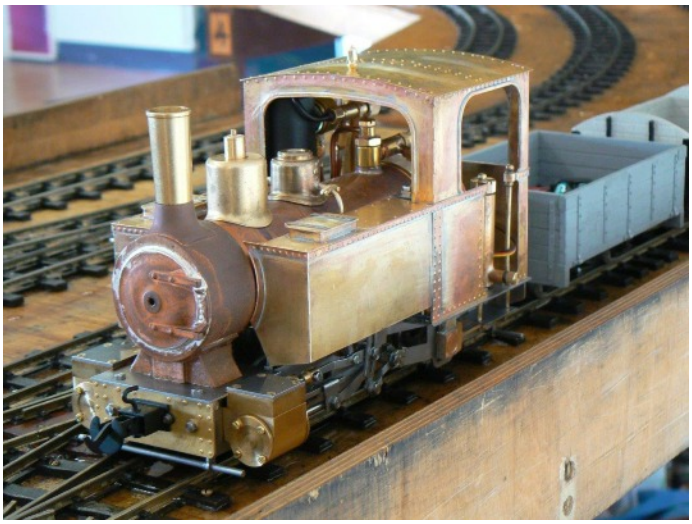
Early Builder Experience

Introduction

In addition to the 3 design prototypes constructed by Keith Dyer, the designer, and 2 local Association members whom he knew well, 5 other members volunteered to be “early builders” of the production prototypes, primarily to review and validate the instructions. They were

- Andrew Charman (editor of SMT)
- Colin Edwards
- Gordon Gill
- Ray Thompson
- Alan Regan (author of this section of the guide)

Colin and Ray have completed and painted their locos. My own loco is also complete but is not painted at the time of writing. Colin’s manually controlled loco can be seen running on You Tube: http://youtu.be/tTPrLnW7d_A All 3 are hoped to be at the National Garden Railway Show at the Peterborough Arena in April. I am indebted to my colleague early builders for their thoughtful and thorough review and comments. I would also like



to thank Pete Newman, Association member and friend in the Bedfordshire Area Group, for proof reading the guide. He was not building nor did he have a set of parts, but his review nevertheless picked up things which others had missed.

Many of this team’s comments have already been applied to the 3 main sections of the guide, so what follows is the additional experience gained during constructing the locos which will hopefully be of benefit to future builders.

Frames

Page 13 of the guide recommends that the frames be painted at this point. I assembled the dummy pony truck bearings (pages 27-30 in section 3 of the guide) out of sequence and attached them after the frames had been assembled. It would have been easier to fit them and then (critically) trim the surplus thread off the bolts and file them flush before attaching the rear footplate to the frames. It is my intention to leave them in place and to paint the frames and dummy pony truck bearings as a unit. See later in the section for how I soldered the dummy pony truck bearing assemblies together.

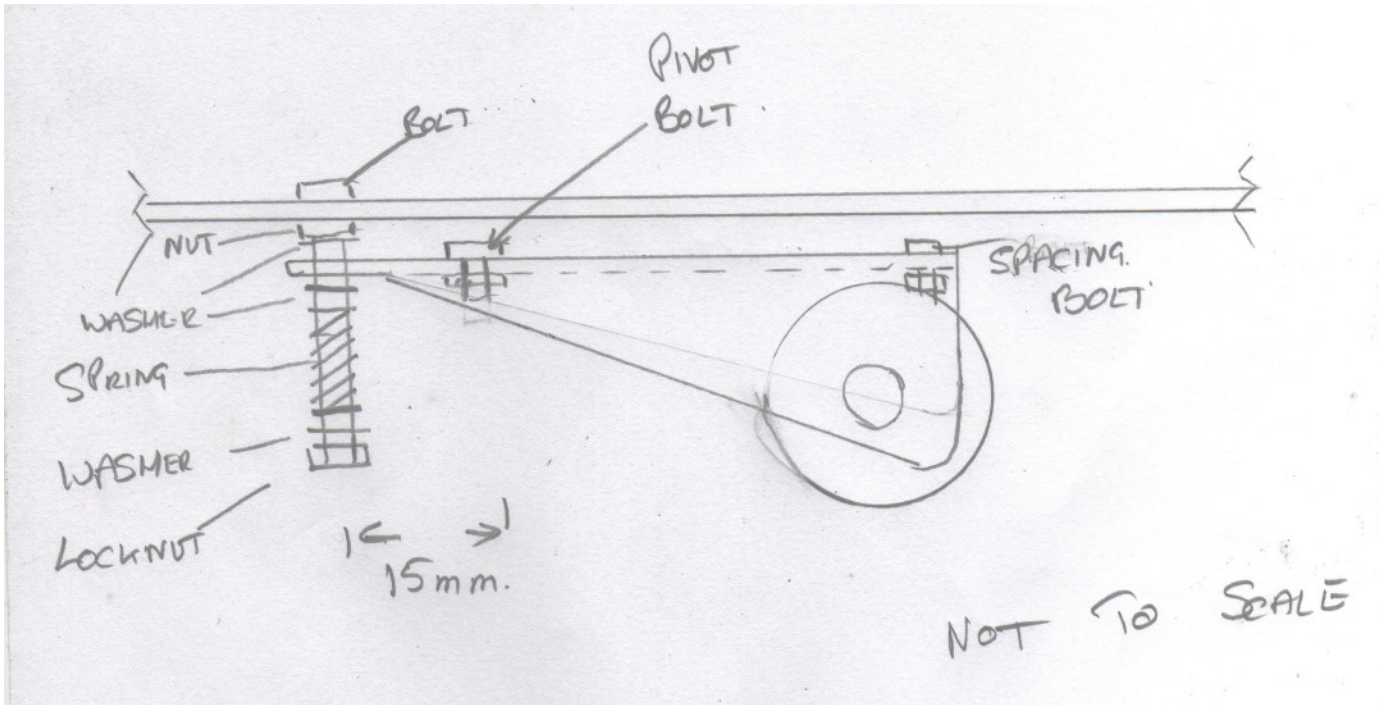
Pony truck

Both Colin and I applied springing to the pony truck, albeit in different ways. These are described on the following 2 pages.

