# BR Mk 1 assembly instructions.

**Introduction**

These instructions are a guide to assembling a Worsley Works BR Mk1 underframe and body. They were developed from the 3mm fret but should be applicable to other scales.

The assembly of a Worsley Works coach are based on those from Comet coaches, so I would refer readers to www.cometmodels.co.uk.

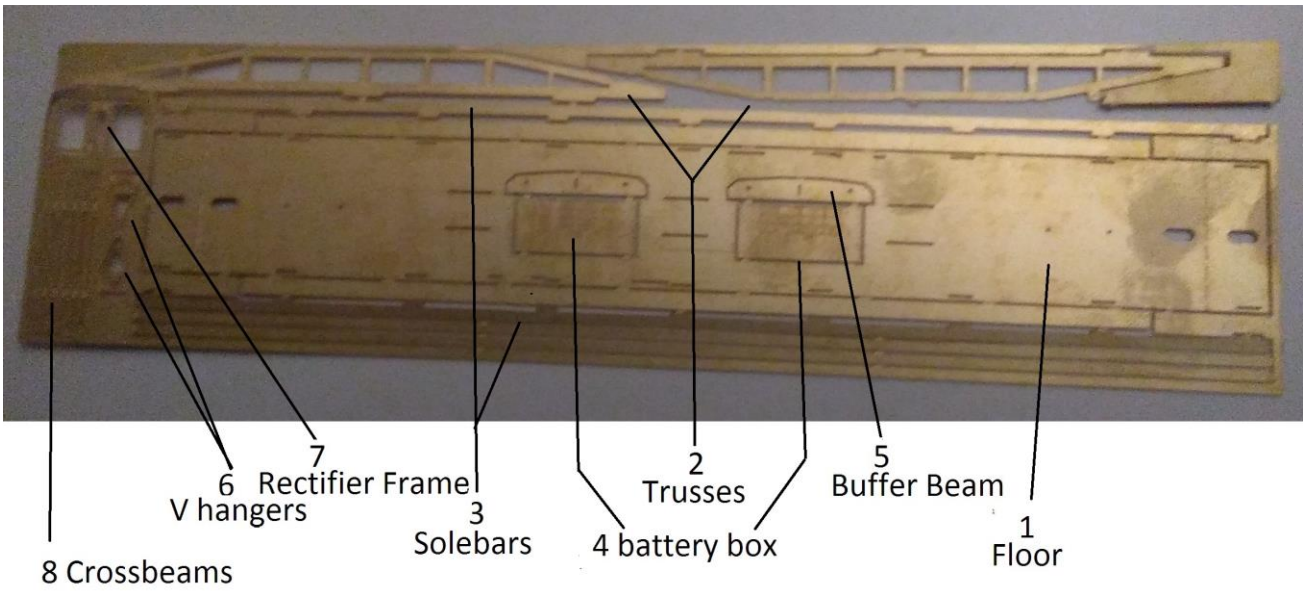
The assembly is based on personal experience on building several BR Mk 1's.

150°C solder is recommended however normal electrical solder can be used. Carrs green label flux (1M Phosphoric Acid) or Yorkshire flux can be used to make solder flow. A 25W soldering iron with a flat tip provides good results. Ensure the tip is clean and flat and not badly pitted. Most tips can be filed flat but will then need to be wetted with solder. A tip tinning compound is best used for this. It is expensive (£7-8) but will last a long time.

**Identifying parts**

There are 2 main frets supplied in an underframe kit. Sometimes there is a very small 3rd etch containing just 2 parts which are handrail supports

