

BRIDGE CONSTRUCTION FOR LITTLE BYTHAM

Overview and some of the techniques used

Part 1 – Design and Construction

By David Wager

This article gives an overview of the M & GNR bridge project for Tony Wright's 'Little Bytham' layout, together with a number of techniques used during the design, build, painting and weathering.

I have always had a fascination with bridge design, and with the opportunity to build something a little different, I jumped at it. I did not realise just what I was letting myself in for but thankfully all of the effort was well worthwhile.

I heard that Jamie Guest had completed a CAD design for the bridge according to prototype drawings, and that photoetches had already been produced by Grainge & Hodder Ltd. The new construction would replace the temporary plastic 'kit bashed' Dapol double track bridge that was in place. I was keen to get a set of etches, and after discussion with Tony it was agreed that I would construct the bridge for him.

As this was the first design and production etch for the bridge there were some issues to overcome. It is usual to have a number of iterations with new design, so no wonder a number of corrections were needed with such a complex design and with Jamie working from poor quality original drawings. There were a number of parts to redesign, plus more detail parts needed to complete the bridge. So a fast learning curve for me, to produce additional photoetch designs using CAD (Draftsight software).

This is the prototype



And this is the model (OO scale)



As installed

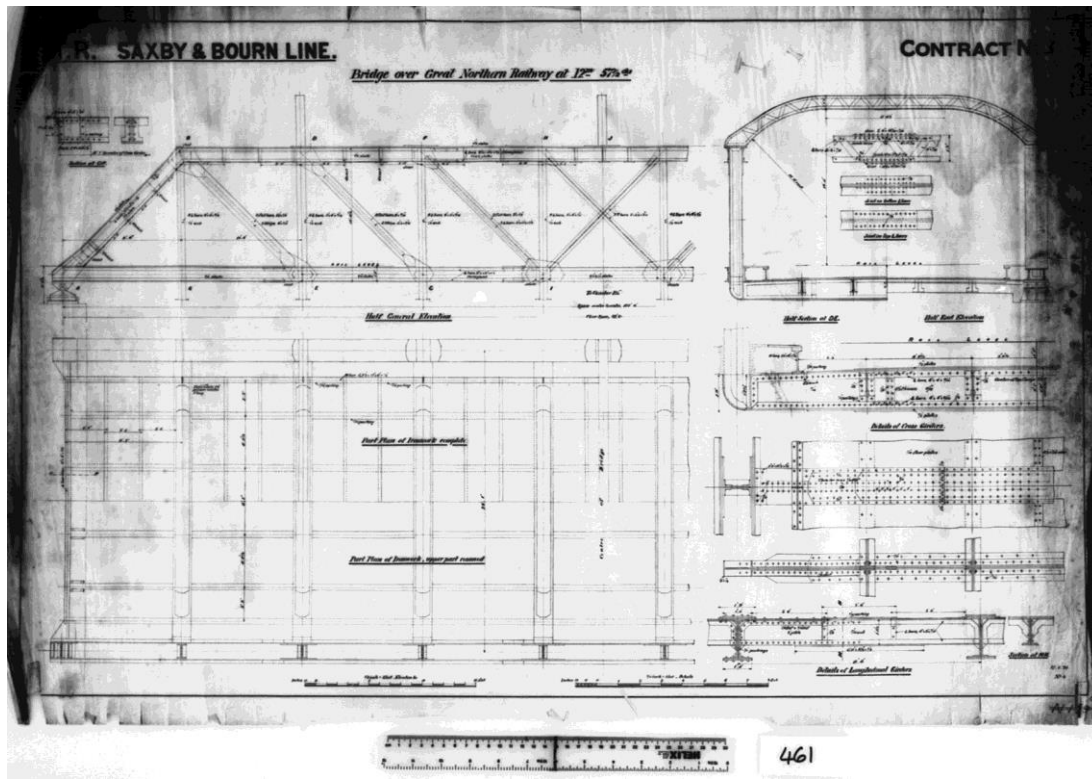


A videos of the layout including the new bridge is available on U-tube

https://www.youtube.com/watch?v=RpaFCwRcl_Q