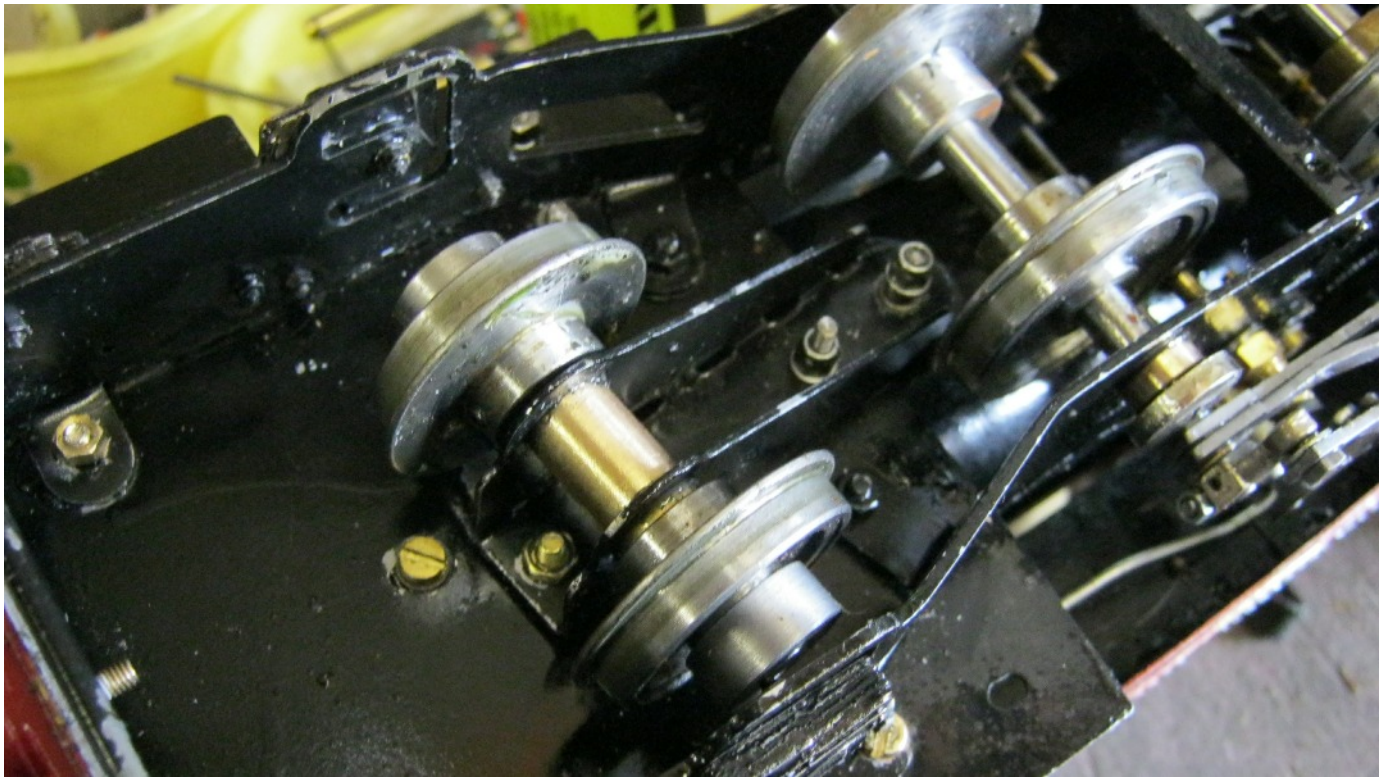
Colin's method

Colin drilled an additional hole 15mm to the rear of the pivot hole for the pony truck. He moved the nut and bolt at the back of the pony truck to this new location. He then fitted a longer bolt instead of that supplied with the kit for the pony truck pivot and introduced a spring between the lower face of the pony truck and the nyloc nut. This has the effect of pushing the pony truck upwards, causing it to pivot about the bolt which he had moved, making the opposite end of the truck carrying the wheels to push down on the track. This modification enabled his loco successfully to push open points when running in reverse.

This hand drawn picture was supplied by Colin. The bolt, nut and spring at the left hand end of the



pony truck were supplied by him and were of sufficient length to contain the spring. The bolt is drawn longer than was in practice the case - see the picture below, which shows that it was more or less level with the centre line of the rear driving axle.



Alan's method

I used a strip of 0.5mm nickel silver which I attached to the upper face of the pony truck at the same position as Colin drilled his additional hole, i.e. 15mm rearward of the pony truck pivot point. The strip bends upwards and has a skate formed at the end, which is positioned over the pony truck axle. The also causes the pony truck to press down on the track, again making the loco successfully push open points when running in reverse.

Roundhouse parts and boiler

Steam exhaust pipes

When forming the bends to the exhaust steam pipes (pages 7 and 8), Gordon and I found that the pipes had an annoying tendency to screw into the cylinder block a little more as we formed the bends. I persevered but Gordon found that by increasing the length of the 5BA thread on the pipes, he could add a 5BA lock nut which restricted the pipe's tendency to rotate.

Smokebox

The instructions recommend on page 15 that the smokebox and mounting plate be fitted to the frames at this stage. This is to verify sufficient clearance between the cheese head screws which secure the smokebox to the mounting plate and the nuts which clamp the steam inlet pipes to the superheater. Page 26 draws the builder's attention to the fact that the pair can only be removed as a unit once fitted. I found this to be a problem when I wanted to fit a Chuff Pipe, so having removed the unit, I marked the position for 4 8BA screws fore and aft of the existing 6BA cheese head screws. I drilled through the plate into the smokebox, separated the plate from the smoke box, tapped the holes in the smokebox and opened out the holes in the plate to provide clearance for the screws. Finally I secured the smokebox using the 4 8BA cheese head screws and reattached the assembly to the loco. This allowed me to remove the smokebox without removing the plate.

If I was building the loco again, I would make this change whilst assembling the frames so that I could leave the smokebox mounting plate in place when painting the frames.

