West Wiltshire Society of Model Engineers Newsletter

Issue No. 14 June 2020

Club Website

You may have noticed that www.wwsme.org is not working at the moment. We have had an issue with the website and it has been taken offline until this is resolved.

Newsletter Articles

Have you enjoyed reading about our various members projects over the past few months?

If you have and you have some pictures or an article you would like to include in the newsletter please send to Colin Wade at secretary@wwsme.org.uk or directly to David Adams.

News

VE Day Special

Determined to celebrate VE day during lockdown David Clarke ran a special train in his garden at home on Friday 8th May.

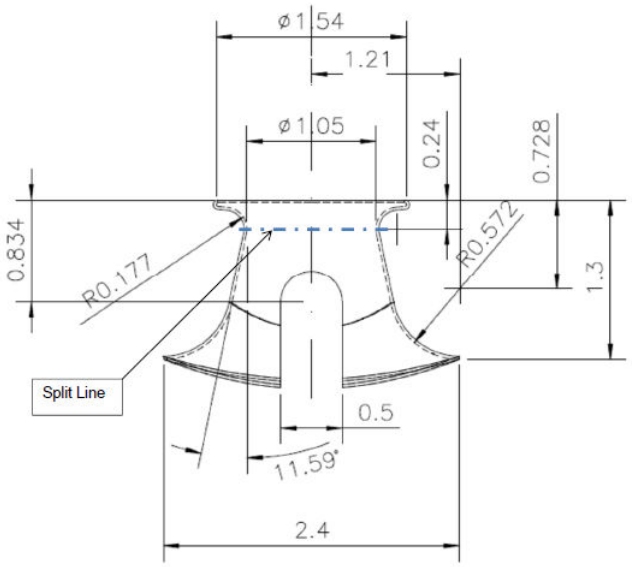
My Spinning Adventures

By T J Neary

I had just completed the cladding of the Grange boiler tube when thoughts turned to the safety valve bonnet. The standard solution is a cast bronze bonnet supplied by Polly Engineering. I phoned them and was told they had none in stock and didn't know when more would be supplied. I had some brass sheet leftover from the cladding and wondered if it would be possible to spin a bonnet on the Myford.
The first consideration was the actual Tooling required. Watching various You-Tube video's I came up with a bar to replace the lathe tool post. I had a piece of 30mm square bar 7 inches long and drilled a 7/16" dia hole to accept the tool post spindle. I added four 1/2" dia. holes along the length as shown the picture below.

Also required was a bar with which to do the actual spinning. I used a 1/2" bar 20" long and turned a ball at each end. As shown below.

For the actual mould I referred to F J Roche's book Historic Locomotive Drawings in 4mm Scale which gives full scale dimensions as well as 4mm scale. Using Turbocad I produced a model of the mould in 5" scale.



From the above it can be seen that spinning the bonnet in 1 piece would result in the mould being trapped inside the finished part. Therefore the mould would need to be split at the line shown above. I had a suitable piece of Aluminium and was able to make the rim portion quite easily using a tool ground to the correct radius. The main body with the large 0.572" radius was more of a problem. Using the CAD, I divided the large radius into 1/16" steps and produced the corresponding diameters. Thus giving a rough, stepped solution as shown the picture below.

To finished the radius I ground a piece of 3/16” gauge plate to the correct radius. As the material was aluminium I didn’t worry about hardening it.

Using a slow speed and copious amounts of oil the cutter worked beautifully. I drilled and tapped the body to take an 8mm thread and bolted the two parts together. I also made a thick steel washer which would grip the sheet brass. I gave the assembly a final polish to ensure there was no step between the rim portion and the main body.

