88D Models – Brecon & Merthyr 45 Class

This kit was designed to be assembled by modellers with varying skill levels. Were ever possible I've tried to provide an easy solution for the more difficult or tedious bits. The kit will produce a fine model but some of you will want to upgrade it by either substituting or even fabricating small extra details, a list of suggestions appears at the end.

A great deal of care has gone into designing this kit and I have "test" built one to ensure everything fits with the minimum of "fettling" by yourselves. Therefore when cleaning off the cusp left by etching - **remove only the cusps**, otherwise the parts will be undersize.

If you are an experienced modeller, then you won't need any help, however others might find these notes useful.

The main skill to master is soldering and the choice of soldering iron is endless, I have named some options under ***Suggested Tools*** below. Whichever make and model you choose you will need a selection of "bits". I get by with 3 - a small pointed one, a small chisel shaped one and lastly a large knife shaped one.

Soldering isn't a black art, you just need to know the rules and stick to them.

Make sure the surfaces to be soldered are clean. Use a glass fibre stick, scratch pen or very fine "wet & dry" paper to remove any oxidation, try to avoid tearing up the surface as it might show later. Preparation is very important on brass, even though it might look clean it still needs a clean, also the etching process can leave an invisible film.

Flux – avoid some of the varieties used by plumbers, they can be too powerful and more difficult to clean off, I use Duncan Models for almost everything. Keep a jar of clean water to hand and a small paint brush and when you have finished a section wash off the flux, it's far harder later. At the end of each model session thoroughly clean your model with a bit of washing up liquid and warm water. I often brush over with "ViaKal" and this both neutralises the acid flux and cleans your model.

Solder, I use 4 sorts. Rosen cored electrical solder for high temperature items i.e. fixing steps to the back plate. 190^0 for a more durable fixing, 145^0 everything else with exception of low melt for white metal items. I also have a separate iron for low melt solder as I find it can ruin the tips.

Use the solder sparingly; I can't stress enough the need to keep the model clean and tidy. If you inadvertently over apply the solder, drag the surplus out to an area where it can be removed with a craft knife and then buff up with a fibre glass pen. Always take the solder to the joint on the tip of the iron, don't feed it in.

It is important to keep the bit clean and in good condition as you work. Get a soldering iron stand containing a damp sponge as old oxidized solder is wiped off on this before picking up fresh solder for each joint. If you haven't made a joint for some time you may find that a hard black crust has formed on the bit. Remove this with a brass wire brush (suede brush) and then feed some multicore solder onto each side of the bit to restore a bright surface (referred to as wetting or tinning the bit). If you follow these rules you should achieve success. Practice on some scrap material to get your hand in first.

If you would like more details on soldering etc. go to Jim McGeown's - **Connoisseur Models site and follow the link "PDF print out sheets", he has taken a lot trouble to provide a wealth of information on how to build a kit.**

Kit guidelines

As this is a "multi-media" kit I recommend you read the instructions carefully before you begin and I list some pointers, sorry if I'm teaching you such eggs.

Don't cut parts from the etched sheets until you need them. Small items get lost or are difficult to identify.

Remove cusp from each part before assembly.

All etched fold lines are on the inside unless otherwise stated.

Some half etched holes are to be punched out as rivets, whereas other are to provide a centre hole to allow you to drill later, example: the outer tank sides need to be bent very close to the location of a handrail, if these were holes, the metal could crease at this point whilst bending.

Due the process of etching, the holes will most likely be a fraction under size. These will need to be carefully opened out and this is best done using tapered broaches or if you can afford it tapered reamers. Do it a little at a time, you can take more off but you can't put it back!

The plastic printed parts have a reasonably high melting point but is best to finally fix in place **after all the soldering is complete**.

Care is required when handling the printed parts. The can be very thin and small parts will not stand up to rough handling or being dropped onto a hard floor – I've been there! However once fitted to the model it won't be a problem.

Take the shine off the surface of plastic parts which are to be glued to give the adhesive a good grip.

Always tack solder parts to ensure they correctly fitted and then solder permanently.

I will point out in the instructions if an assembly step is **critical** to get right.

Damaged Parts and Shortages.

If you damage an etching during construction it may not be possible to replace individual pieces, but at a minimum cost replacement frets (one of the sheets as originally supplied) can be supplied, unless in stock 2-3 weeks turn around.

The printed parts may be easier to replace, some parts may be stock and therefore can be supplied. If they are to be ordered then to excessive carriage costs from the printers I would need add it to another order. This will inevitably lead to a delay in providing the part, as with an etched sheet, I will do it as cheaply as possible.

Castings aren't normally a problem as again they are normally in stock.

Items required to finish Kit

ABC Mini gearbox and motor (or alternative)

3 x Slater's 7860Q – 5' 0" wheels

1 x Slater's 7842 – 3' 6" bogie wheels

1 x Slater's 7157 plunger pickups

Number Plates (available at — http://www.88d.uk/pups/Number_Plates.asp)

Transfers

Paint

Only cut parts from fret as needed and read each instruction fully before commencement.

Do not fit any printed parts until soldering is complete, they have a relatively high melting point but better safe than sorry.

All pictures and more are available at http://www.88d.uk/pups/BM_45_Pictures.asp

The prototype differed from one loco to another and I would suggest you have a picture of your chosen loco before you start, some pictures are available at http://www.gwr813.org/gallerysw9.html.

Note! *Not all of the items on the etch maybe required to complete this model.*

A number of holes are marked but <u>not drilled</u>, you will need to decide which to do before assembly.

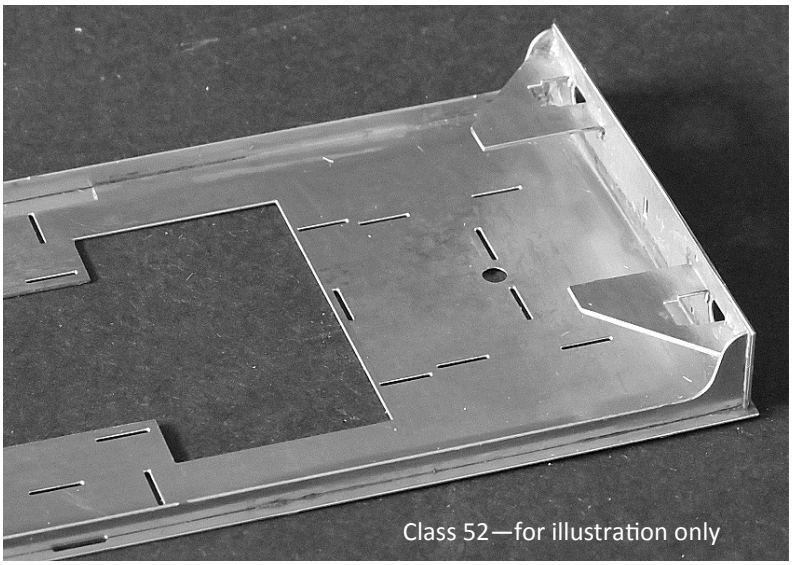
Some of the pictures are from previous kits, but will be almost identical to this model—marked "Illustration only".