Gas tank mounting bracket

Page 29 explains how the gas tank is united with the bracket carrying it and the regulator servo. Ray found fitting the nuts to hold the foot of the gas tank to the bracket to be somewhat fiddlely, so cut a piece of brass bar to the length of the gas tank foot, drilled 2 holes at the same spacing as those in the foot and tapped them 8BA. Having got the outermost bolt into the hole in the bar, the threaded hole for second bolt was in the right place.

Radio Control

I followed the instructions in regard to installing the R/C components. I used a Spektrum DX6i and 6-channel Spektrum receiver as I had both to hand. This is more sophisticated than a Plannet combo, offering the possibility of adjusting servo throw and trim (centre) via the transmitter. The following notes may help builders with similar equipment.

- I connected all components together before installing the servos into the loco, to make sure that the servos were in a known position. There is nothing more frustrating than to achieve mechanical adjustment only to find that the servo arm isn't at its centre point or wherever you wanted it to be. This is particularly important for the servo connected to the reversing rod.
- For the regulator servo, I first set the servo to its mid point in the step above. I then aligned the position of the regulator arm and the servo arm midway between 7 and 8 O'clock when viewed from the rear. I used the Spektrum's servo throw adjustment to achieve a 45 degree arc of travel either side of this point, i.e. from 6 to 9 O'clock. The regulator valve was lightly closed and the grub screw in the arm was tightened when the servo travel was at the 9 O'clock position. This means that the regulator is open a quarter turn when the servo arm is at 6 O'clock. I have found that this is fully adequate for a loco which in prototype form would not have exceeded 15 MPH and provides a fully stick of movement on the transmitter for half movement of the servo giving a quarter turn of the regulator.

- For the reversing servo, where I used the metal geared variant of the Hitec HS81, after mechanical adjustment to to achieve mid gear when the servo was at its mid point, I adjusted throw from the transmitter menu. It is critical that you do not overthrow and drive the radius rod to the top of bottom of the expansion link as the lifting arm will tend to lift the radius rod when the expansion link is fully forward or rearward. If this additional movement does not exist, a bind will occur and the loco will not run smoothly at low speed. Rotate the valve gear by hand and listen for servo chatter (a slight humming noise) during rotation. Reduce the throw until the chatter goes away. If the timing and vale travel have been set correctly then this will provide sufficient movement of the radius rod.
- The Spektrum's trim adjustment can be used to fine tune mid-point of the valve gear, but remember that as you adjust trim, you cause the servo to throw (move) more in one direction than the other, so adjusting trim will then require adjustment to throw. This is why starting with the servo in its mid position and achieving good mechanical alignment to mid gear is so important (and saves time later on).

Tanks and Cab

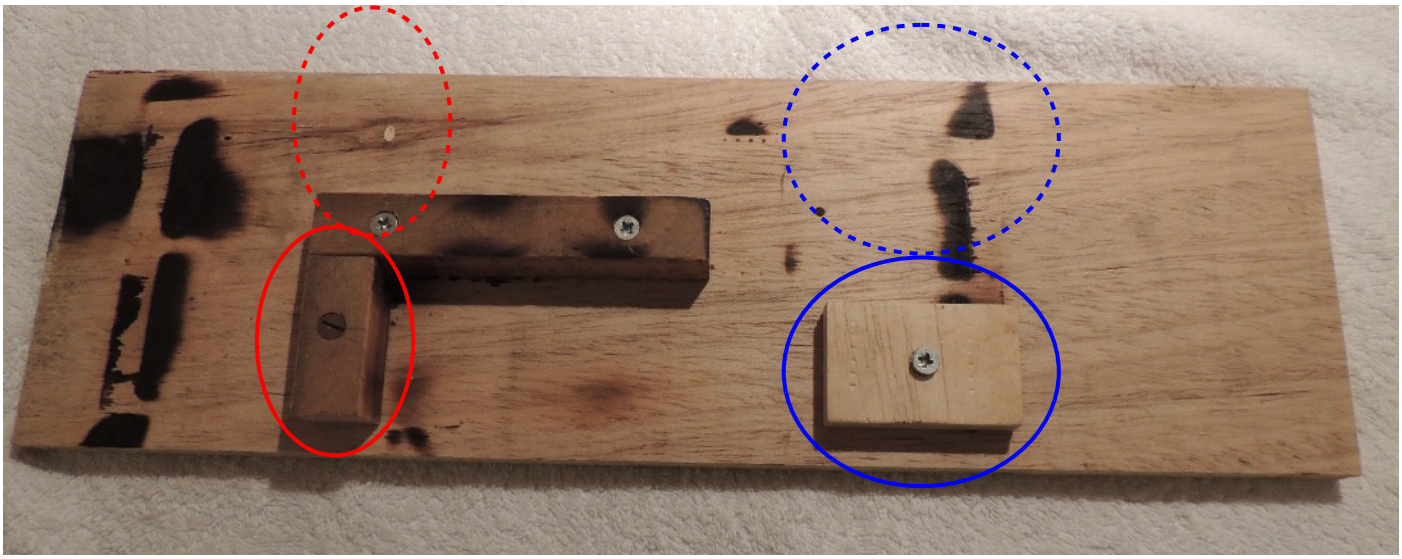
Colin, Ray and I all soldered our bodies together to a greater or lesser extent. Ray made limited use of a twin-part epoxy to attach some of the rivet strips whereas Colin and I persevered with solder. I will describe my own technique in this section in case it helps other members.

Jigs as aids to soldering

We all made jigs to assist us when soldering up the body. I will describe my own but they are representative of those used by my colleagues.

Jig #1 - tanks and cab

This is a very simple jig used to contain the right hand (RH) tank side, front and top so that CWT1R, CWT16R and CWT2R or their left hand (LH) equivalents can be soldered together in a single operation. The base is 18mm plywood and the L-shaped blocks are MDF. The small oblong block on the right (circled in blue) and secured centrally by a screw goes over the cab doorway and holds the cab in position whilst the tank top and end are being clamped in place. The jig is longer than the total length of the cab side so that it can be clamped to the bench, creating a firm platform to attach the parts to be soldered. The jig was created for soldering up the RH cab & tank assembly - I made a similar jig for the LH side but then used it for other purposes. The smaller of the MDF blocks (circled red) and the oblong block (circled blue) would be moved to the positions circled dashed red and dashed blue. The position of the oblong block is not critical, but the smaller MDF block needs to be at right angles to the longer MDF block.



