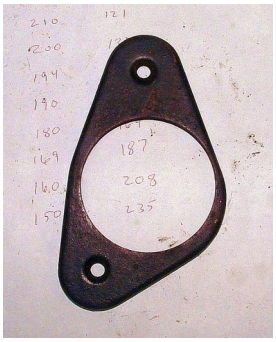
YES, YOU CAN STAMP YOUR OWN TRIUMPH PARTS!!!
Ron Weber
Central Pennsylvania Triumph Club
January 28th, 2024

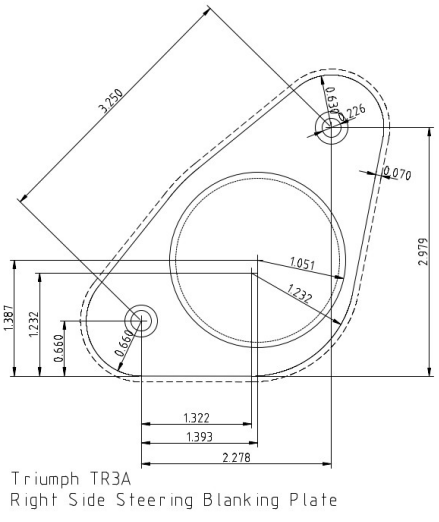
Putting a car back together after a lengthy restoration is always a challenge and you inevitably find out you wish you took more pictures, organized parts better, kept better records, inventoried what you have and what you need, et cetera. I experienced all of these in the process of putting my TR3A back together. A prime example of this is when I discovered I was unable to find the blanking plate for the right hand steering column hole in the firewall. After unsuccessfully digging through all my boxes and the extra boxes of parts that came with the car, I wondered that maybe it wasn't on the car to begin with. Luckily, I had a picture of the car as-dragged-home (it was a barn find) and discovered it wasn't there to begin with. This started a search for the elusive blanking plate where I discovered it is no longer made by anyone and, after checking with a number of club members and searching on the internet discovered it is nearly impossible to find used.



I was able to find an image on the internet of what this part is supposed to look like. It clearly is a stamped and formed part so that left me with only a couple initial options to get one. Option one is continue to look for a part and hope I found one before I complete the rebuild of the 3. Option two is I could cut a part out of 1/8" steel that looks like the part, paint it and use it knowing it won't look original when installed. Fortunately, I didn't have to resort to either as I had the opportunity to chat with club member Jeff Costenbader at the annual CPTC Christmas Party. Jeff's restored a number of Triumphs so I asked him if he had one of these to which he responded he didn't but why don't I just make one out of scrap sheet metal. He indicated he used a relatively simple process quite successfully to form a stamped part for a Spitfire he restored. That intrigued me so we agreed to chat more on the phone a little later.

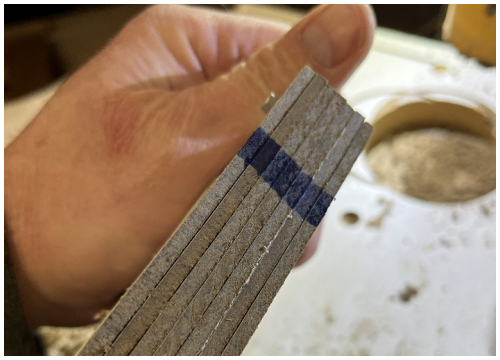
The process that Jeff explained to me on the phone was simple enough. The punch and form part of the die are made of tempered hardboard mounted to rigid bases (called "upper and lower die shoes" in the industry). The sheetmetal is sandwiched between the two and a hydraulic arbor press is used to press the two halves together forming the sheetmetal between the punch and form. It didn't seem possible that the hardboard could withstand the pressures necessary to form a sheet of steel. I was skeptical about this and at the same time intrigued so I decided to try it. What did I have to lose?

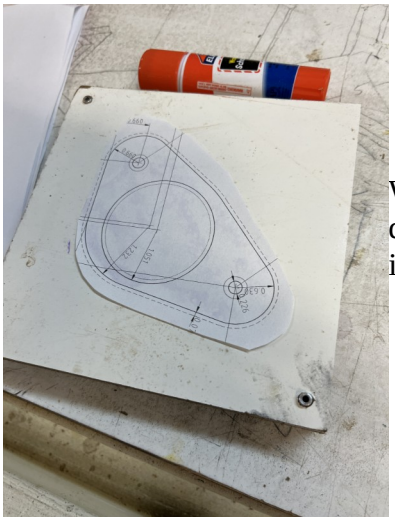
The first thing I did was measure the centerline distance on the firewall's screw holes where the plate is supposed to mount. This gave me a scale reference that allowed me to take the image I found and reduce or enlarge it until the hole dimensions on the image matched the measurements between the firewall holes. Once I had this scaled properly, I could start to take dimensions off the image for the other features of the part. The dimensions I pulled probably aren't exactly accurate to the original but close enough. At this point, I could have done a scale drawing on graph paper but I ended up creating a CAD design of the part to make it easier to print out multiple scale drawings.