Please Decide There are 2 ways to build this kit.

1) Solder everything together as per normal.

2) Make it in sections and screw it together at the end, this will make painting much easier

1) Remove (1) footplate and (2) valances from sheet, detach any parts within the footplate and store safely. Clean off the cusp from the footplate and valances taking care not to bend or distort the valances.



2) With footplate upside down, tack solder valances into grooves, equal distance from each end, ensure they remain at 90^0 to the footplate. When satisfied finish soldering and check again they at 90^0 to footplate.

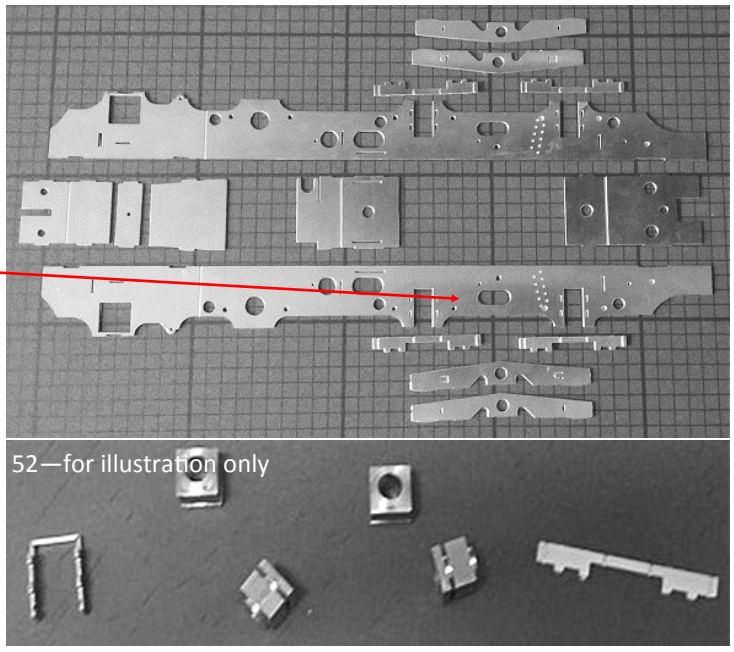
3) Remove and clean up (3) buffer beams and punch out half etched rivet holes.

4) Buffer Beams

Solder buffer beams on to ends of valances and footplate, groove by buffer holes furthest from footplate; it does not extend beyond valances. You now have box into which the chassis will fit.

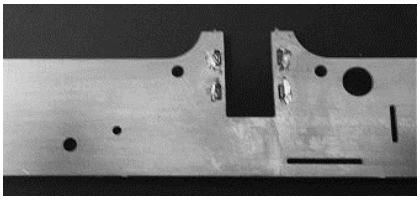
Remove parts (12) 4 off buffer beam stiffener plates, start by removing the cusp and bend the tabs at 90^0. Lay a pair into front corners of the footplate and measure the distance between them, they should be 25.5mm apart, if not remove material from the long facing sides <u>equally</u>. When satisfied solder into the corners using half etched groove as guide. Offer chassis to footplate to check it fits between stiffeners, there should be about 0.5mm clearance either side. Repeat at rear and measure, the distance should be 22.5mm, check chassis fits.

Alternatively, dry fit buffers beams and then solder to buffer beam stiffener plates (12) the little tab will fit inside the valances, this will allow you to secure after painting. Check fit of chassis as above.



5) Locate (4) & (5) from chassis etch and remove cusp left by etching process, bolt together (use 10BA compensation beam holes, alternatively tack solder together) and offer to the footplate assembly, if they are too long remove an equal amount off each end until they fit comfortably inside the "box" of the footplate. The above action is ***<u>very important</u>***, both to be able to keep the chassis square and is easier done now than when the chassis is assembled. When satisfied put the footplate to one side for now.

6) Punch out the 2 rows of rivets on each frame.

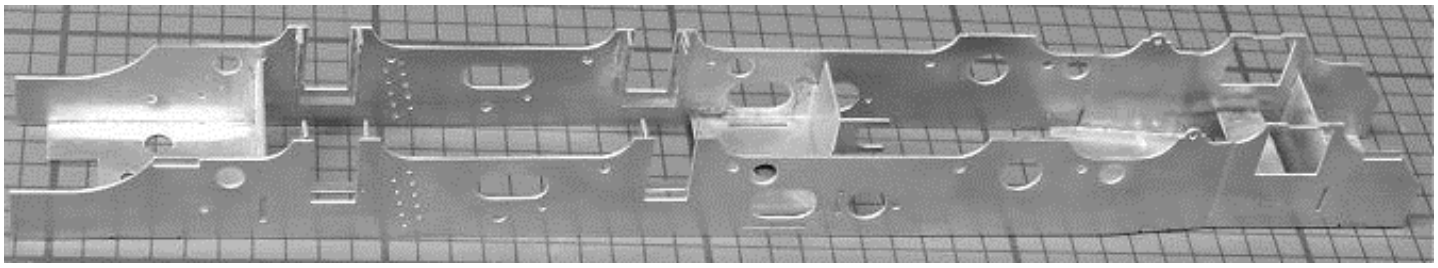


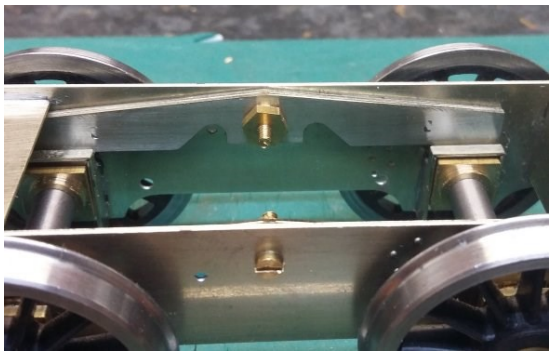
7) Remove (6) 4 off horn block guides fold into U shape and dry fit into slots in frames. Ensure the horn block is a tight sliding fit, adjust until satisfied. With horn guide on the underside apply flux and solder to each tab, don't overdo it as the solder will run through and build up on the inside and foul horn block. Check that each horn block slides freely but is not sloppy, file off protruding tabs. Note small tab on end of each leg can be folded to retain bearings later.

9) Joggle the frames at the rear end, lines on the inside of bends, final adjustment later.

