West Wiltshire Society of Model Engineers Newsletter

Issue No. 12 April 2020

Things are going to be rather different for us all for a while with the AGM postponed, the April and May open days cancelled and our regular club meetings suspended until further notice.

The newsletter is probably the only thing at the club which does not need to be affected by Covid-19 at this time when we unfortunately are not able to visit the club site.

Hopefully, if members are spending more time at home then there will be more projects being built.

In this edition of the newsletter we have three articles written by members showing their projects.

If you have a project in progress or completed and would like to share your pictures and write an article however long or short then this can be published in the newsletter for members to enjoy.

The mores varied the subject of articles are the better.

Some suggestions could include if anyone has pictures and memories of the club over the years such as how the club began giving rides on the portable track at fetes, the old track site in Westbury, moving to the current site and building the tracks, building the club house and the machine shop.

If you have built your own garden railway at home or if you have any workshop experience and techniques you would like to share these would all make interesting articles which can go into future newsletters.

Please send your articles to Colin Wade at secretary@wwsme.org.uk
or directly to David Adams.

A Pannier's Tale

By Alan Milner

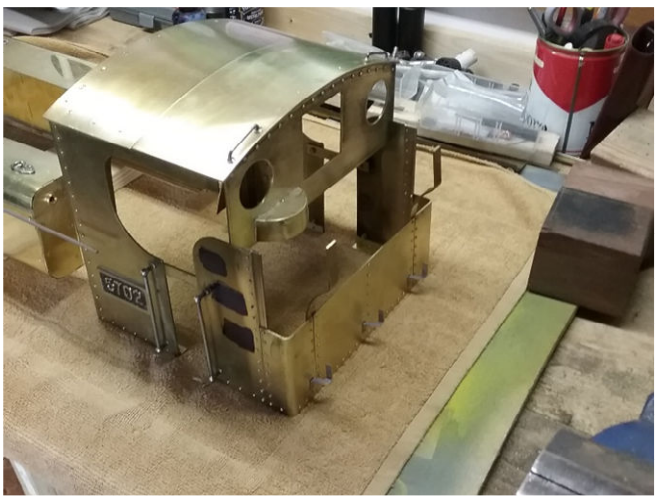
When my son was 5 years old I started building a 5" GWR 57xx pannier tank the boiler and cylinder block having already been started by an obviously very accomplished model engineer.

Convinced my young son would be riding behind it when he became a teenager, and to highlight how I underestimated the amount of hours work needed to accomplish this, shown are the meagre results of my winter's efforts in the shed (my son is now 24!)

The pannier tanks were obtained as a kit from 'Model Engineers Laser' the tank outer wrapper thankfully already formed as doing this myself was keeping me awake at night, but there is still a lot to do prior to being able to soft solder them together, another club member is going to give me the benefit of his soft soldering experience when this civil emergency is over as it's not a skill I have developed.

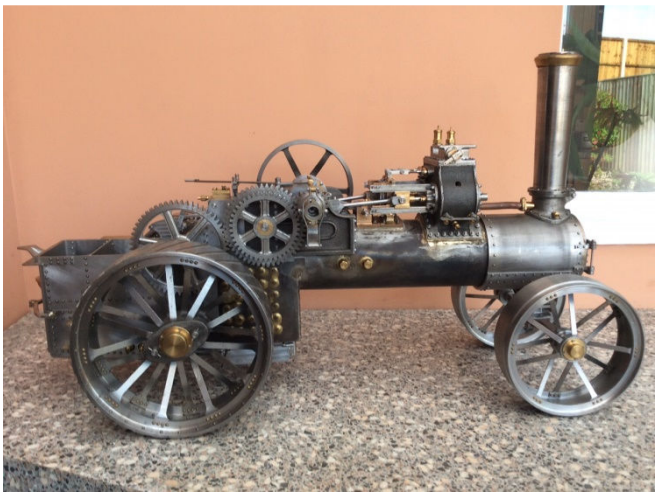
The cab and bunker has many variants from LBSC's original plan to allow access to the controls etc., but as with several other modifications to the models design over the years this is something I wish I had made myself more aware of them from the outset.

I've been struggling with the rounded corners of the top of the bunker which I'm thinking of making from copper bashed in to shape over a wooden former, but two attempts so far have only fed my hungry scrap bin, but will get there eventually.