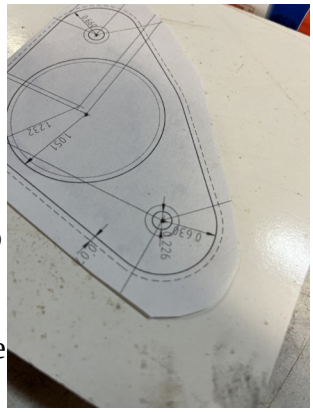
The process for making the die set is very similar to what is done to make a production die set. The main difference is my set wasn't going to be made of precision machined, hardened steel that is designed to manufacture tens of thousands of parts. I only need one part so for the upper and lower die shoes, I used ¾" particle board (I reasoned that it was already formed under extremely high pressure so it shouldn't compress much in use). For the actual form and punch, I used ¼" tempered hardboard. The upper and lower die shoes were cut to roughly 7"x8". I made a eight 6" x 6" blanks of the hardboard not knowing how many I'd need. I also cut a three 6" x 6" or so blanks of 20 gauge steel so I'd have extra just in case.

After cutting the die shoe pieces, the next step was to locate and drill guide pins for these. Lining up the edges of the top and bottom die shoe, as well as the hardboard blanks and the sheet metal blanks, use a drill press to drill 3/16" holes in opposing corners to locate the die shoes to each other and reference the hardboard blanks to each other. While not necessary, if you have access to a +0.001 3/16 reamer, ream the holes to make inserting the pins easier. Pin these together using 3/16" steel or aluminum pins. A slight bevel on each pin makes them easier to drive in. Make sure they are at least 1 ½" long. Now take a Sharpie® marker and put a vertical, perpendicular alignment line across both die shoes on one side of the stack. This mark is critical for future alignment.





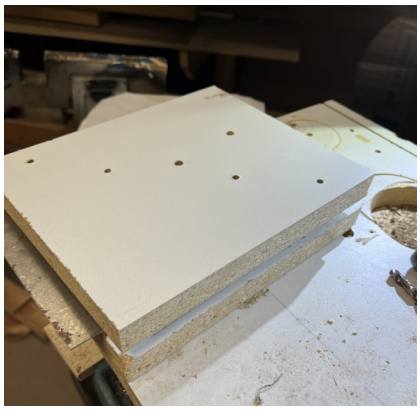
While you have your stacks assembled, print out a copy of the CAD drawing at 1:1 scale and glue this to the center of one die shoe, orienting it to ensure widest margins around the drawing.



Now that the full stack is assembled, use a center punch to transfer the paper drawing hole centerlines to the die shoe. Drill 3/16" holes at these points through the entire stack using a drill press to ensure the holes are perpendicular. Once this is done, everything can be disassembled so the form and punch can be made.

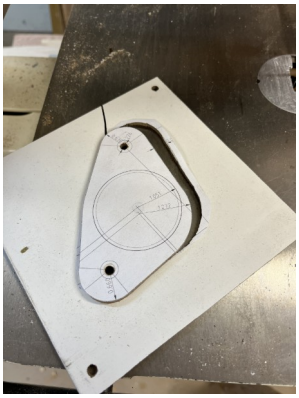
For the blanking cover I made, I decided to form the center embossment first. To do this, I picked a hole saw that matched closely the diameter of the embossment I wanted. Using a drill press and taking one of the hardboard blanks, I used the hole saw to drill where the embossment needs to be using the existing 3/16” hole in the hardboard as a pilot hole. Once the large hole is drilled, remove and save the hardboard slug that remained in the hole saw since this will be used for the punch. The remaining blank with the big hole in it is now the form tool.