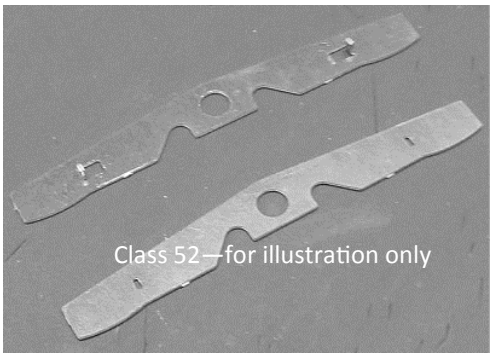
10) Remove (7) (8) (9) (10) & (11) frame spacers, clean up cusp. Bend with the half etched lines on the inside. ***Note! All bends will have the half etched line on the inside unless otherwise stated.*** The kit is deigned to be fitted with an ABC motor/gearbox and a mounting bracket is incorporated as part of the centre spacer. Spacer (7) is at front and spacer (10) at the rear of the chassis. (11) Provides the springing for the radial axle, tap the hole 12BA, a nut can be soldered to the underside if desired.

10) Dry fit all the seven parts to ensure they all slot, when satisfied with the fit, lay the chassis upside down on a flat surface and tack solder together. Check that it is still flat and square and then solder all joints fully. Check again before proceeding. See below.





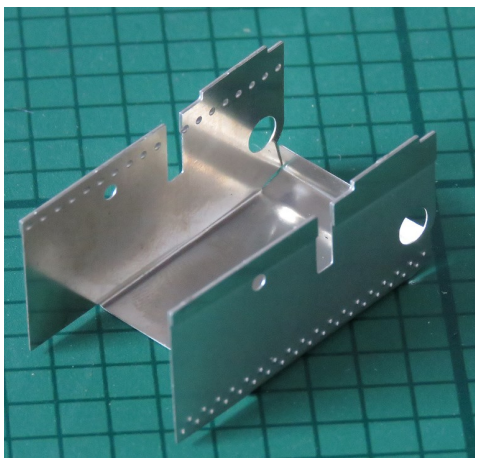
11) Locate the compensation beams (13), file off tabs and deburr all around outside. Note! There should be a slight bulge on each end of the beams where they rest on the horn blocks. (these are now just one piece per side)

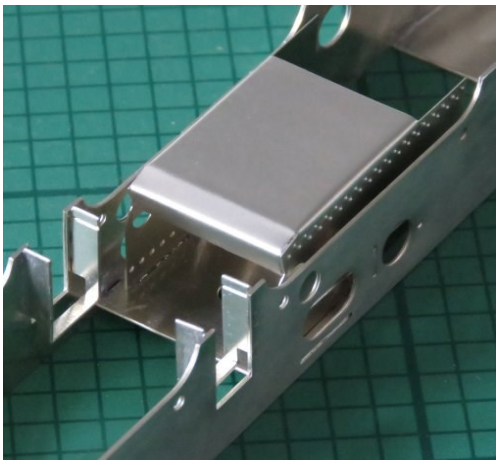


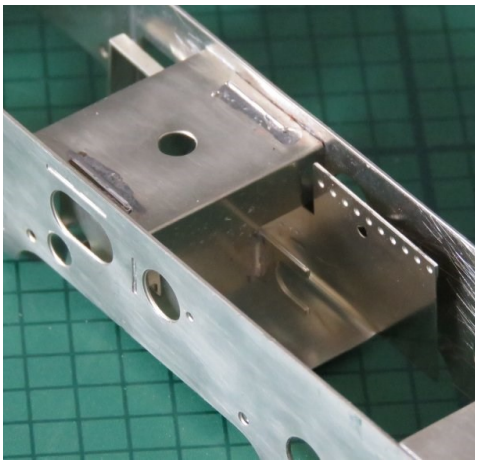
12) Using the 2 pivot bearings and 2 - 10BA x ¼ bolts secure the 2 beams to the chassis. (The beams fit in the slot above each horn blocks). Check that the beams move up and down easily. DON'T open out hole in chassis as this will affect ride height and the degree of compensation.

13) Taking the 6 springs (PP1) glue into place, there are pips on the springs and holes in chassis for location.

14) Remove (15) (ash pan) and punch out the 2 rows of rivets, clean up and fold into a flat bottom "U" shape with the rivet detail on the outside. Then make the double fold on the base as per picture, offer up to the half etched locations on the chassis and adjust to get a good fit. Solder in place, see picture, ensure it is pushed up to the top of the location or it will foul the rear brake stretcher later.



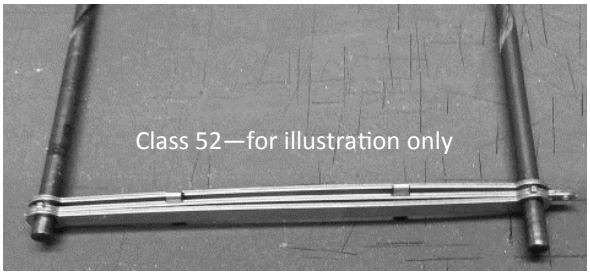


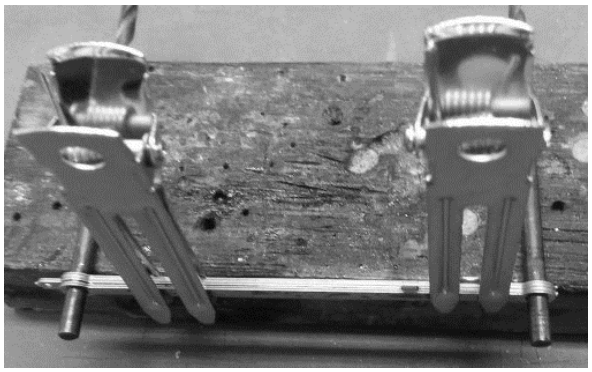


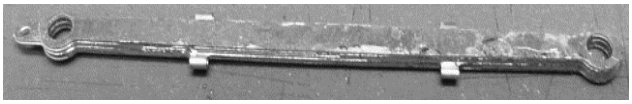
15) Take each slater's wheel and lay face upwards on a piece of 600 grade, wet and dry and with a circular motion remove and slight pips of plastic left from moulding operation. With an emery stick or similar, kiss each of the 4 facets on each end of the axle and then try fitting a wheel to each end. Sometimes you might find the slightest burr in hole in the wheel, if so kiss with a fine square needle file. At all costs avoid a sloppy fit. Now fit the crankpins as per instructions that came with the wheels.

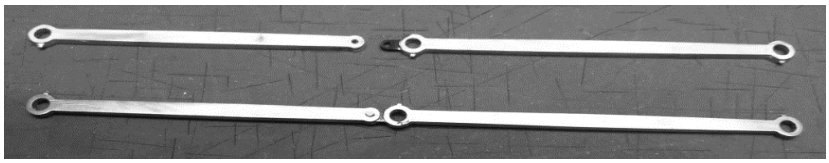
17) Using the bearings (and washers to reduce side play if needed) fit wheels and axles to the chassis – Do Not fit the motor/gearbox at the moment. When all 3 wheel sets have been fitted, push along the bench or piece of spare track, the chassis should roll freely. If not determine which axle is the problem and correct it.