Main Fret

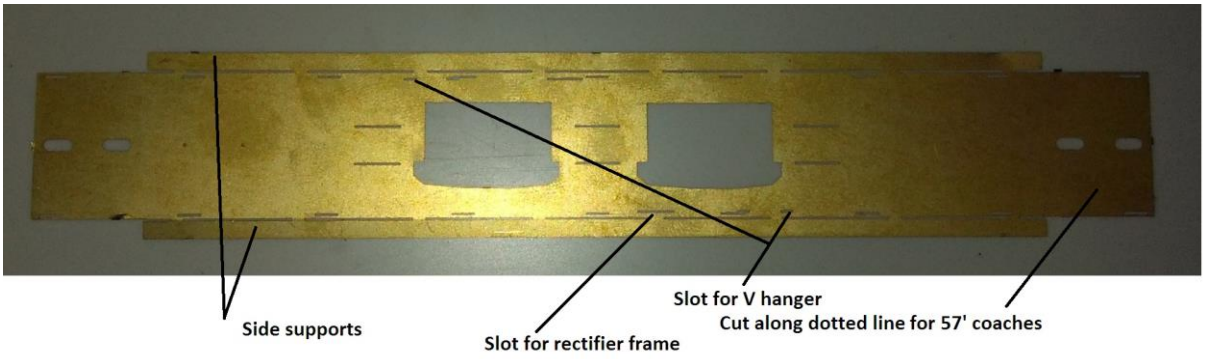



There are 2 different sized cross beams on the fret which will be described later during assembly.

**Assembly**

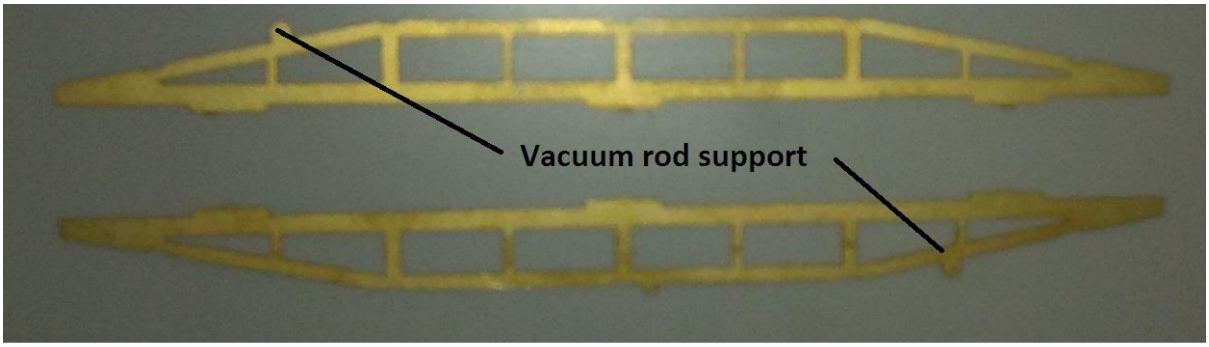
Cut the floor (1) from the fret taking care not to cut off the side supports.

For 57’ coaches cut off the ends of the floor at the dotted line




Bend the side supports up so that the half etch is on the inside.

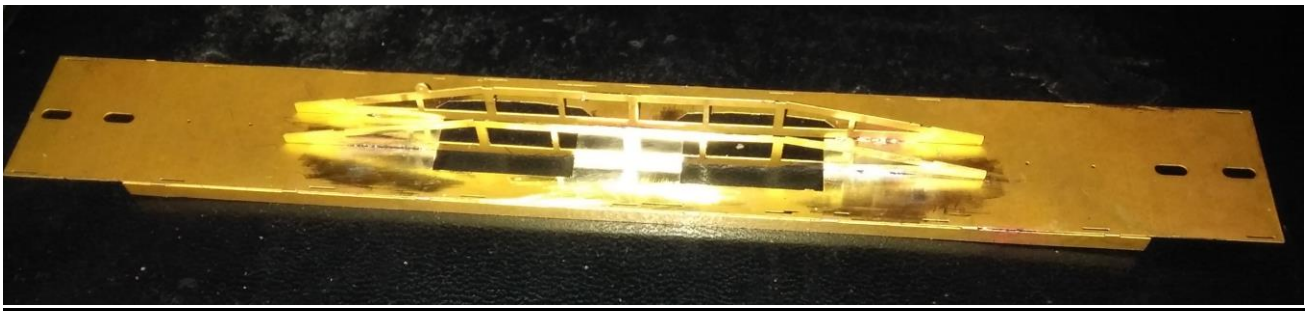
Cut the trusses from the fret. They are identical but fitted the opposite way round.