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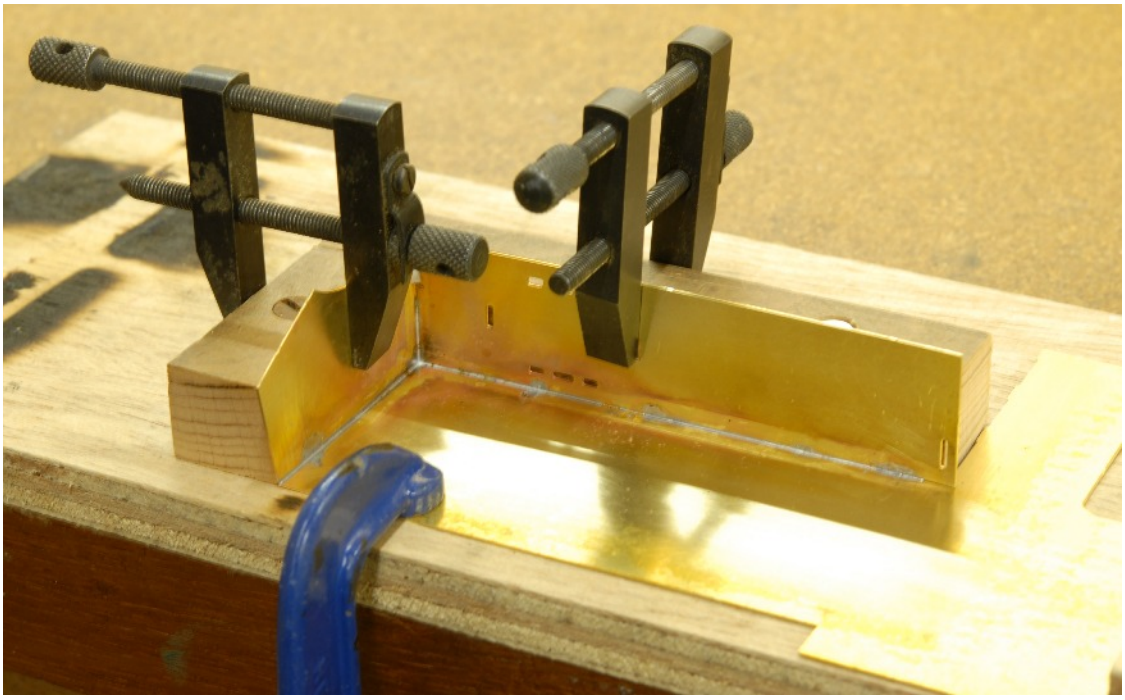
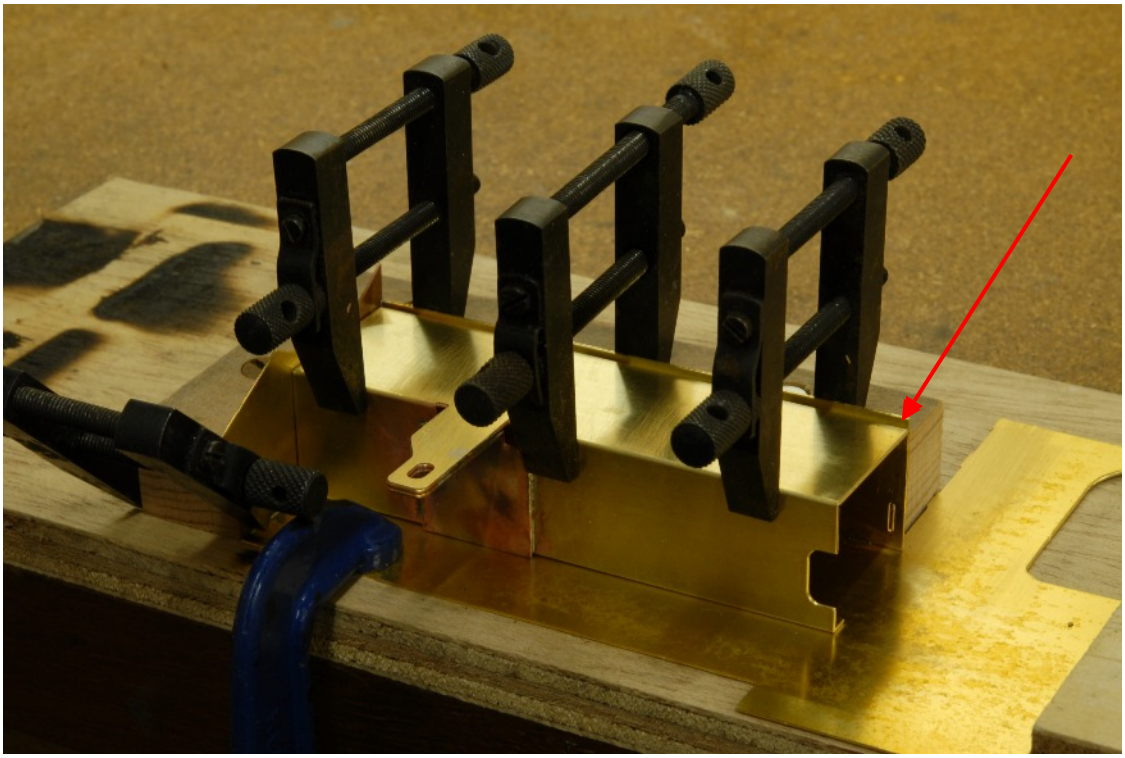
This shows the tank top and front clamped in the jig after soldering. If you use Bakers Fluid as a flux, it will inevitably have splashed onto the engineers clamps. Wash it off promptly with hot soapy water, otherwise the clamps will start to corrode. Note that the clamps need to be removed anyway to proceed to the next step.