16) Locate parts (16), there are 6 parts to each side. Use “black” 2.5mm drill(s) shank to align the holes before soldering. After soldering the parts together file off surplus solder, cusp etc. until you have a nice solid looking rod. Before joining the two halves of the rods, either coat the “tongue” with a permanent marker pen or smear with super glue and allow time to dry thoroughly. Both methods should prevent the solder from penetrating the joint, use a piece of 1mm nickel silver wire to form the pin and solder on the back only, trim off excess and clean up.



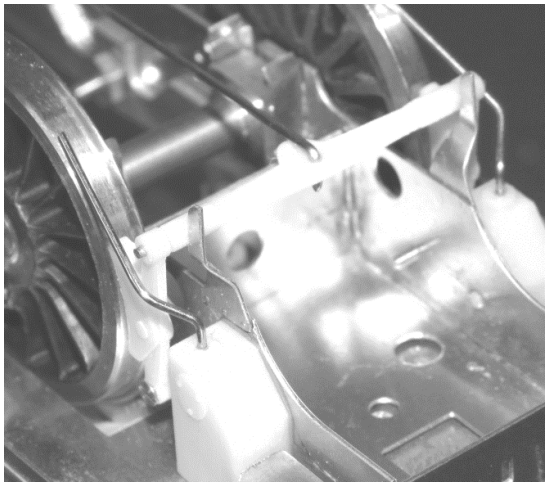


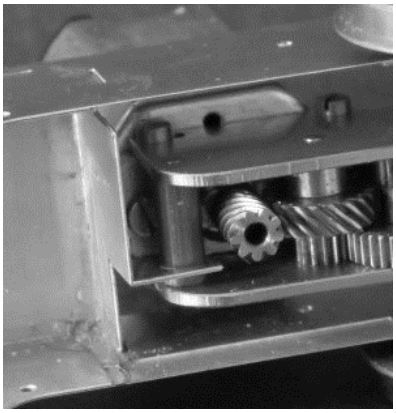


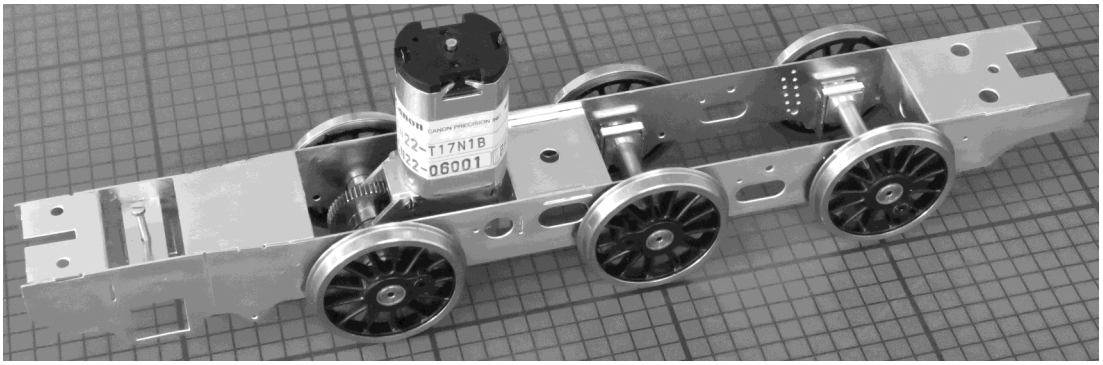


17) Fit bearings to crankpins and try coupling rods, it may be necessary to ever so slightly open holes in coupling rods, if so do it sparingly, sloppy rods = poor running. Don’t worry about excess length of bearings at this stage remove excess later, fit washers, retaining nuts (prototypical are supplied in the kit for final fitting) and roll along the bench. If there is any binding, identify where and ease the offending hole in rod and retry, repeat until chassis rolls freely.

18) Remove (17) life guards (guard irons) and punch out rivets, the ones with 2 rivets go to the rear, bend to shape to align with the wheels, note the bends go in opposite direction for each pair. Study picture right. Having bent to shape solder into the half etched locations on chassis.



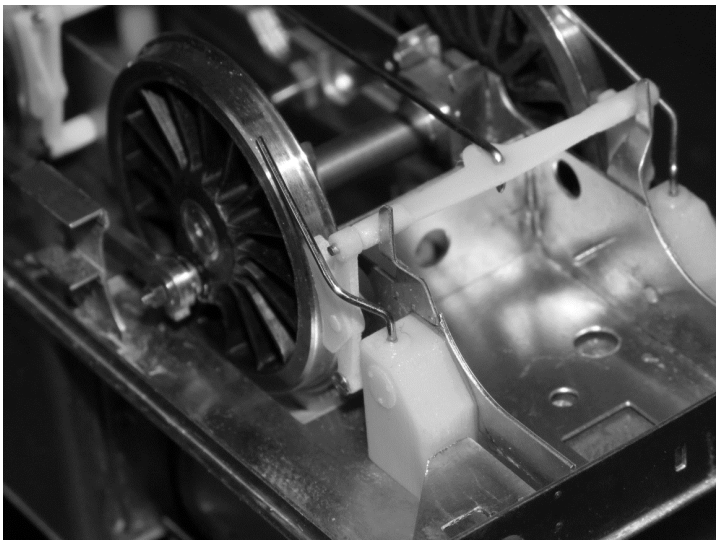


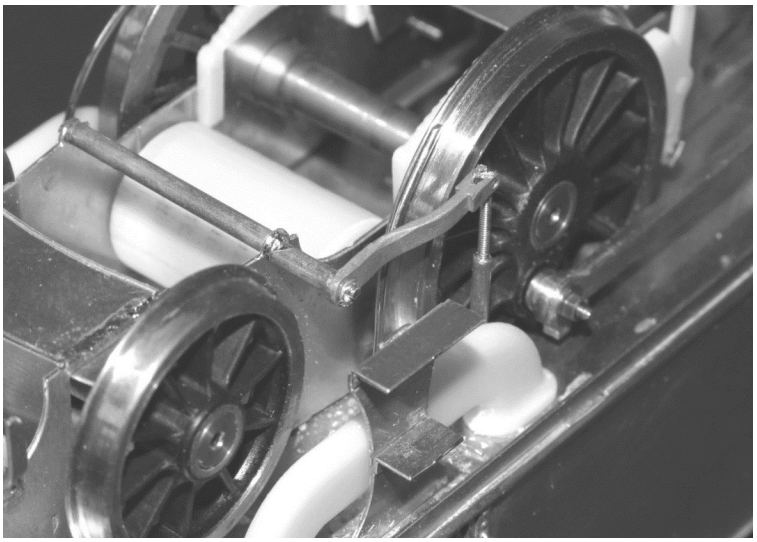


17) Remove the coupling rods and rear set of wheels and fit motor and re-fit wheels and coupling rods. If you have pair “flying leads”, you could now try out the chassis on a piece of track. Note! Photo shows a ABC Mini motor / gearbox, not a ABC Mini S as should be fitted.

