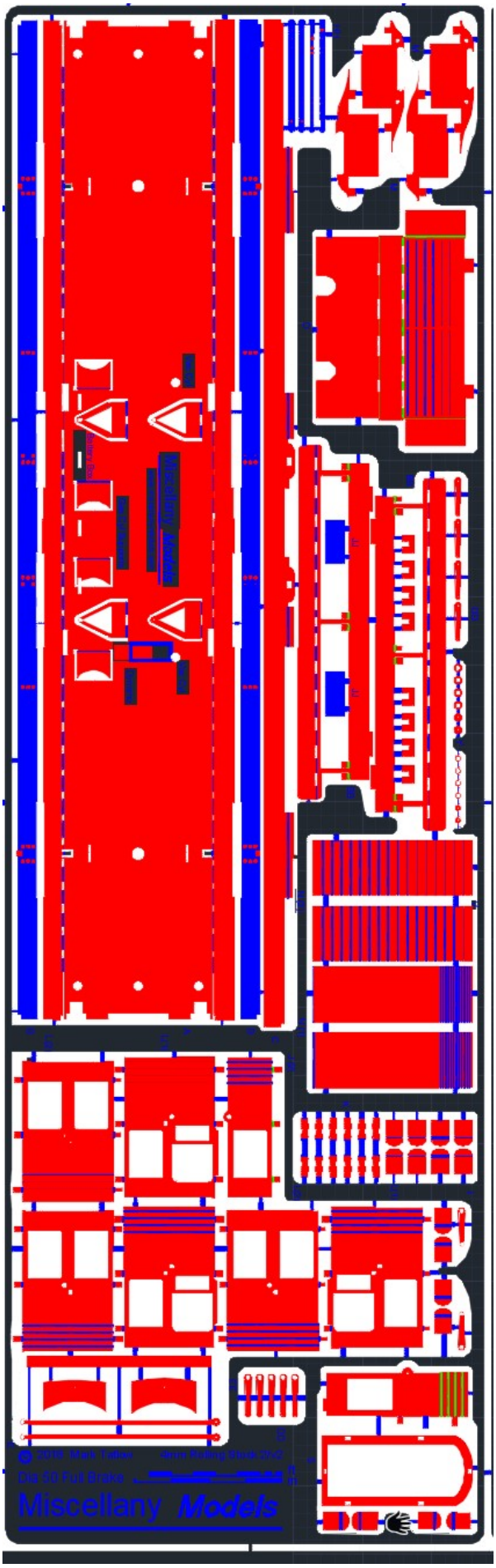
Figure 44 - Cove-roof corridor Passenger Brake Van to LMS Northern Division diagram 51. (Author)

Drawing not to scale.

NB, this drawing is slightly inaccurate as the ducket is not in reality central on the sides.


Miscellany Models


Miscellany Models


Miscellany Models