It was at this point that I had one of those 4am sudden awakenings and thinking “idiot”. Of course during the spinning process I would probably need to anneal the brass. This means heating it to Cherry red. But until I had finished, the rim portion would be trapped inside the spinning and being Ally It would melt as I annealed the brass. So I had to remake the rim in steel.
The next unknown was the required size of the piece of brass sheet. Having no idea I cut a circle that would clear the lathe bed with a bit of clearance.
Using a blunt ½" end mill as a fulcrum I started my 1st attempt. I locked the lathe saddle, cross slide and the top slide and commenced levering the brass sheet over the mould. All went well at first. As I gently levered the flat sheet it magically began to take the form of the mould but I came unstuck when trying to get the material to tuck behind the top rim. Despite several annealings I had no success.
Below are few of my better failures. I did learn that I needed much less material than I originally thought. I ended up using a 2 and a ¼ inch dia. blank.

After a number of failures my stock of brass sheet was running low so I decided to only spin the body of the bonnet and make a machined rim. By just using the main part of the mould with a new washer, the need for the reflex part of the spinning was obviated.

Below is the final bonnet with the machined rim soldered to the body.

Conclusion

I had great fun attempting spinning and was pleased with the result. I am sure that with a bit more practice I could have achieved producing the bonnet in one piece. If anyone wants to borrow the tools I made to give it a go, let me know.

Plastic Boiler Plate Formers? Don't Be Soft! Part 3

By David Adams

In Parts 1 & 2 I described how I used 3D printed plastic formers to make the copper boiler plates for my 3 ½" gauge Martin Evans design William locomotive.

For the outer and inner firebox wrappers I designed some 3D printed plastic bucks to form the copper over. The 3D printed bucks for forming the shape of the outer and inner firebox wrappers worked well in conjunction with some lengths of mild steel bar used to roll the annealed copper over the buck with the help a large vice used to push the bars and form the copper over some of the tighter radiuses.

Figure 1 - Firebox inner wrapper sheet being formed over 3D printed buck.

The outer firebox which is formed from the boiler barrel by cutting the boiler tube and opening up the tube to form the outer firebox on William has an extension piece of 2.5mm coper held in place by a strap plate riveted to the inside to attach the extension plate to the boiler barrel.

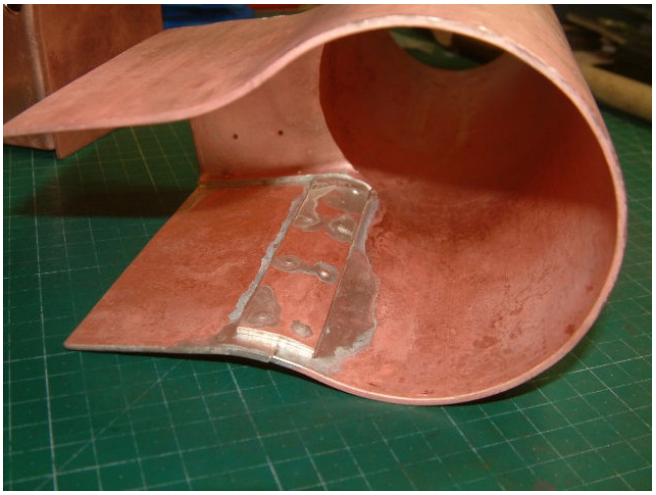


Figure 2 - 3 1/2" William outer boiler shell construction showing firebox extension and riveted strap after silver soldering of strap joint and throat plate.

When the buck for the outer firebox was modelled on 3D CAD I included a groove into which the riveted strap could sit to allow the final adjustments to be made to the shape of the firebox once the strap had been riveted into place. This worked although care was needed to bend the copper either side of the riveted strap joint and not bend the strap at the point the extension meets the boiler barrel which loosens the rivets – as you can guess this happened to me and I had to re-rivet the strap into place and try again.

Figure 3 - Boiler outer shell firebox being formed over hollow 3D printed buck. Note groove in buck into which riveted strap can fit.