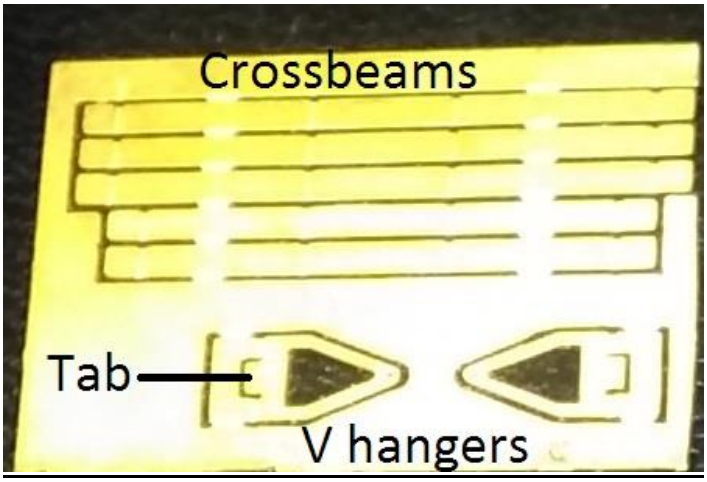

The vacuum rods are made from 0.5mm brass rod (not supplied) so the vacuum rod support bracket on the trusses will need to be opened out, either with a drill or needle file.

Turn the floor over so the coach side supports are at bottom. To the flat floor slot each truss (2) into the row of 3 large slots that are either side of the floor center. **Make sure the vacuum rod support is at the correct end.** As the V hangers are normally on the left side of the coach, the rod support on the truss fitted on the top row of slots should be on the left. The truss fitted to the bottom row should be on the right. The V hanger slot should act as a guide. Turn the floor over and solder each truss into place. I you flux both the top and the bottom of the floor the solder should run down and fix the trusses to the underneath of the floor as well. Fix just a small part of one tab first and then check the truss is at 90°. Adjust if needed. Solder other end and again check for squareness. Then solder middle tab along its length and the re-solder the end tabs along their full length.

Repeat for second truss ensuring rod support is at correct end i.e. at opposite end to the other support and in line with V hanger slot.



Underfloor details



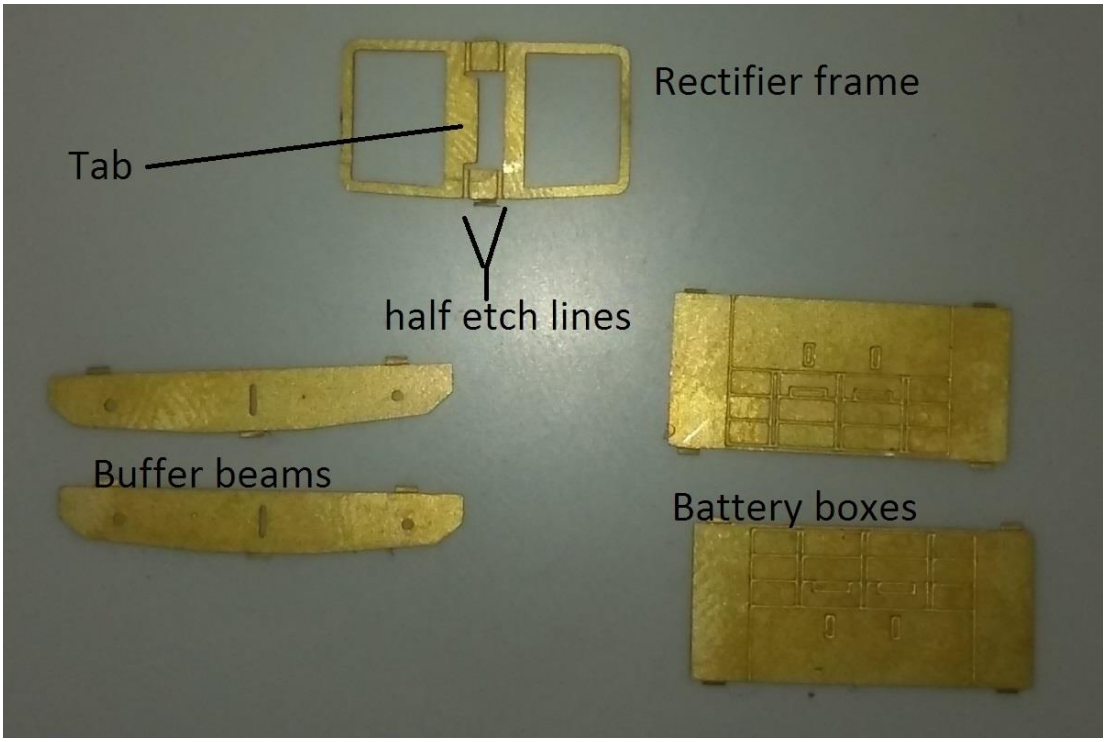

Bend V hanger (6) along half etched line. Insert small tab resulting on the V hanger base into slot on floor opposite rod support on the truss and turn floor over and solder from above in a similar way to trusses.
Insert the brass rod through the truss support, till it touches the V hanger, whilst holding in place, solder the end of the rod to the round bit on the V hanger. Cut the rod flush with the rod truss support and solder in place. You can file nearly flush with the truss if needed.
I reality the rod was bolted to the truss so it would not have been completely flush.
Fit the other V hanger in the same way