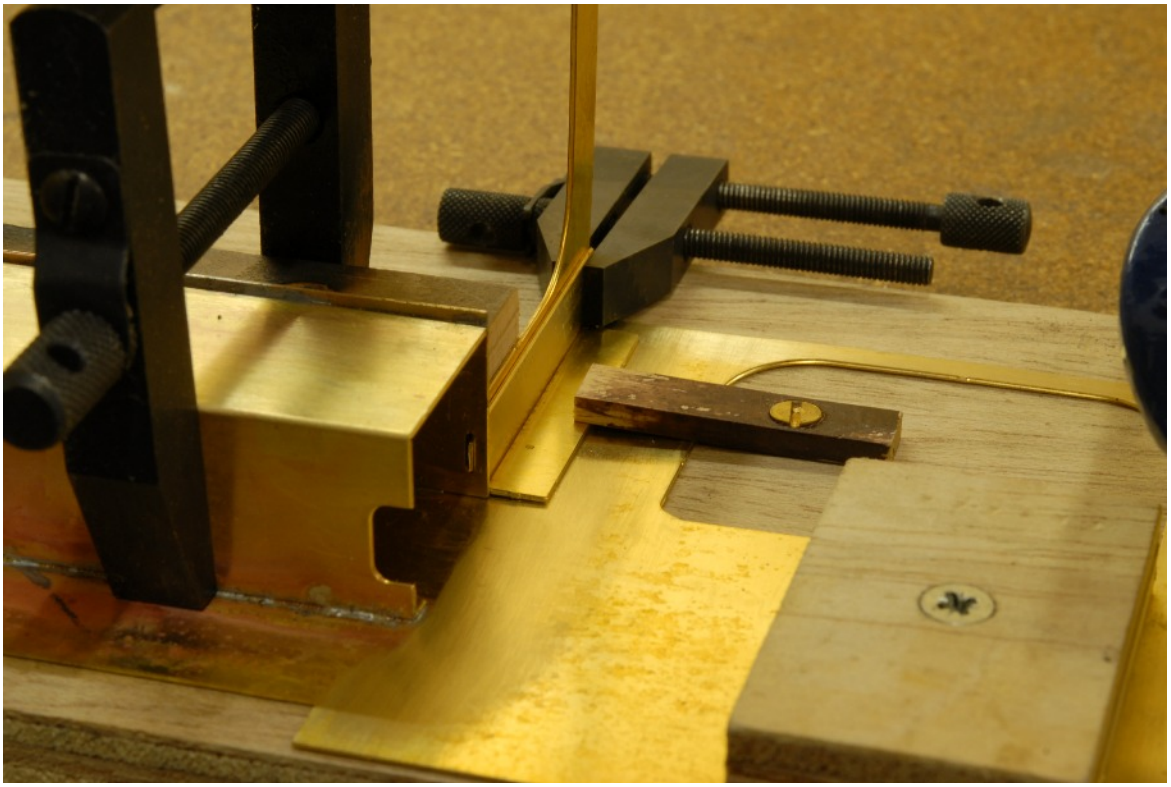


The next step is to solder the tank inner CWT18R in place. This is prepared per the instructions in section 3, i.e. CWT17R is soldered to CWT18R first and the assembly is then clamped in place as shown in the picture below. Note that I over formed the tank inner slightly, resulting in the vertical edge sitting slightly inside the edge of the tank top (as shown by the red arrow in the picture below). This wasn't a problem on the RH tank because it contains the receiver but would have been a problem on the LH side as the battery holder just fits inside the LH tank.

I used the same technique for soldering the tank inner to the tank/cab assembly as used to create the tank cab assembly in the first place: I heated the assembly until locally dull pink and applied the solder, at which point is ran readily. The jig and clamps prevented the other parts becoming un-soldered but I found that providing I used a short and narrow flame, heating was reasonably localised.

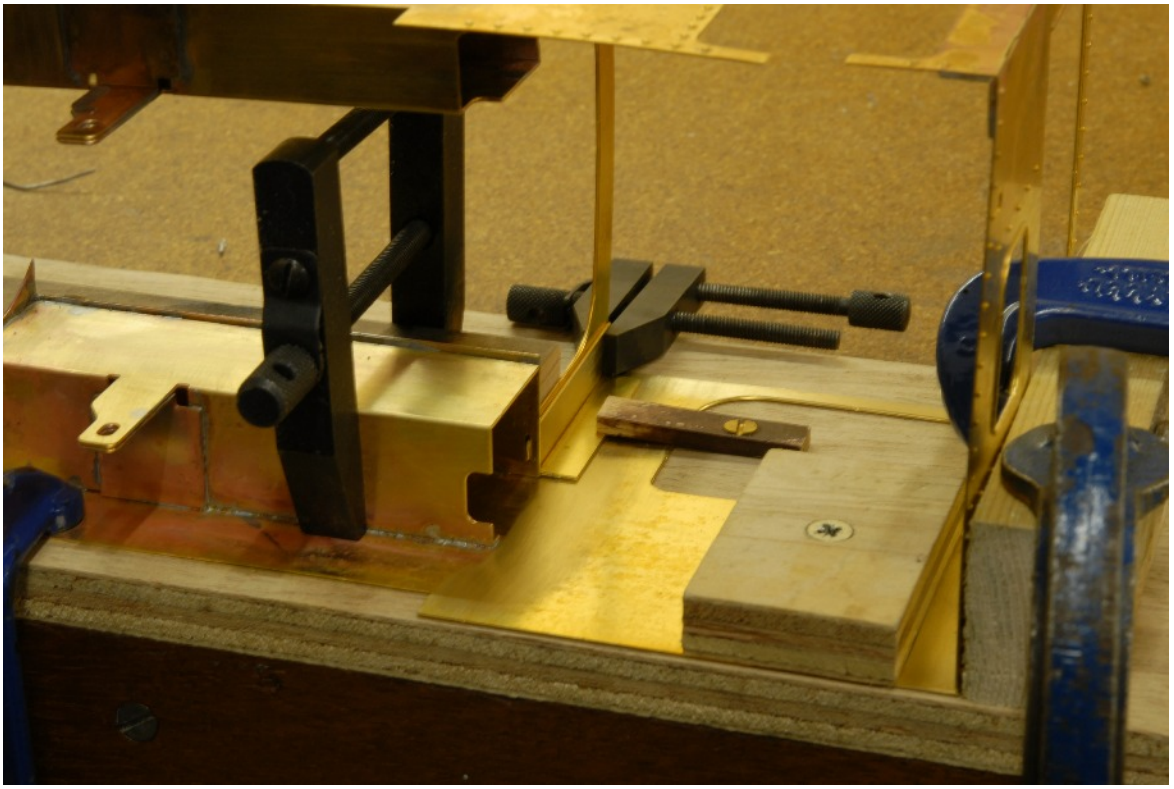


The next step was to solder the cab front to the cab & tank assembly. The L-shaped bracket CWT4R was formed per the instructions in section 3. However, I attached it and the cab front CWT7L at the same time, clamped all 3 parts together and soldered as a unit. The picture on the next page shows the assembly ready for soldering.