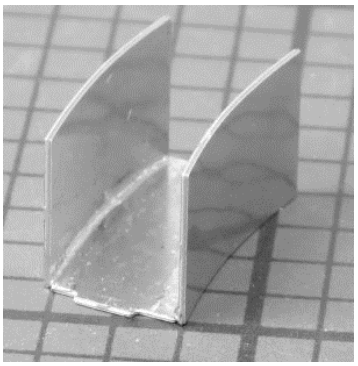
18) Now identify the (PP2) rear Sand Boxes to use. The front sand boxes are combined with front splashers, so ignore at present. The rear sand boxes are mounted on the chassis; use the pip on the back to locate in holes in chassis.

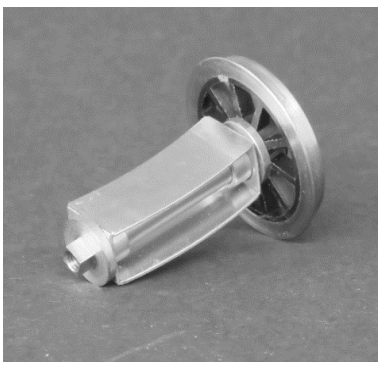
19) Taking 2 pieces of 1mm wire form sand pipes which fit into the holes on the bottom of each box, run a 1.1 or 1.2mm drill down the holes to ensure the wire will fit and the super glue can penetrate. The rear two are easy, requiring just one bend, the front are more complicated. They need to come out and wrap around the front brake hanger see pictures.

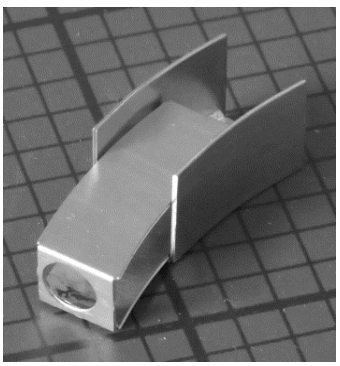


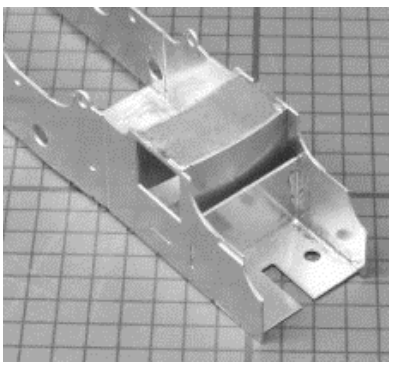


23. There are 2 ways to fit (PP3) the brake hangers, (a) solder a piece of 1mm wire through the holes in the chassis or (b) tap the holes 12BA and carefully drill the upper brake hanger hole 1.2mm diameter. Now fit brake hangers to chassis.
24. Take brake stretcher bars (PP4) and either glue in a short length of 1mm wire or drill 1.05mm and tap 12BA each end of stretcher. Fit stretchers between brake hangers. Using lengths of 0.7mm wire bend to length 3 pieces to form pull-rods and glue in place on stretchers. If you have screwed on your brake hangers, you can remove them as one assembly when you decide to paint.
25. A piece of 2mm rod, (trim to 42mm long) is provided to form the brake cross shaft. Thread this through brake rod brake holes on rear of chassis. Solder right end (looking from the rear and top) with 1mm poking through to outside of chassis. Locate and clean brake arm and slide on end of rod.
26. Next take the 14BA bolt, cut off the head and then slide the end into the brass tube and solder. Either crush the tip of bolt or file a small flat on it and slide into fork on the brake arm, then with the arm slightly below centre, trim top of tube level with top of chassis.
24. Bend (18) & (19) to match curve on (20), solder (18) & (19) to sides of (20) to form a “U” shape. Now fit this to the chassis to form Radial axle guide. Bend (21) to form a box & solder, test in guide and fettle until it moves smoothly, place in guide and bend up tabs. Lastly fit screw in (11) and place a spring over screw to press on to (21) – it’s a bit fiddly! Place a top hat bearing in each end of box and fit wheels and axle.
25. Having tested the fit with the footplate you can remove brake hangers, wheels, bearings and motor/gearbox. The chassis is now ready to paint.



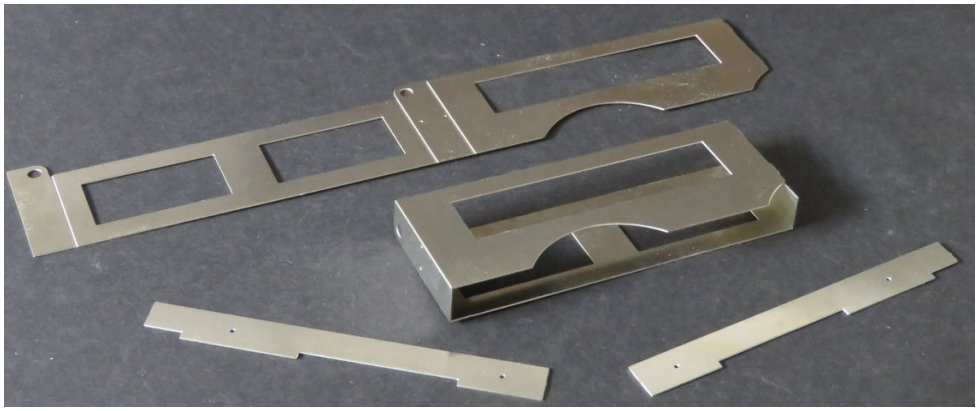




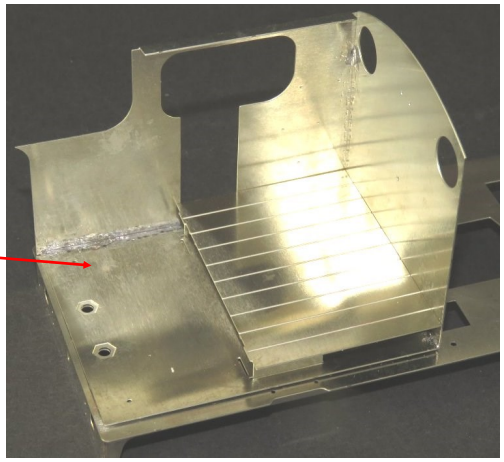


26. Cut out parts (22) balance weights and clean up, glue to wheels in correct position relative to the crankpin. Either mask wheel tread using maskol or similar and paint the whole of the wheel front or just paint the balance weights
27. After painting re-assemble and ensure everything moves freely. Fit your wiper pickups or plunger type and wire up to the motor and test your chassis runs smoothly.