1” Scale Fowler Ploughing Engine

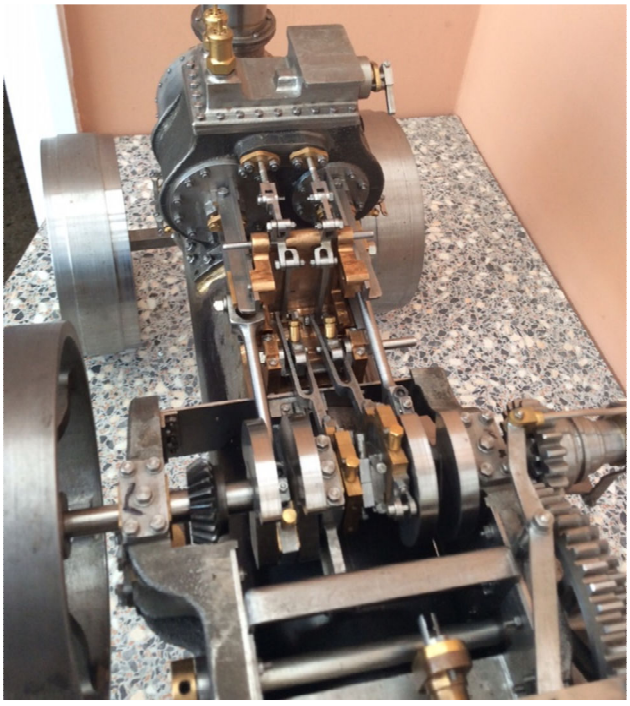
By Chris Wiggins



I have been building a 1” scale Fowler Ploughing engine for a few years now, using the Hainning 2” scale drawing as the basis of the design (a challenge in itself). I wanted to make a 2” engine but my lathe and mill are not big enough. It is totally scratch built; I did all the necessary casting drawings and had the patterns and castings made (1” casting are not commercially available). The picture of the engine is a little out of date, as I have now soldered the ploughing drum support to the boiler. Also, I have taken advantage of the current confinement to make all the steering gear.

The major outstanding tasks are the regulator, valve gear and drain cock operating mechanisms, ploughing drum clutch and coiling mechanism, lubricator, blower valve (I will have to make one, as proprietary valves are not small enough) and pipework.

As an aside, I had real problems sourcing steering chain that was roughly in scale (small enough) for a 1” engine. None of the model engineering suppliers could help. However, after a trawl on the internet, I found the ‘English Chain Company’. They are internet based, but offer a wide range of very small to very large chains. The chain shown in the picture of the steering gear I obtained from this company and their service was very good.



Plastic Boiler Plate Formers? Don't Be Soft! Part 1

By David Adams

One of the greatest challenges of our hobby and one of the most rewarding is building your own silver soldered copper boiler.

The boiler plates are cut out from copper sheet and heated to anneal them which removes the internal stresses in the material and makes it soft and easy to work. The flanges on the boiler plates are formed by working the annealed copper over boiler plate formers.

Figure 1 - Completed back head plate & smokebox tube plate for my 3 ½" gauge William after threaded bushes have been silver soldered into position.

In his locomotive designs LBSC specifies that boiler plate formers should be made from ¼" mild steel, Martin Evans says the formers could be made from thinner 1/8" mild steel which is then screwed onto a hardwood backing for support and in Alec Farmer's book Model Locomotive Boilermaking (a 'must read' for any model engineer) he suggests the formers could be made from Tufnol. All of these methods are fine if you are a professional boilermaker and intend to use the formers to make many boilers but if you are just making one boiler then it seems to me making up a set of formers by cutting them out by hand and filing a radius on the edges is a lot work for a set of formers you are only going to use once.

3D printing has well and truly arrived in the world of model railways especially in the smaller gauges with complete locomotive, waggon and coach bodies able to be printed on the increasingly low cost 3D printers aimed at the home hobby market. This got me thinking – how could 3D printing be used in the larger gauges such as SM32, SM45, 3 ½" & 5" gauges?

For the first locomotive I built, a 3 ½" LBSC Tich the nameplates were successfully 3D printed and painted and have stood up to 3 years of use. Hobby 3D printers are of the FDM (fused deposition modelling) type which is best described as a computer controlled hot glue gun. A filament of plastic (commonly ABS) is fed from a reel into a heated nozzle where it melts and is forced out through typically a 0.25mm orifice. This creates a 0.25mm thick strand of molten plastic which the 3D printer moves in the X and Y directions to build up a layer of plastic and once the layer is complete the item being printed moves down in the Z direction to allow the next layer of molten plastic to be built up. Because FDM 3D printed parts are made in this way the one thing the finished parts do not like is being exposed to heat which rather limits where these parts can be used on a live stem engine.

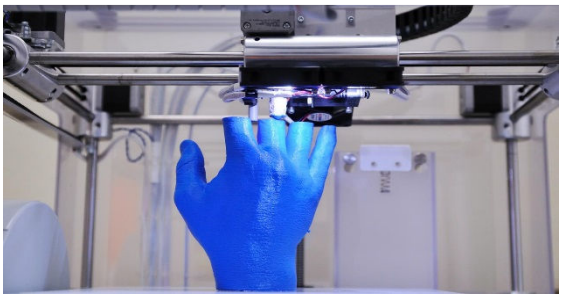


Figure 2 - An FDM 3D printer in action. Looks handy?