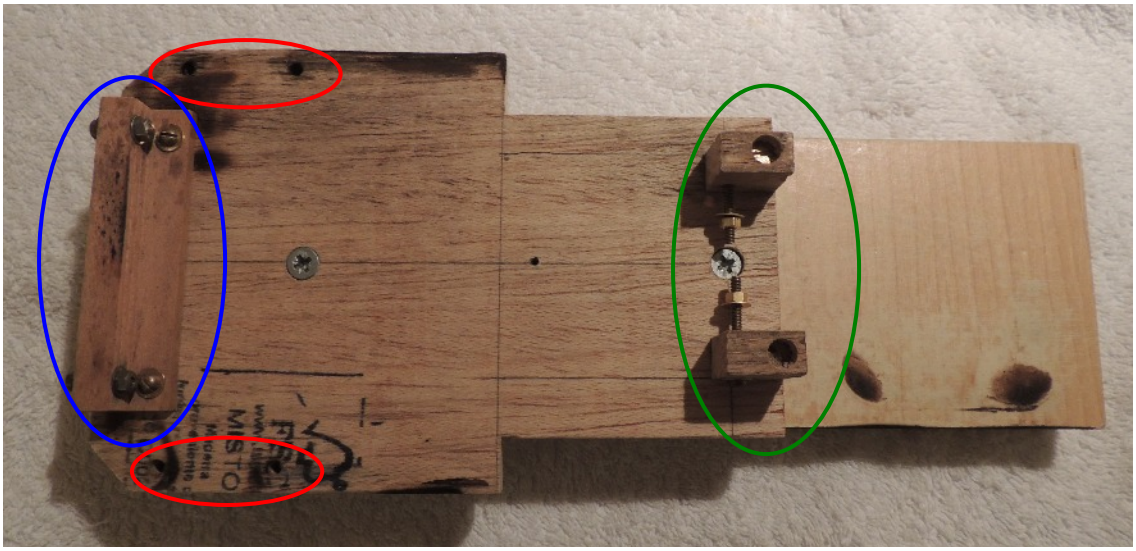
Note that an engineer's clamp was left securing the tank inner to the rest of the assembly, in case it moved during the next soldering operation. The unwanted lip between the vertical face of the tank inner and the tank top is more visible in this picture - try to avoid this on your loco! Also visible for the first time is the use of the small oblong block of plywood for securing the cab to the jig. Finally a piece of scrap (and sacrificial) wood was used to clamp the L-shaped bracket to the cab side.

The picture below shows the whole assembly including the LH side of the body, which had already been soldered up using the techniques outlined here and shows how the LH side was joined to the RH side. Bakers Fluid was again used and judicious use of the flame and watching for the telltale change to colour enabled the assembly to be soldered from the rear without everything else coming apart. The same technique was then used to solder the cab rear and its L-shaped bracket (CWT10L and CWT3R to the rest of the assembly.



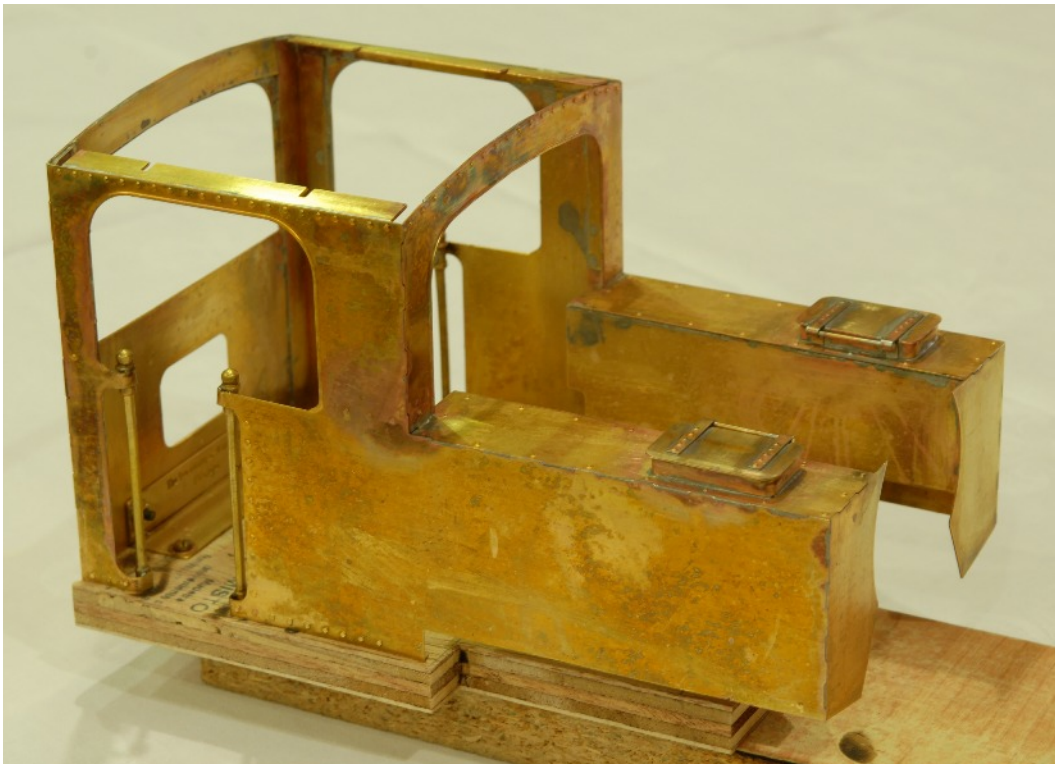
Jig #2 - mounting for cab/tank assembly

Once the cab and tanks were an assembly, I soldered the cab handrails in place. I did this out of sequence because I felt that the heat I applied when soldering the handrails to the upper brackets on the cab sides would cause any detail applied to the cab to un-solder. I was conscious that the assembly was still somewhat flimsy so made a jig to hold it rigid and enable me better to control the mounting of the handrails, taking dimensions from the loco to establish key points on the jig.