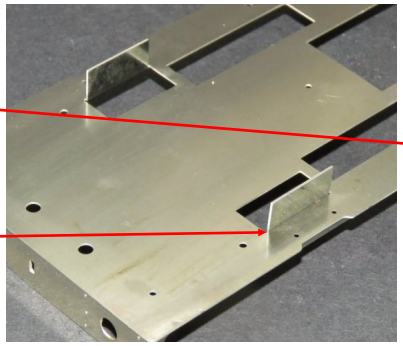
Superstructure



31) Take the Tank sub-frames and bases (23-26), clean and fold to form a box trapping brass bar into the 2 holes, *make sure you have them the right way, the slot furthest from end goes at cab end.* 2 tabs should extend beyond the for later location. *If you are making sections, tap holes in bases for 12BA.*

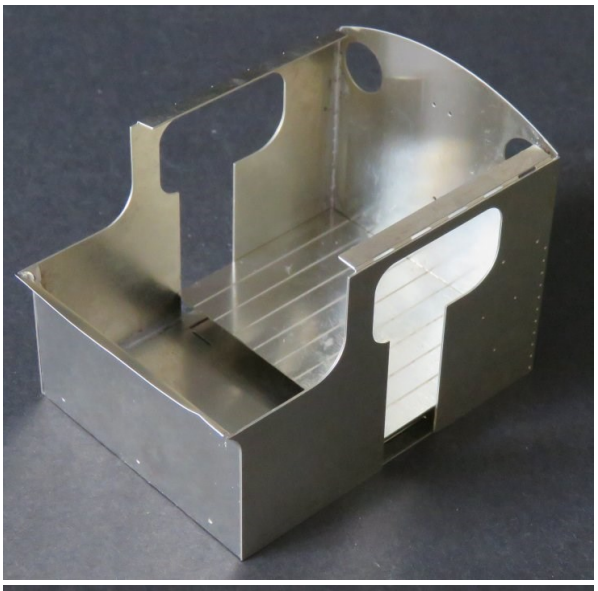


32) Check that the brass bars are correctly fitted and solder box seam and the solder in the base ensuring cut-outs match those of the sub frame boxes. Put to one side.



33) Locate Cab and Bunker base plate (27) , *tap the 3 small holes for 12BA,* solder 8BA nuts into the half etched pockets.

34) Bend up the 2 large tabs on footplate, these help with location of cab and support the floor.



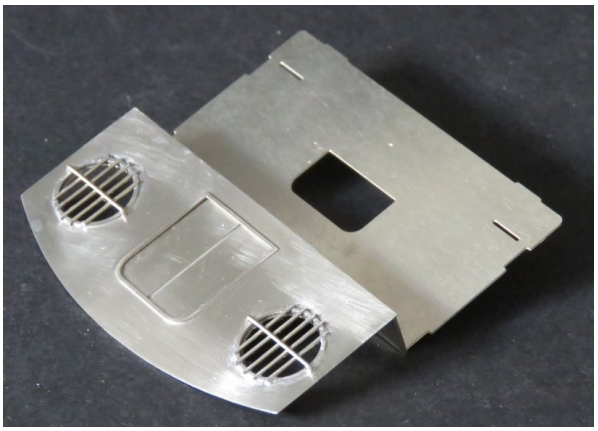
35) Take (28&29) Cab and Bunker sides, clean and punch out rivets. Note! decide if you are fitting cab side handrail, if so drill out the 2 holes to suite.

36) Take (30) Cab Front and clean and repeat for Cab Floor (31).

37) Unless your chosen loco didn't have cab side handrails, bend and fit handrails

38) Finally clean up Bunker Rear (32) . Set to one side.

39) Start Cab assembly by fitting the Front (30) to the Base (27), next fit a side (28) to these with the side level with the front of cab, ensure all is square. Now place this over the large tabs on the footplate and offer up the Floor (31) and other Cab Side (29), fettle if required. When satisfied tack together and check all is square and upright.



40) Take the Cab Doors (38) and clean, *do not remove the full thickness tabs*. These tabs fit into the recess between cab back and sides and can be soldered from within the bunker.

41) Take the Bunker Rear (32) and form the top curve to match the profile of the sides, *note sides may be a tad too long, this can be removed later*. Now finish soldering and carefully bend over top flap of cab sides. *Remove before soldering so as not to solder to footplate.*

42) Take (33) Cab Back and clean and form the 2 bends.

43) Take (34) Coal Door, clean and solder in place, there is half etching on both to fit flush. Some of you may wish to adapt this to form open or partially open doors.

44) Take (35) Cab Back overlay and fit to cab back, align the window openings. Carefully trim off any excess metal from the edges.

45) Next lay flat (a piece of wood helps) with window bezels upper most. Cut 0.7mm wire to length and lay across window openings, then solder in place. Again from 0.7mm wire bend 2 “U” shaped piece to go across these into the holes. Clean up thoroughly, easier now than later.

46) Locate (36) Coal Shute Door, carefully punch out the rivets down each side. Draw a pencil line between the 2 tab holes to show height of floor. Then fit door to cab back and fit the cab back into position, *there should be a small recess with the sides at the top section*.

47) Fit the Cab Front overlay (37), offer part (50) to lower cab front, then position the overlay to stand on top of (50), centralise both and clamp in place. *If you are making sections, remove (50) for now.* Fix the cab overlay, it may need to be trimmed at the sides to give a smooth side.

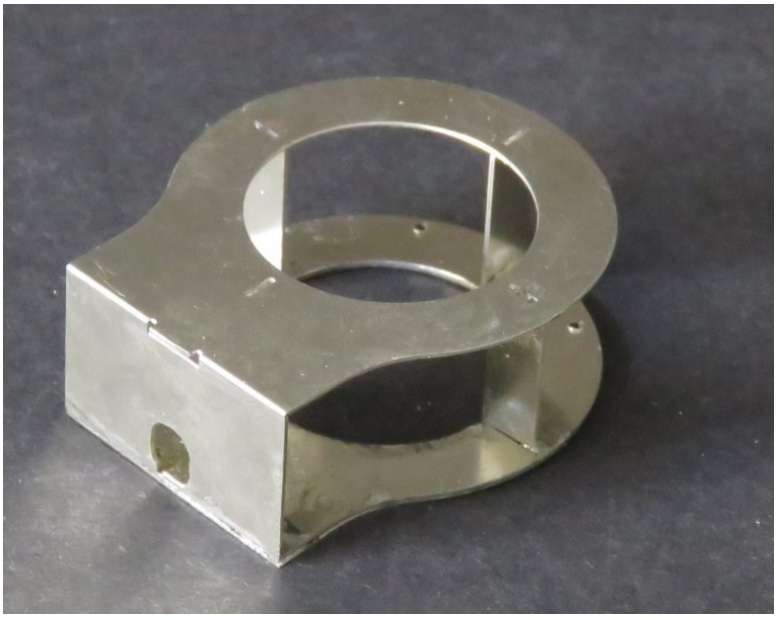
48) The Bunker Floor (39) has a hole for a breather pipe in rear left corner (see step 51). I find it is best to slide it in and push the tab through the coal hole and let it rest against the back, you can now judge how much to bend it. Shake it out, bend it and fix in place.