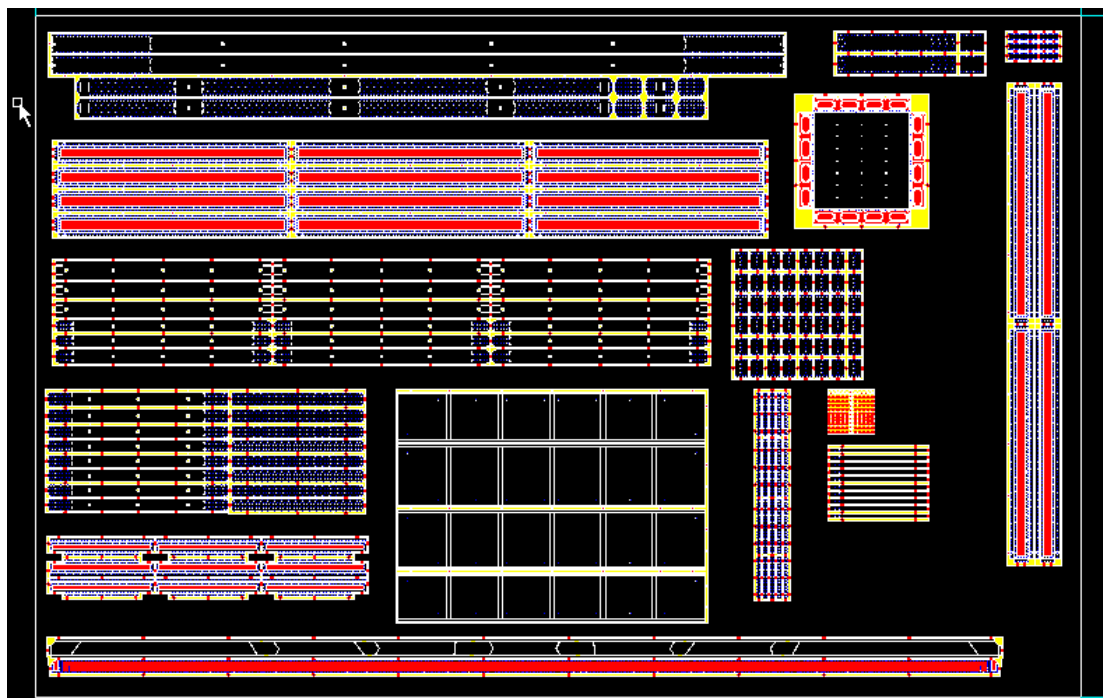
Design

This is one of the original drawings to work from. A real test of the eye sight, but does include good old feet and inches!



The additional CAD design (shown below) was produced using Draftsight, for which the licence is cheaper than Autocad but wholly adequate for the task in hand. Jamie used the same.

A little water tank etch was 'snuck in' for Andy!



A set of rules for photoetch design need to be adhered to, otherwise the etch will not form properly, or construction would become difficult. For example, the fold line width according to material thickness.

A couple of very good articles in Model Railway Journal have been referred to:

MRJ No 190 pages 93-99 & MRJ No 228 pages 18-25

Some other useful documents produced by Hollywood Foundry. Sadly they have closed their business, but it is rather far away in Australia if I remember. I had already captured the pdf files which can be accessed in this section.

Construction

This was a challenge with long fold lines, narrow flange widths and soldering of 'curvy' parts. Furthermore the construction of each of the two trusses is in a number of layers giving the potential to unsolder work already done. And what a lot of rivets to punch!

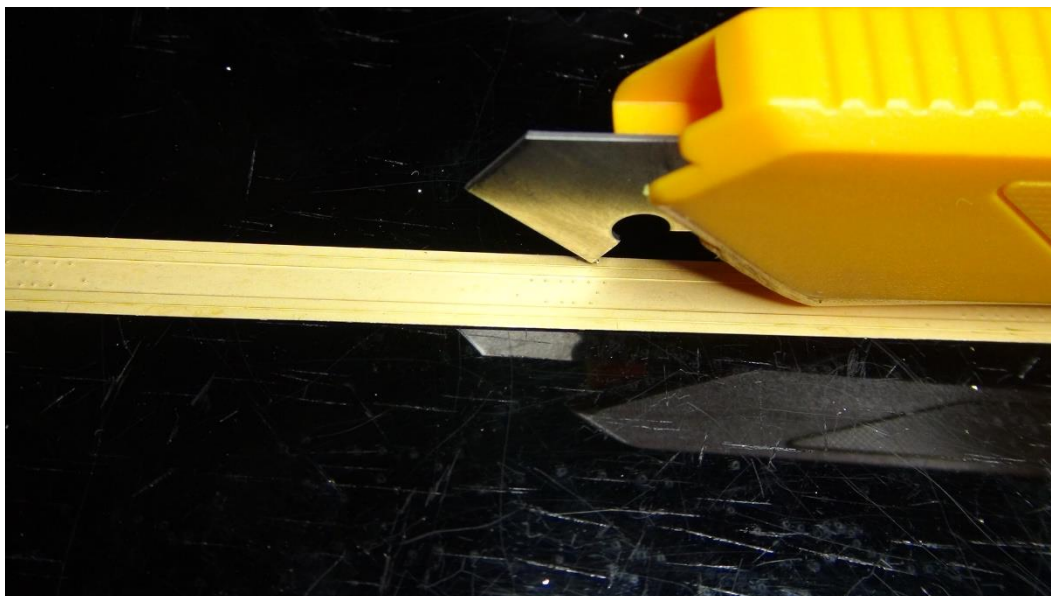
A combination of standard soldering and resistance soldering was used. I'm not sure how I would have managed without the resistance soldering kit from London Road Models. With time it became second nature to employ either of the techniques depending on the task. Tinning followed by resistance soldering was much 'cleaner', and coupled with the David Brandreth micro-solder pieces, clean-up was kept to a minimum (Scalefour News No 205 pages 28-29).