**Solebars**

Fit one of the solebars to the bottom edge of the floor in a similar way to the trusses. The tabs fit into slots along the edge of the floor and are soldered from the top. Again make sure it is at 90°
**The other solebar is fitted after the rectifier bracket**

The rectifier frame (7) is folded up along the etch lines and the small tab (similar to the V hangers) is fitted into the slot half way along the edge of the floor. There is typically only one rectifier bracket fitted on most Mk1's. However you will need to check the prototype.

The only exceptions may be buffet and kitchen cars which are also fitted with a lot of other underframe equipment.




Underframe with V hangers and rectifier frame fitted

The second solebar is now fitted in front of the V hanger and rectifier frame in the slots seen above of the front edge of the floor.

The battery boxes are folded up, the half etched lines on either side this time are on the outside.

The battery boxes are soldered to the underside of the floor. Position should be judged from the prototype, but for most BR Mk1's about 2mm to the left of the central truss support and next to the solebar seems to be about right.

The buffer beams are fitted centrally across the ends of the solebars with the top of the buffer beam in line with the bottom of the floor. This leaves a small recess above the buffer beam and the end of the floor visible.

Other underframe details are not included with the etch but may be required. These include alternators, vacuum cylinders with their levers rectifiers and gas cylinders. For 3mm these are available from 3mm society.
Air and propane cylinders can be made from discarded plastic sprues.
To solder white metal to brass first tin the bras with your normal solder. To solder the white metal component like a vacuum cylinder to the floor then you will need a temperature controlled soldering iron and some white metal low temp solder. A simple controller can be made for your existing iron can be made using a light dimmer switch attached to a 13amp socket mounted on a board of plywood MDF or similar material. The dimmer switch has a cable and 13amp plug wired into it for plugging into the mains socket. Plug your iron into the socket and adjust the dimmer switch until the white metal solder just melts; this should be around 70°C. You can mark this position for future use.

Coach ends.

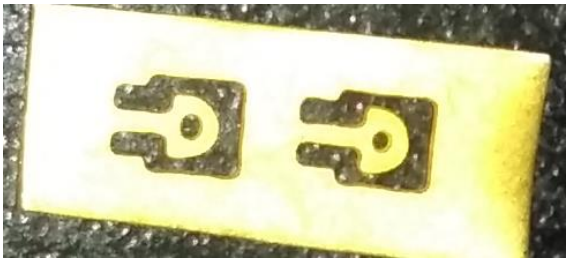
The coach ends are on a separate fret along with their supports and footsteps. There were 2 types of footsteps fitted to Mk1's so refer to prototype for the correct type. Steps were generally fitted at just one end which had the water tank filler but again some coaches may have had steps at both ends particularly kitchen cars.

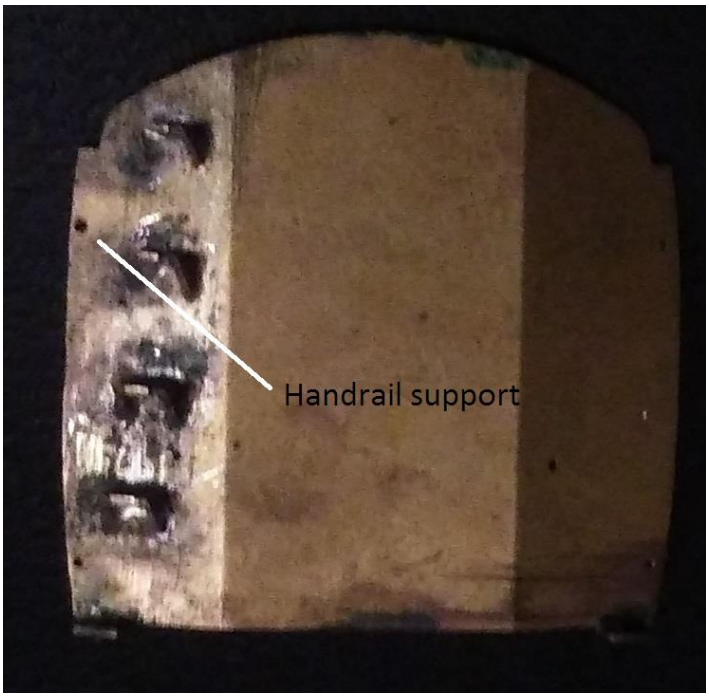
If using steps with support brackets then bend the brackets so the half etch is on the inside.