My plan was to attempt to 3D print a set of boiler formers for the locomotive I am currently building, a 3 ½" Martin Evans design William 2-6-2 tank engine. The boiler for William is made from a seamless copper tube which is cut and opened at one end to form the sides of the firebox so I decided to 3D print a buck to form the shape

of the outer firebox as well as a second 3D printed buck to form the inner firebox which is formed from copper sheet.

Would it work? Would the 3D printed plastic formers be able to withstand 2.5mm and 3mm thick annealed copper being formed over them by being repeatedly beaten with a rubber mallet?

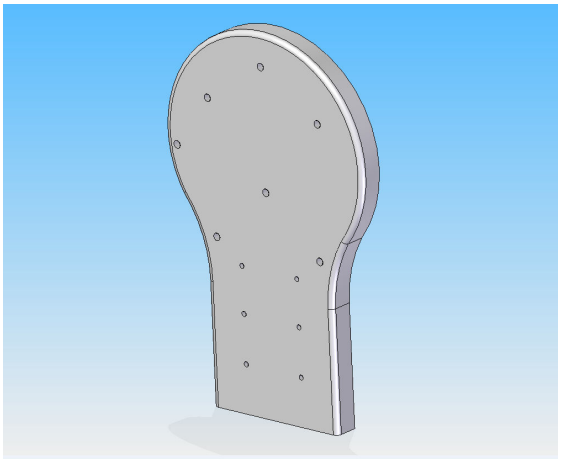


Figure 3 - Back head plate former modelled in 3D CAD.

The boiler plate formers and bucks were modelled using 3D CAD software. I used Solid Edge but FreeCAD is free to download although I have not used it. The radiuses are modelled onto the formers for the copper to be formed around along with pilot holes for all the holes (fire tubes, threaded bushes, fire hole etc.) to allow the correct hole positions to be drilled into the copper plates without the need for marking out the hole positions. I modelled all the pilot holes 3mm diameter on the 3D CAD models for William's formers. The bucks were modelled hollow on 3D CAD with a 4mm wall thickness to save both time and cost when these parts were 3D printed.

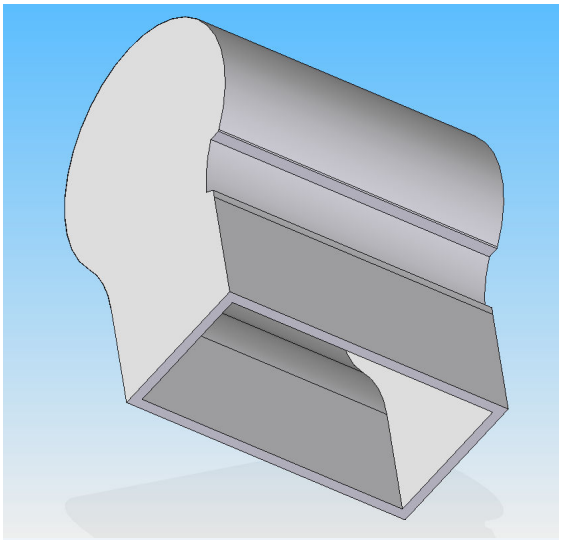


Figure 4 - Outer firebox wrapper buck modelled in 3D CAD.

If like me you didn't get your very own 3D printer for Christmas there are many companies where you can upload your 3D CAD files to their website and get an instant quote for them to be printed in ABS plastic using an FDM 3D printing machine. These companies offer finishing options such as hand sanding or bead blasting but there is no need for any of these, you are only going to attack your 3D printed formers with a rubber mallet, they don't need to look pretty.

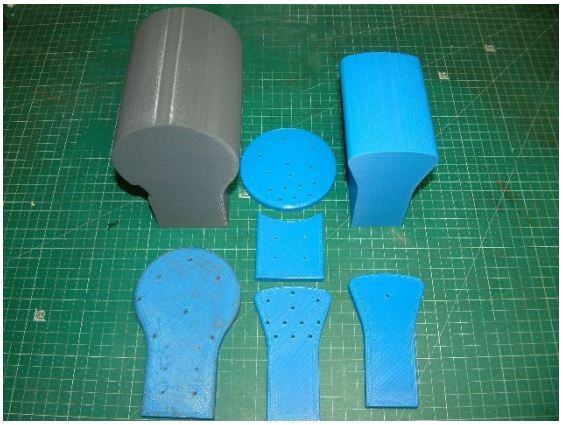


Figure 5 - Complete set of 3D printed formers & bucks for 3 1/2" William boiler.

Will the 3D printed plastic formers work?

Find out in Part 2.