Two solder temperature ratings were used, 179 and then 145 to reduce the risk of de-soldering.

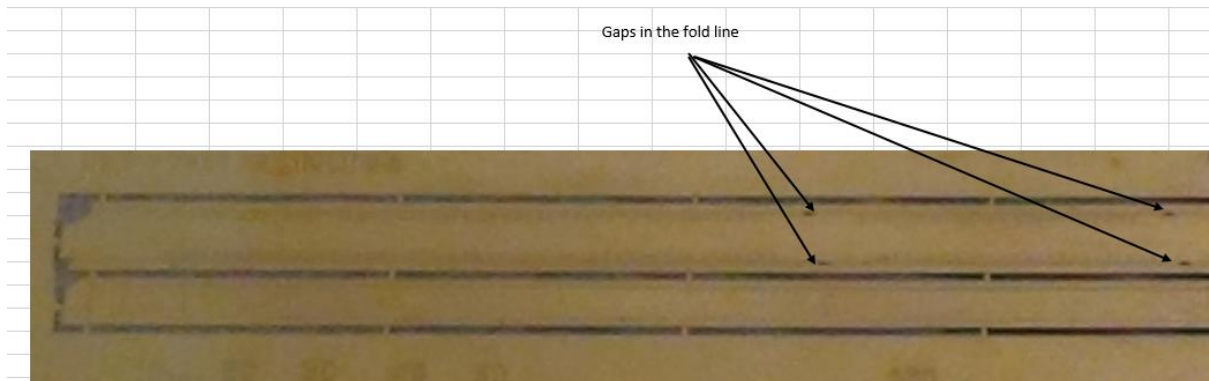
Long narrow folds

The longitudinal beams were longer than the largest 'Hold & Fold', so a number of shuffles back and forth had to be done. With a long narrow length and the fold lines too narrow the beams tended to curve.

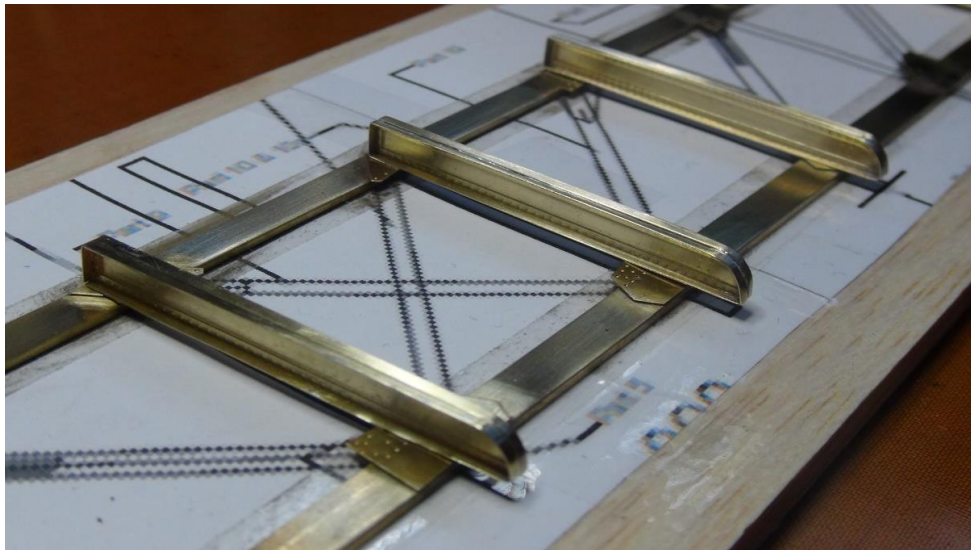
The fold lines were widened using an 'Olfa' PC-L cutter. This helped the fold but lacked uniformity of depth down the length.