Drill out the 4 half etched dots on an end using a 0.4mm drill and clean any resulting burrs. Flux both sides of the hole and fit the tab on the step through the hole and solder from the back. Again solder will come through to front and run along sides of step to provide a secure fixing. Any excess solder can be cleaned up using a blade.

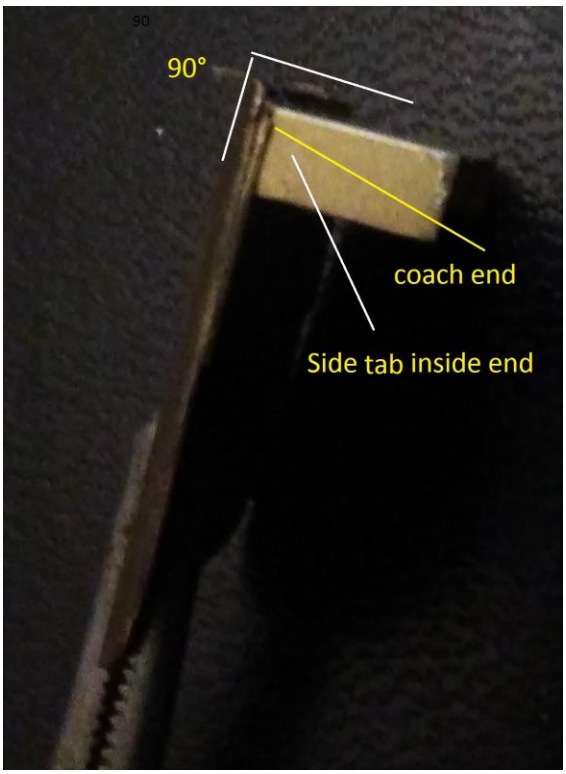
In some kits you may find a small auxillary etch containing 2 handrail brackets one of these is soldered in place on the left hand upper edge of the side in the etched hole.

The lower etched hole is for the end of the handrail which can be made from 0.35mm brass or phosphor bronze wire.

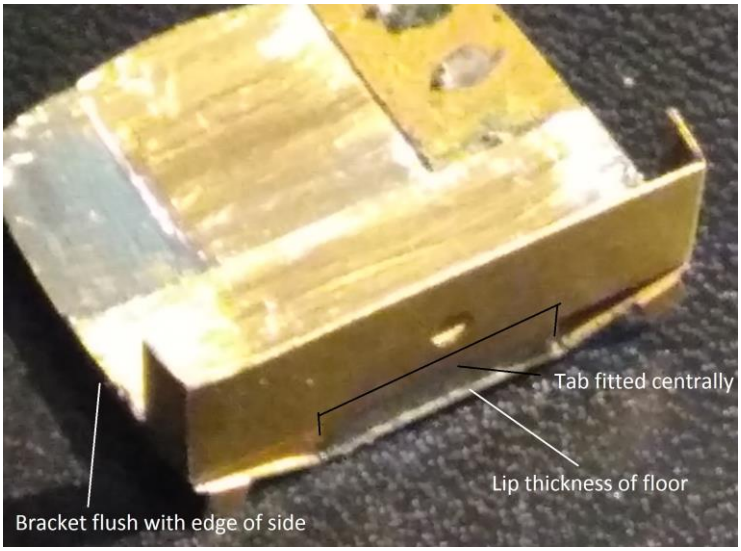




The coach end support brackets are fixed to the inside of the coach ends and help form the end profile and fit also to the coach side.
Bend up the coach support brackets with the etch lines inside. 2 tabs should be created that will be soldered to the ends. 2 small tabs are also folded up but before doing this file the edges so they fit inside the ends and they are at 90° to the ends. These small tabs will be at a slight angle to fit against the curve of coach sides when assembled.