Next the die set is assembled. The round disk (punch) that was saved is attached to the upper die shoe using a wooden dowel to locate it. Depending on the diameter of the hole saw pilot drill, the corresponding hole in the die shoe may have to be enlarged to accommodate the dowel. Trim or cut the dowel flush with the punch surface. The bottom die shoe is used to hold the form tool with the large hole. This is located to the lower die shoe using only pins through the two alignment holes in the corners of the blank. Place one of the steel blanks on top of the form tool and onto the alignment pins, making sure the marker line on the steel blank aligns with that on the bottom die shoe and the mark on the form tool. Place the upper die shoe on top of this stack making sure the Sharpie® mark lines on the upper and lower die set as well as the hardboard layers are aligned.



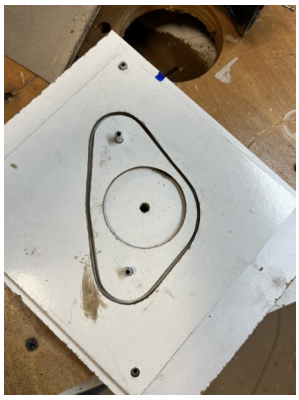
Next, place this stack into a 12T hydraulic arbor press using a steel plate under the stack and another on top to provide additional support. Use the press to apply pressure to the stack, hopefully forming the embossment. After removing the stack from the press and disassembling the stack, you should find a perfectly formed embossment in the steel sheet.

Now confident that this process may actually work, I proceeded to work on the outer profile form and punch tool using a couple of the other blanks I made. To do this, I printed a couple more 1:1 CAD drawings, cut print close to the profile of the part, then glued one of these to each of the two hardboard blanks using the glue stick. When doing this, I took care to align the centerlines of holes on the drawing with the 3/16” holes drilled in the blanks.

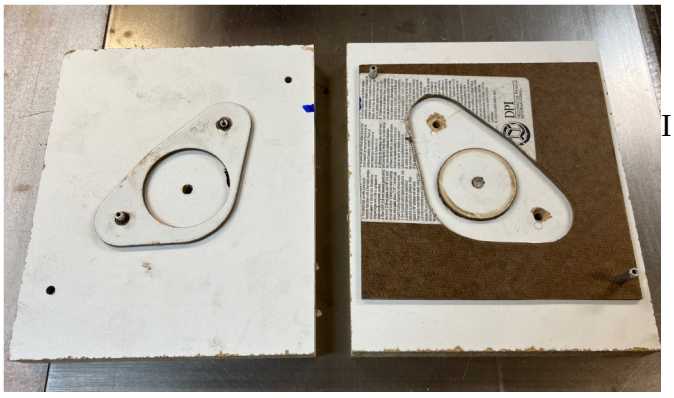


To make the punch tool for the outer profile, I used another one of the blanks and glued the CAD drawing to it. Using a bandsaw, I cut along the outer profile of the drawing to create the punch tool.

Making the form tool was a little more of a pain. I drilled a number of holes using various hole saws. I then had to Dremel® between the hole tangencies close to the drawing lines. Once I had this roughed out, I used a sanding drum mounted in the drill press to sand up to the line. I placed the punch into the form to eyeball the gap between the punch and form and then tweaked form tool using the sanding drum to provide a uniform gap around the punch tool.



Now that the outer profile punch and form tool are done, the profile form tool is assembled to the top shoe and the profile punch is assembled to the bottom shoe using the alignment pins to position them properly. Make sure all the Sharpie® marks are aligned! Place the previously formed sheet with the round embossment onto the alignment pins of the bottom shoe (again, checking the alignment mark) and place the top shoe on top of that.



I

The stack is then again placed back into the 12T hydraulic arbor press and again used a steel plate under the stack and another on top to provide additional support. I applied pressure to the stack, removed it from the press, disassembled the stack to find a very nicely formed plate.

The final step involved drilling out the center embossment with a hole saw and bandsawing the part out of the steel sheet. I followed that with some cleanup on the belt sander and a little file work to end up with the finished part.

In hindsight, I might have been able to combine the two steps into a single step to stamp the profile and center embossment at the same time. I was a little unsure whether the process would work so I took baby steps and did it in two steps. The key to making this work is keeping everything in alignment and this is done by using the pins. What helped make this form easy is the depth of the form isn't that severe so not a lot of metal needed to be moved. A possible future experiment might be to see how deep a draw can be done using the hardboard tooling. When I have time. ☺

To close, I'd like to again recognize fellow CPTC member Jeff Costenbader for sharing this with me. It reinforces the benefits of belonging to and participating in a vibrant club where each of our experiences can be shared. God knows, we need all the help we can get to keep these little British cars on the road well past their design life!