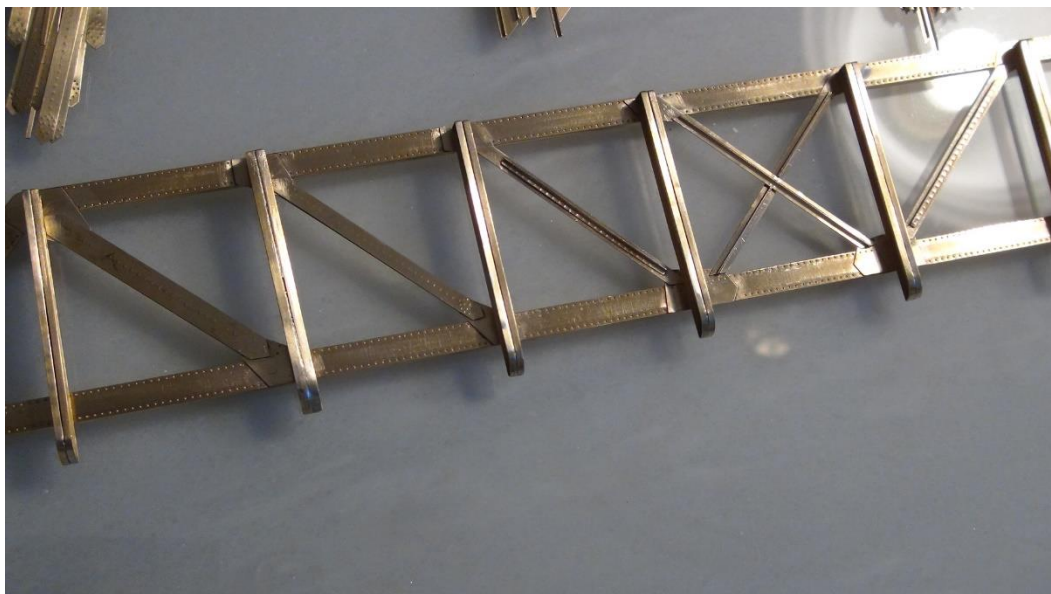
Ideally there should be gaps in the fold line so that the fold is done in sections. A test beam was included on the additional etches so that this could be tested. Still to be done but should be a lot easier to fold whilst keeping the beam straight. Thank to Ian MacDonald for his advice.