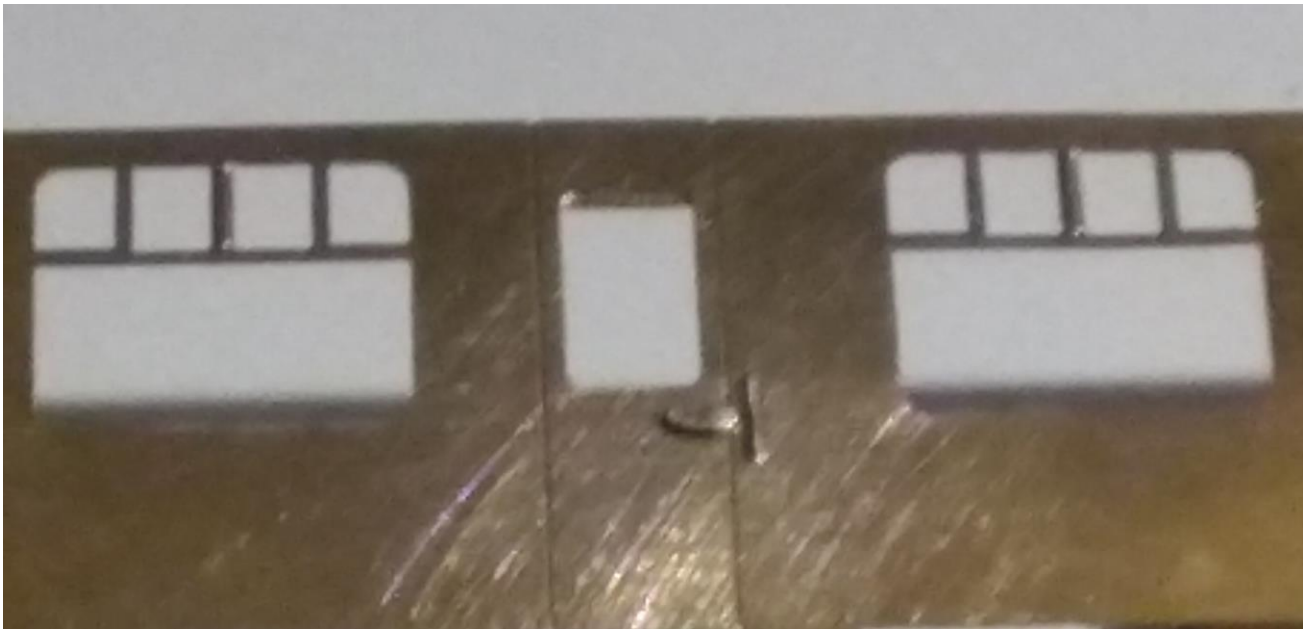

Bend the coach ends along the vertical support lines so the etch lines are inside the bend. They should be bent a little more than needed. Dry fit the end support brackets inside the coach ends so that the large tabs should be central and flush with the centre section of the end. The profiled sides of the bracket should be flush with the sides of the end. However this is usually not the fact.
Fit the bracket so that bottom of the end is proud of the bracket by the thickness of the floor>
Solder in place. Fill the etch lines of the side tabs with solder and solder the side tabs the the coach end of the bracket, making sure this joint is still 90 °
In practice the edge of the bracket will need a little filing.
One of the side tabs will also need filing along its bottom edge as the etch line was slightly too near the edge by a fraction of a mm. This is why you need to fill the inner etch line with solder.
Bolt an 8BA nut the end to the floor. Solder the nut to the bracket.
This will allow you to remove the floor at any time in the future.
Bend up the bottom step on the coach end and put a fillet of solder in to strengthen it.
If you flux the inside of the joint a tiny bit of solder should run along the joint by holding the iron vertically against the end of the step.




When finished the bracket should be flush with the outer edges of the end, so that when you fit the sides they also should be flush with the ends. The sides fit outside the ends.

Coach sides

Before fitting the coach sides they should be fitted out. Handrails can be made from thin wire. Try 0.3 or 0.35mm
The etched holes may need opening out with a small drill.
You may find buying a cheap pair of pliers and filing the nose of the jaws to the correct width to make consistent handrails quickly.
Door handles can also be made by bending wire double and then at 90 ° to form the stem. A little solder on the double bend followed by flattening with a file will give a representation of T handles. In larger gauges T handles are available as etches.