As you see, this is the jig after use. The red ellipses each sit over 2 holes drilled in the jig through which the bottom end of the handrails were pushed. The bracket at the back (circled blue) was used to bolt the back of the cab to the jig and was made from an off-cut of hardwood, machined to an L-shape. This was over-engineered and could have been a simple block of MDF, screwed to the jig. The green ellipse highlights 2 small blocks, also made of hardwood, screwed and glued to the jig and used to secure the tanks via their front mounting points. The distance between the outside faces of these blocks is 58mm, i.e. the width of the frames at this point. The feet of the tank mounting points sit on the base of the jig, it needs to be at least 62mm wide at this point. Finally, the back corners of the jig were cut at right angles so that the edges of the cab were exposed, which assisted when radiusing the edges. The jig was made out of the same 18mm ply as jig #1 and was screwed to a foot (an offcut of chipboard) so that the jig could be clamped in the vice.

The picture below shows the cab assembly attached to the jig, albeit after the handrails were soldered in place. Setup of clamps for soldering the handrails in place is shown on the next page. Note also that I had not taken the 45 degree cut off the back of the jig at this point - I only recognised the need for this later in the build.

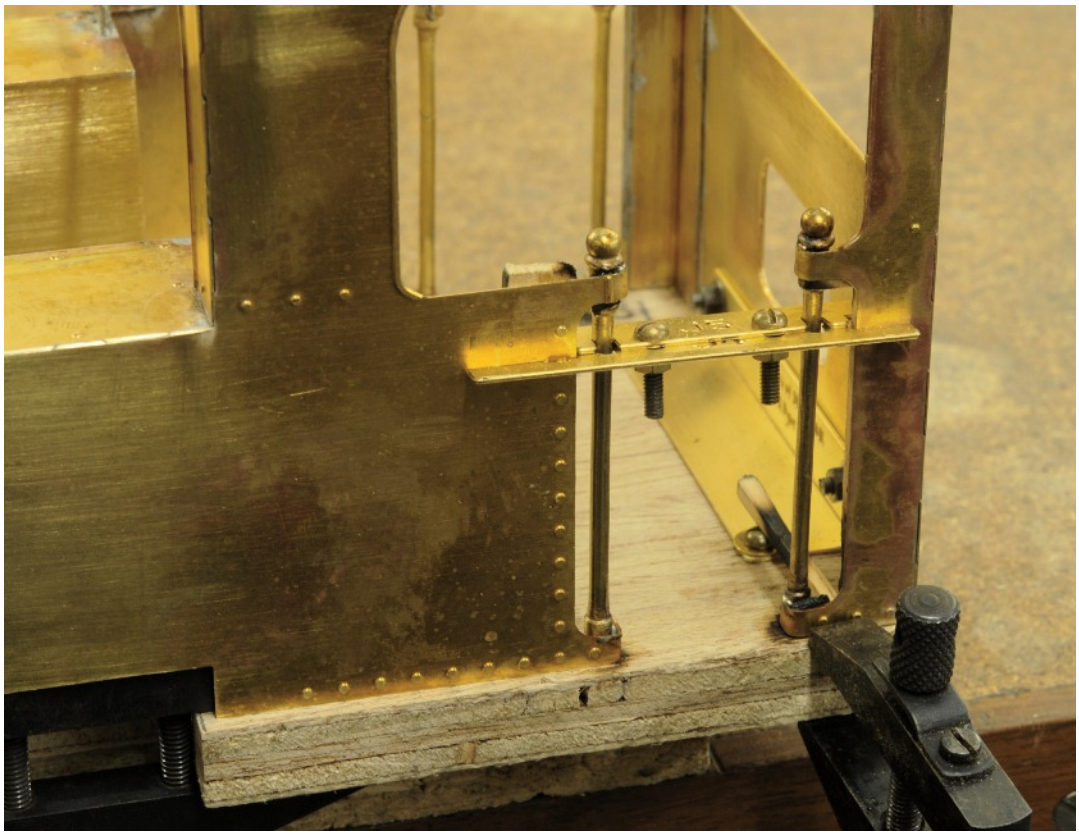


Soldering the handrails in place

Though section 3 of the instructions suggest use of glue to fix the handrails in place, I was by this time intent on completely soldering the body, so I proceeded as follows.

I assembled the clamp to secure the handrails to the upper cab mounting points as described in section 3 (jigs J4 & J5). However, to get the handrails parallel with the inside of the doorway, I extended the slots in J4 and put a thin wooden spacer between the edge of J5 and the back of the cab doorway on either side. The scrap of wood on the LH side is visible in the picture. Just visible bottom left in the picture is another engineers clamp which I used to maintain the position of the leading edge of the tank (I had previously soldered a small L-shaped bracket to the back of the tank at this point to help maintain a straight edge and it was to this that I attached the clamp). Finally, I used another scrap of wood to create an edge against which to fold the lower handrail supports, again with the intent of maintaining a straight line across the bottom edge of the cab.

When all the tabs which wrap round the handrails were formed, I fluxed the areas to be soldered and applied heat and solder. The result was a strong, neat joint.



Also visible in this view is the bracket supplied with the etched parts used to secure the cab to the rear of the footplate. There came a point when I was moving the assembled cab on and off the rest of the loco and needed this bracket on the loco. This was when I made (and over engineered) a bracket from hardwood which I attached to the jig. Before finally moving the bracket designed for securing body to footplate of the loco, I used the jig to solder a couple of brass nuts to the inside edge of the bracket because getting the steel nuts into place amongst the other fittings in the cab (gas burner, pipe and lubricator) was so difficult.