Progress – Vertical beams attached to one half of truss

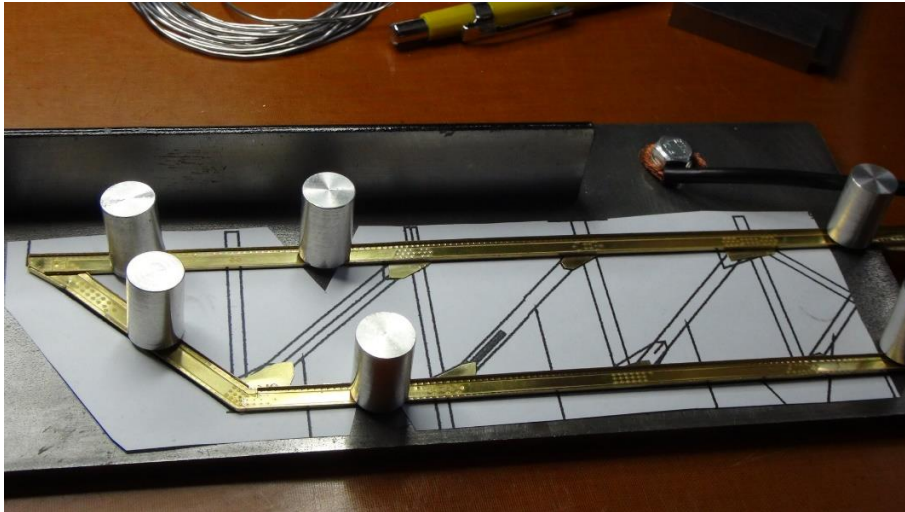


Progress – Compound diagonals connected to flitch plates

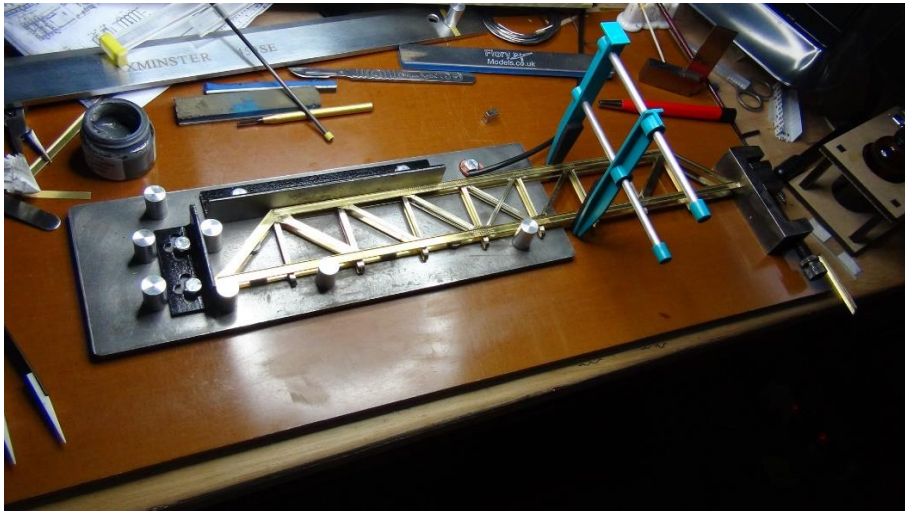


Some resistance soldering set-ups

One half of truss – flitch plates and end diagonal braces



Combining two half trusses



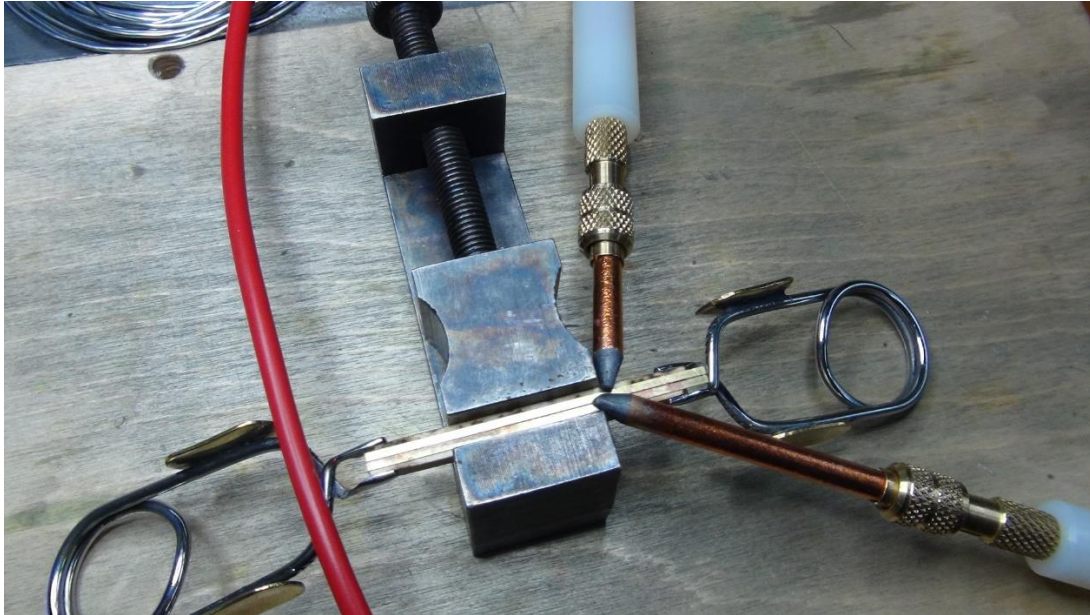
Triple layer sandwich of top cross bracing. Soldering this way stiffening the sub-assembly before final removal from the fret.



One particular set up was not typical of the usual metal plate or clip to close the circuit. When soldering two parts back to back of a riveted channel section, first the backs were tinned.

They were then set up in a small vice with pieces of wood sitting between the flanges. This clamped the parts whilst electrically isolating the brass from the vice. Two probes were then used in steps down the length of the section with short bursts to achieve the bond.

DCC concepts NO-CLEAN flux DCS-SFNC was used throughout.



Folding of delicate (narrow) parts

Folding the flanges of the top cross bracing was not possible by the usual 'Hold and Fold', so clamps had to be set up with the finish of the fold achieved by using a rolling bar



On the opposite side of the bracing a clamp had to be made up



Sub- assemblies complete



Cleaning up after soldering was done using Flory models sanding sticks, various gravers and finally a good clean with 'Bar Keepers Friend' stain remover