The sides are soldered to the ends so that the end of the side is flush with the coach end and the top of the side is flush with the step in the coach end just above the handrail support


Screw both ends to the floor

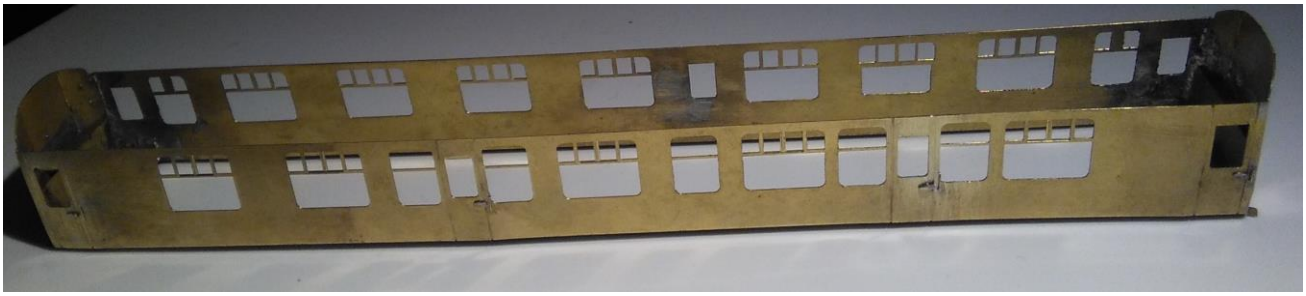
Using either blue tack or tape fix the other end of the side to the sole bar or the internal side support so that the side is parallel to the solebar.

Start by tacking the junction of the top of the side to the coach end and make sure everything is still square.

Solder the side tab on the coach end bracket to the coach side

Run solder down the joint of the tacked end between the side and the coach end. Again if fluxed then the solder should creep through the joint

Repeat the process at the other end and with the other side. You should now have a topless and bottomless
box.

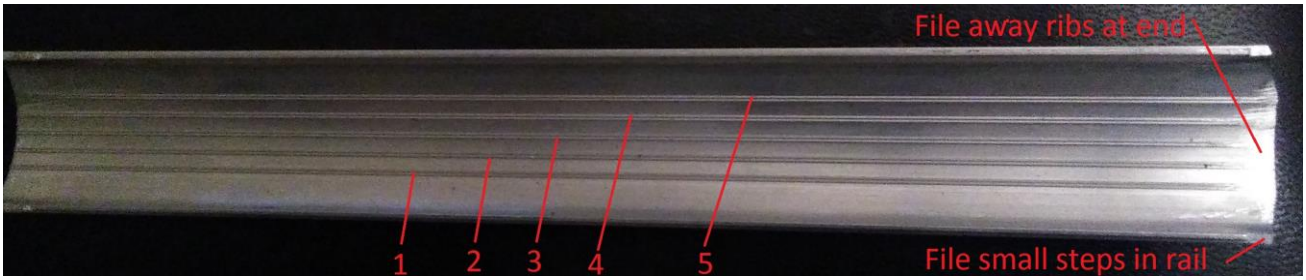


**Roof**

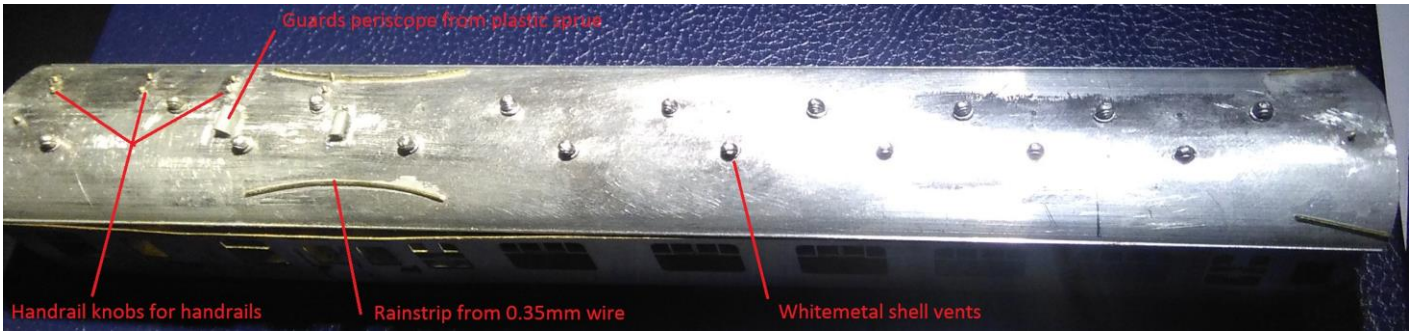
The roof section is extruded aluminium and has 5 pairs of moulded lines on the inside.