Other uses for Jig #2

As mentioned above, I mounted the body in the jig to radius the rear edges of the cab. I also mounted the body in the jig when soldering on the rivet and other detailed parts onto the body as this provided a stable platform, especially when clamping parts in place. If I were to build the loco again, prior to fixing the rear footplate to the frames, I would use it as a former to ensure that I got the holes for the handrails in the right place. I was in the fortunate position during my build to have a reject set of laser cut parts (the first supplier failed quality checks on samples so we took our business elsewhere). I cleaned up the footplate from the reject laser cut parts and used it as a former. It's an ill wind that blows nobody any good…

Soldering the detail parts onto the body

I should explain at this point that I have never soldered any brass loco body together in the past. I have some experience of soldering brass, but had never attempted anything on this scale. I was satisfied with the way that the body had soldered together and this gave me confidence to solder the detail parts in place and achieve my aim of a completely soldered body.

I assembled and fitted the water tank filler caps before I soldered on any detail parts. I formed CWT20 around jig J6 and soldered CWT20, 21 and CWT19 as a unit, from the inside. I then soldered the units onto the top of the tanks, using largish engineer's clamps between the upper surface of CWT19 and the bottom of the tank to retain them in place. I also re clamped the tank sides with a clamp across the top of the tank. By keeping a close eye on the colour of the brass, it was possible to solder the assemblies in place before the rest of the body became too hot. Once the assemblies were in place, I soldered the straps to the tank lids using solder paste (obtained from Blackgates Engineering), which needs less heat to flow than stick solder.

I then proceeded to the detail parts and soldered CWT23L&R and CWT5L&R in place first. I used the jig J3 as suggested in the instructions to achieve the correct position for CWT23L&R and used small bulldog clips to hold them in place. I used the same clamping method for CWT5L&R. The beauty of these clips is that they absorb little heat, so the work gets hot more quickly, meaning that there is less time for heat to spread to other areas of the body before you can apply solder. They do deform after a while but can be bought cheaply by the 100 and thrown away when life expired. I again used Bakers Fluid and found that careful observation of the colour of the brass gave me a good indication as to when to apply the solder. The outside end of CWT23L&R was free to move, but I judged that I could hold this against the tank fronts using a small piece of wood whilst the solder cooled and that if the other end was secured, I would not get the part out of position. This indeed proved the case.

Once the above parts were in place, I soldered CWT24L&R in place, albeit I used engineers clamps to secure each strip to the tank side. I started from the front of the tank, leaving the the rest of the strip free to expand. Having soldered the first 30mm in place, I attached a second clamp (but left the first in place) and soldered the next 30mm onto the tank side. Very little solder was needed because the flux tended to draw solder along the joint, i.e. from where I had just soldered to where I was next soldering. I continued along the strip until it was soldered at the cab end.

The vertical rivet strips CWT6L&R were clamped to the cab side at the top, so they could expand towards the bottom, and once solder was applied, any tendency to bow outwards could be corrected with flux, more heat and a piece of wood to press the strip against the side of the tank until the soldered had cooled.

The edges around the cab were soldered in a similar manner, i.e. staring at the centre and soldering outwards and downwards on either side, clamping as I went and using Baker's Fluid to draw solder along the joint.

The only really difficult part to solder on was CWT15, because the back of the cab tended to deform as it was heated, making it very difficult to get CWT15 to sit snugly against the back of the cab. I had many goes at this before I was content (I was never fully satisfied) and if I was building the loco again this is the one part which I would glue in place.

I'm reasonably satisfied with the results. What I like most about solder as opposed to glue is that it's quicker (Superglue needs time fully to cure even if it fixes quickly) and if you do get something slightly wrong, a little heat releases it, you clean up the work and start again. A second attempt is often then successful because the work was tinned during the first attempt, meaning that only flux and heat are needed on the second attempt.

Dummy pony truck bearings

First of all, I countersunk the hole in S1L/R. Then I assembled the 6 parts S1L/R through S6L/R together in the order described in section 3 instructions, using the countersunk screw and its bolt, plus the 12BA bolts to hold the assembly together. I sat each assembly separately on a fire brick, fluxed the assembly using Baker's Fluid and heated it up, applying heat only to the axle box part of the assembly. As it turned colour, I applied solder which spread along and between the layers of the assembly and by using more flux was able to draw the solder out to the edges.

Once heated, it stayed sufficiently hot to apply solder in places where it appears not to have run and a little additional heat soon had the solder running again. I avoided getting solder onto the back of the assembly so the nuts were readily removed after the work had cooled. I felt that his was much quicker than gluing successive layers in place.

I also soldered the countersunk screw in place, from the top. This left a certain amount of solder on the face of SL5, effectively tinning the surface. I used one of the small bulldog clips referred to earlier to clamp SL7 to the assembly and really only needed heat and flux to solder SL7 in place.

Compressor and air brush

The Roundhouse instructions make reference to testing and fine tuning the loco's valve gear using a compressed air supply if possible. Keith performed various Internet searches and found a wide variety of airbush kits suitable for the modelling environment. A Google search for "model airbrush kit" returned a multitude of options between £60 and £80. Most were rated at 35-40 PSI, which is more than enough to run Victory on compressed air. All included an air brush and some included additional paint containers. As you will see if you access the web page referred to below, it is very possible to achieve a good finish using aerosol spray cans but use of an air brush will take your painting to another level.

Painting

Colin provided the following link which provides hints and tips associated with painting locos. This will clearly be of limited utility to builder who don't have access to the Internet. The author is Chris Bird (he of the Summerlands Chuffer and a 16mm member). I'm prepared to provide printed black and white copies of the article to builders without Internet access on request. However, if you've ordered Victory by email then I assume that you can access and print the article yourself. Please contact me as required.

http://www.gardenrailwayclub.com/workshop/painting---the-easy-way

Conclusion

These notes capture the comments made by the early builders and the approach taken to building the kit. Any omission are my mistake as opposed to disagreement with their suggestions. This has been a long project and I may have forgotten a couple of points. Please take them as suggestions only - you may well have better ideas and different ways of making the assembly satisfying and successful. If you do and have access to the Internet, do share your experience on the eGroup SteamModelLoco so that others may benefit.

Good luck with the build and I hope that you are as pleased with the outcome as we early builders are with our locos.

Alan Regan, 19th March 2014