The 3D printed formers and bucks worked well and were a good use of 3D printing to save a lot of time and effort making these parts compared to using the more traditional methods described by

the likes of LBSC, Martin Evans and Alec Farmer in decades gone by. I would like to think that if they had 3D printing available to them at the time they would have used it to save time and effort making things like formers and bucks and put the time into the making the best job you can of building a large scale locomotive, driving it and getting on with the next one!

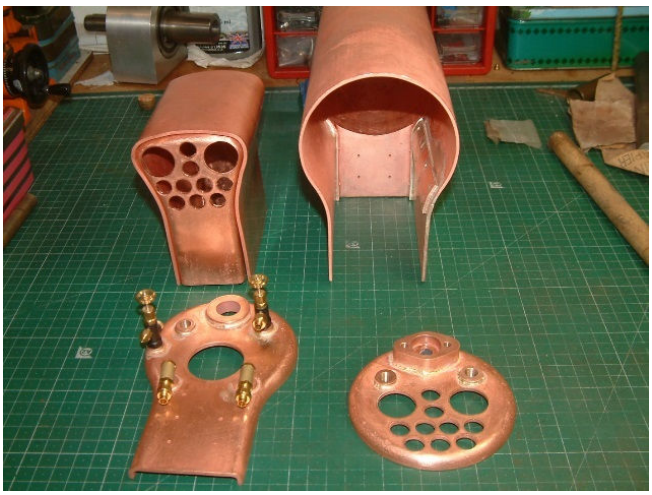
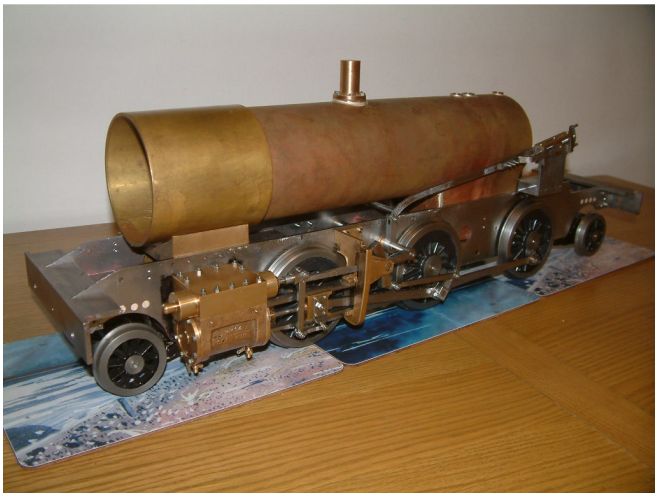
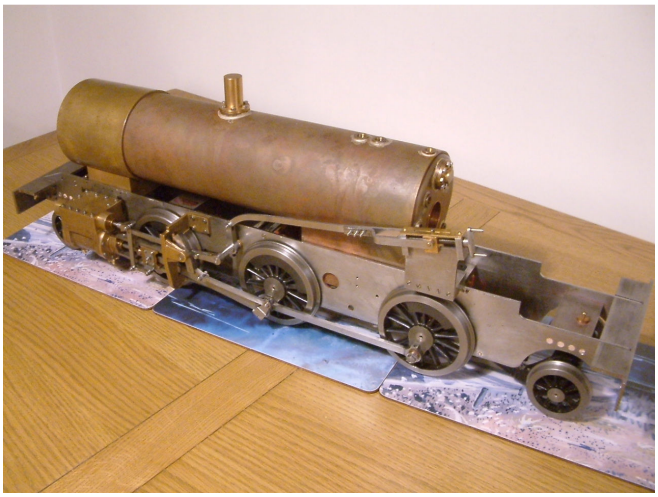


Figure 4 - Success! Inner firebox assembly, outer boiler shell assembly, backhead plate and smokebox tube plate ready for fitting of fire tubes.

So what else could we use 3D printing for in model engineering? Anyone fancy having a go at a home foundry making their own castings using 3D printed patterns? Just a suggestion!





Figures 5 & 6 – William a 3.5" gauge design by Martin Evans. Work in progress...