These lines act as guides for the positions of roof vents. Roof vents are not supplied in the kit but are available as cast whitemetal parts from different manufacturers.
Most Mk1's were fitted with torpedo vents but some had shell vents and depending on maintenance depot, shell vents may have been fitted.
Early Mk1's may have had transverse ribbing as per LMS practice but later Mk1's were ribless. Again this may have been a result of where they were built.
Refer to original photos if possible, although this can be notoriously difficult to find the correct one.
Ian Kirk coach kits come with a good diagram for most Mk 1's

Most vents will be along line pair 2 or 4




Most vents are on 1mm stems so you will need to drill holes in the correct places. Don't forget when you turn the roof over the vent ends up on the other side.
Vents can be glued into place but you may want to melt over the ends inside the roof aswell.
File away the vent guide lines at either end of the roof to allow the roof to fit flush with the end
File small steps in the roof rails to clear the coach end.




Rainstrips can be made from the same 0.35mm wire used for handrails and are superglued in place.
Guards periscopes can be made from waste plastic sprues filed to profile.
Other roof details like tank filler covers can also be made from sprues or plastic card.
Gas cylinders for underframe detailing can also be made these same materials.

Fix the roof to the coach body with tape and run a scriber along the coach end scribing a line on the overhanging underside of the roof. Cut and file to this line so that roof end is almost flush to the coach end.
When roof is filed and fitted it can be glued to the body using a flexible adhesive like UHU, Evostik or similar. Superglue and Araldite tend to be too brittle and tend to crack with body flexing.
When the roof is attached to the body it adds rigidty to both.

**Painting**

Before painting all grease dirt and flux needs to be removed. This can be achieved several ways.
Washing the assemblies in warm soapy water with an old toothbrush will remove any flux.
Burnishing with a brass bristle brush will remove both flux and surface grease and oxides.
A soft steel bristle brush can be also be used carefully and will put a slight scratched key in the metal. Cellulose thinners will remove any grease from assemblies.
Once clean do not handle wit bare fingers as you will undo your cleaning.

Bare metal is first painted with an etch primer. Try Halfords Etch primer in spray can to give a good finish.

| | |
|---|---|
| Roof grey | Humbrol Plastic Bumper primer |
| BR Maroon | Ford Damask Red or Vauxhall Burgundy Red |
| | Ford Burgundy Red or Triumph Damson |
| Custard (cream) | Vauxhall Sahara Beige, Vauxhall Gazelle Beige - Talbot Jonquil - Peugeot Antelope Beige(worn) |
| Blood | Ford Venetian red |
| Carmine | Ford Rosso Red - Vauxhall Carmine Red |

The red on blood and custard coaches tended to fade very quickly causing it to lighten and become less intense, and the cream became dirty and darker.

**Other parts required**

Mk1's were fitted with different bogies during their lifetime.

Early Mk1's 1957 -1960 had BR1 bogies

After 1960 they were fitted with Commonwealth bogies so unless re-bogied Blood and custard coaches would not be seen running on commonwealth bogies.

3mm society supply
Mk1 bogies
Corridor connections
Vacuum Cylinders
Alternators
Buffers

Couplings

Windows can be made from clear 5 thou styrene sheet or acrylic. Use UHU or evostik to fix in place to avoid fogging.

Card seating was produced by PECO but now may be available as a download file for printing your own.
http://www.airfixrailways.co.uk/PecoInt.htm

2nd class seating was blue and 1st was red
Partitions and inside floor can all be made from styrene sheet. On corridor coaches the partitions sat between each pair of windows and the corridor partition ran between the first and last of these. There were 3 small windows for each partition on the corridor wall. There were usually toilet compartments at either end
Open coaches had a double seat on the other side of the walkway. Partitions were at either end forming an entrance vestibule. Composite coaches had a partition separating 1st and 2nd class
There would also be a partition separating smoking from non-smoking.

Lining transfers are available

Black and Gold for Blood and custard and Gold black gold for Maroon just below the windows
The crest was typically in the centre of the side.