49) Its probably easer to fit the Cab Beading (40) at this point as it helps to be able to get your fingers in the bunker to hold the cab while you mould the beading to shape. Start by tacking one end in place and then carefully bend the rest to shape. *If you find it easier, cut the beading in half and start from both ends, this also works if there is a little cusp remaining*. I’ve supplied a couple of spare bits, just in case. Fit 2 lengths of 0.9mm wire each side to form cab handrails.

50) Coal Rails (41), I’ve supplied 2 types the “as built” and the later version which have been plated. Choose which you are going to fit and then bend to shape, the rear tags will need to be bent in to follow the contour of the bunker back. Dry fit first and when your satisfied fix in place soldering tags to inside of bunker and fitting inside where they meet the cab.

51) Lastly take a short length of copper wire and bend to a “umbrella handle” shape and fit it hole in bunker floor.

52) Clean (42) Cab roof, punch rivet holes and roll to suite profile of cab. Curl up the half etched strip on each side. Next, solder roof braces (43) into the grooves, check to ensure it fits correctly. Then solder (44) on the outside centrally, there a couple of etched marks to guide you.

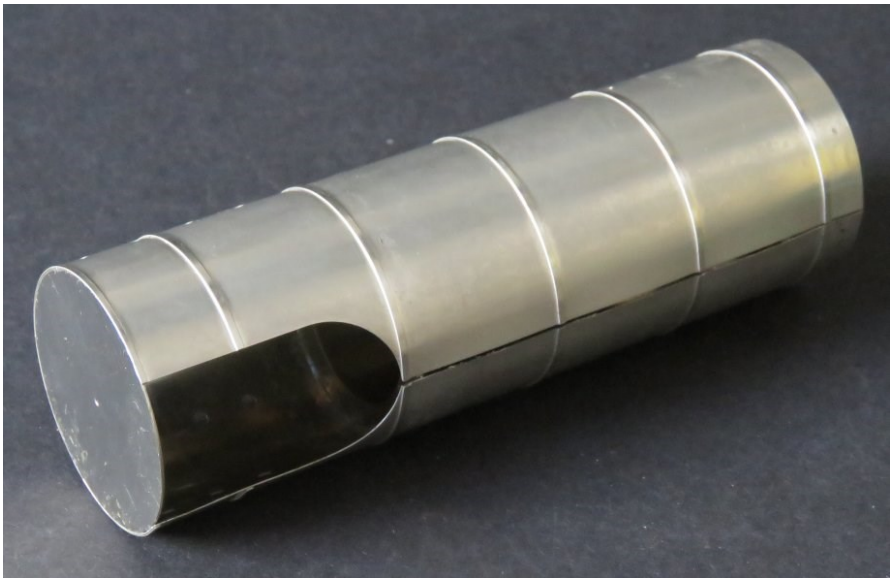


53) To complete the roof take the piece of $^{1}/_{4}$” tube , solder in place on the roof and file down to 1.5mm height. Take part (45) and form “lid”, you can fix it shut or part open, the hinge goes at the front. Alternatively there are some etched rings which will perform the same function as the tube.

54) **<u>Now to the Boiler and Smoke Box</u>**. Locate parts (46 to 49) smokebox assembly. Clean up (46) and fold into a “U” shape, then fit the 4 parts (47) in to the slots. Adjust until square and the solder together, offer to the footplate.

55) Take item (48) and carefully form around the structure you have just made. Establish that you have the wrap the correct way, the chimney hole is nearest the cab.

56) Using a couple of bits of thin packing, lay “cage” face down on these and wrap (49) around it. Holding everything in place carefully lift and check you have the slightest recess into which you can fit (49). If satisfied with packing, lay back on packing tack one end of the wrapper flush with the base of the cage. Using clamps squeeze the wrapper into curves and pull tight around top of smokebox. The wrapper should be the correct length to fit around the whole structure, if too long, trim end each end equally. When sure that it fits and the overhang is just enough to allow the front etch to sit in place tack solder, repeat checks and then solder fully. You can now fit (49) to the front, this is best done with a resistance soldering iron or glue, clean up the whole assembly.



Note! Depending on how you cleaned up the parts and assembled the previous structure, it might be necessary to do some fettling in the next stages. To check follow the next stages in the order outlined.

56) Next clean up parts (50 & 51), roll both and set aside. Roll boiler (52) and hold in shape with elastic bands.

57) With the smokebox lying on it’s front (as per picture), place (50) inside (48) and then (51) inside (50). The front end of the boiler should now fit inside these. If things don’t look right, remove boiler and offer boiler ring (54) into the space. This will give you a guide as to any adjustments you need to make.

58) When everything fits, solder (53 & 54) into the ends of boiler (52) to keep both ends circular, as per picture.

59) Take 8 brass washout plugs and solder in the holes, its neater if you solder from inside.

60) Fold up (55) and fit into rear of smokebox, don’t secure to boiler barrel at this time.

61) If you have built a separate Cab/Bunker assembly bolt it to the footplate. Next push the boiler into the smokebox and using a 12BA nut & bolt locate on the front of the cab and line up smokebox at front of chassis, hold in place with an elastic band (or bolt it). You can now rotate the boiler until the hole for the dome if at the top and solder to smokebox. *One way of doing this is to place a set square on each side of and up against the footplate, then rest a 6” steel rule on top of the boiler and clamp to both, you can then rotate the boiler until it is top dead centre.* Those following the section route may like to consider making an alignment mark on both and leaving them to be bolted to footplate after painting. Now set aside for now.

62) Locate (58) tank front plate overlays, prepare and punch out rivets.

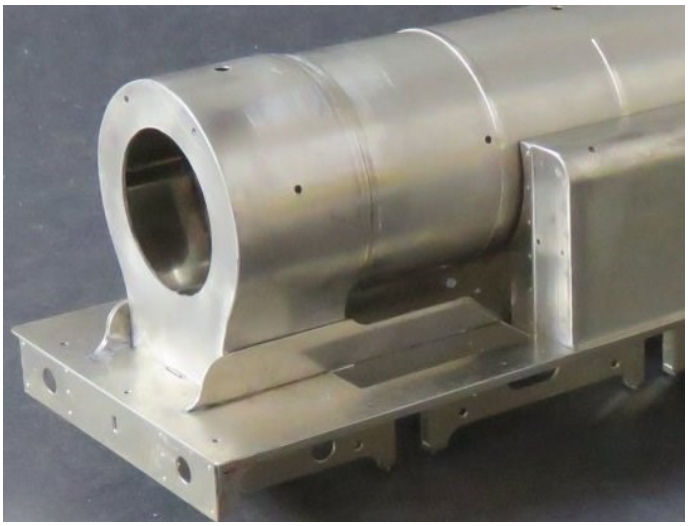
63) Take a tank subframes and either (56) or (57), the end holes are offset by 0.5mm, the larger overhang is at the back end of the tank. There are 2 ways to form the bend, on or off the frame. To apply the overlay start by aligning with the bottom of the frame and with not more than 0.5mm of overhang at the front end and tack solder at the base. Next tack at each end at a point just below the brass bar, then tack to the top of the inner tank side. Offer (58) to the front of the tank and check that (56/57) just overhangs all around (58), repeat at the other end and ensure (50) is covered. If satisfied carefully finish soldering (56/57) to the tan subframe. Repeat for other tank.

64) Now solder (58) to respective tank fronts and remove any tank overlay to leave a nice clean square corner.

65) Ensure extreme care required here. Now solder each tank assembly to (50) using the tabs to locate, make sure everything sits flat on the bench. To make this unit more manageable use a piece of scrap etch to bolt across front holes. Remove any overhanging overlay and file back any tabs that protrude. Offer the complete assembly to the footplate & cab and check all fits, if so solder in position using holes provided in tank and footplate for alignment. Tap holes in tank base for 12BA screws, use brace mentioned earlier whilst painting.

66) Fit handrail knobs and wire along the top of each tank, check before soldering that they sit down flush.

67) Take the boiler assembly you made earlier to see if it will slide in between the tanks, don't force it. Check that the tank are sitting vertically and are parallel to each other. You will most likely need to remove evenly a little off each side (they were drawn slightly too big), until the boiler just slides in.



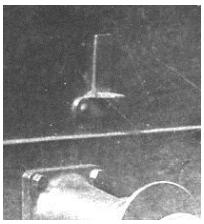
68) Carefully clean (60) frame extensions, don't remove half etching at the front end (very sharp end). Dry fit along side the smokebox in the slots of the footplate, make sure they are the same distance back from front of footplate. Tack back end and extreme tip of front end to stop them moving, when satisfied you can solder the boiler and frame extensions to the footplate. Remove the boiler and solder frame extension, check boiler still fits.

69) Fit (PP5) Smokebox Door into the front of the smokebox and fit handle (dart) in the centre.

70) Fit handrail knobs to smokebox and along boiler and bend 0.7mm wire to form the handrail.

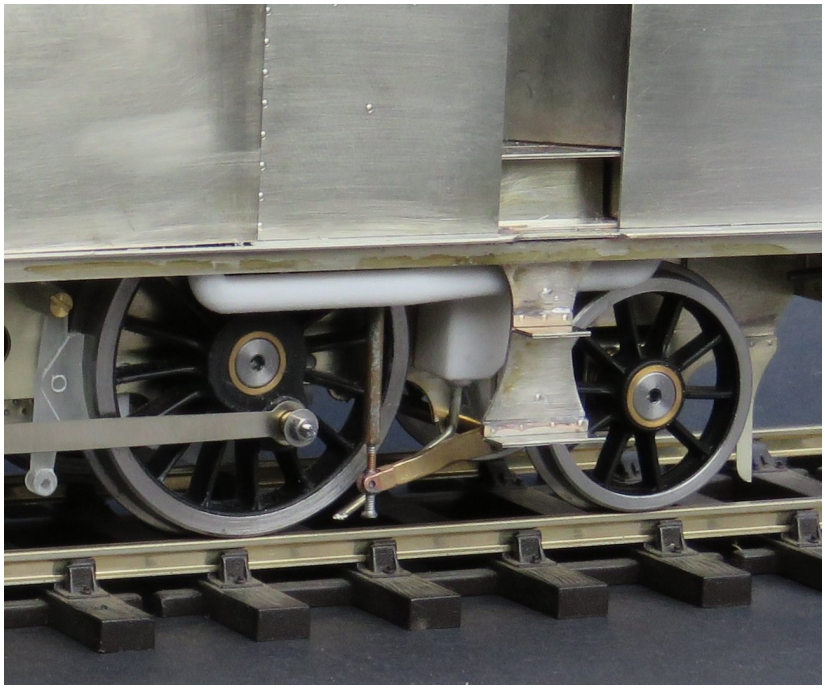
71) Fit (PP6) Combined sandbox and splasher to footplate with rear edge up against tank front. Bend 1mm wire form sand pipes as per picture and solder into holes in the footplate.

72) Fit buffer bases to the buffer beams, put heads etc. safely to one side for fitting after painting.



73) There is a choice of Lamp Brackets, later style castings which solder into the holes in the footplate and bunker or etched early style (61). The front ones simply require bending at 90^0 and soldering over the holes in the footplate. For the rear take a "T" shaped piece, punch out rivets and fold at 90^0, then solder in place on the bunker with the protruding piece at the top, then use low melt solder or glue to fix the straight piece into the slot.

74) Clean up (62) Step back plates and punch out rivets, fold tops at 90^0. Clean up (63) Steps, punch out rivets, fold at 90^0.



75) Solder (64) to the back of (62), this helps stiffen where the centre is half etched, there are 2 short and 2 long for respective back plates. Then solder one small step to each back plate, followed by a medium one on each front back plate and large on each rear back plate.

76) Clean up each step assembly and fit in the pockets on underside of the footplate, make the holes are not filled with solder as these are used by handrails.

77) Take (PP7) Balance Pipes and glue in place in the holes in the footplate, they are handed so check before gluing.

78) From 0.7mm wire form 2 handrails and fit in holes in footplate above from steps.

79) Repeat for handrails on tank fronts.

80) Identify (PP8) “Piano” cover and fix in place between frame extensions.

81) Fix brake pipe castings to the footplate at each end.

82) Bend whistles to shape and fix in holes in front of cab.

83) Clean up Safety Valves casting and fit to boiler. A good way to get it sit neatly is to wrap a piece of wet & dry around the boiler, then work the casting around the so it take on the shape of the boiler.

84) Glue on Dome (PP9) and Chimney (PP10) after using the above technic to sit nicely. To be sure there are central use the technic described in step 61 earlier.

85) Identify (PP11) Tank Fillers and (59) Foot Trap Sheets, dry fit (59) and offer (PP11) in position where the cut out is. It may be necessary to trim the sheets and notch around boiler bands until a happy balance is achieved. When satisfied fix both in place.

86) On the right hand side, a pipe ran from the smokebox into the cab. I have provided (PP12) a 90^0 flanged fitting to be glue to the side of the smokebox. There is also a piece of 2mm brass rod which should be bent with a joggle at the front end, which goes into the (PP12) and through a hole in the cab front, this hole will need to be enlarged to take the pipe. I suggest the following sequence, a) enlarge hole until rod fits b) joggle rod and with (PP12) pushed on, adjust until it sits parallel to the boiler c) put rod through hole in cab and line up (PP12) on smokebox until the rod lies horizontal to the tank top d) fix at each end and (PP12) to rod, trim surplus in the cab. Don’t fix rod to cab or (PP12), leave a little long at cab end to hold whilst painting, fit and trim later.

87) Identify (PP13) Handbrake Column and fix in place on left side of cab above the pull rod on the chassis.

88) Dry fit Boiler Back head, it will need a little metal removed at each side at the bottom to fit between splashers. When happy paint and detail ready to be fitted after painting inside cab.

89) Paint Body and Chassis, reassemble, fit decals and number plates.

90) Fit coupling hooks and buffer heads.