



Signup to the blog to ensure you get Other Articles directly in your inbox.

<https://solarstorm.ca/blog>

CuMai Part 2

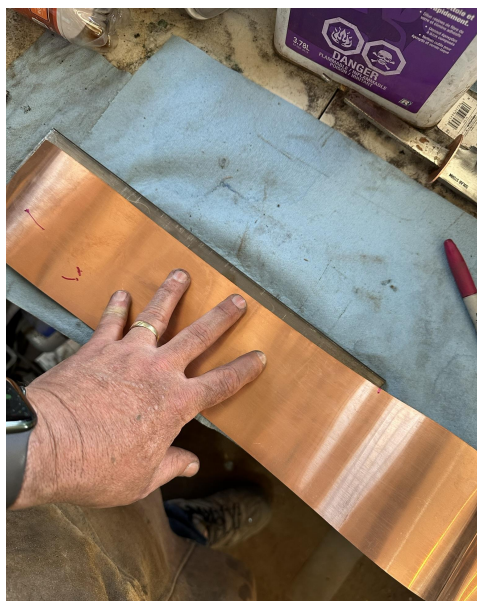
For Part 2 goto <https://www.solarstorm.ca/articles>

Now that we have the damascus sides drawn out, it is time to create our CuMai stack.

Clean at least one side of the damascus billet so that it can be used in the layer against the copper. I just use an angle grinder to do this because the imperfections will flatten in forging and help create the ripples that make the copper shim look a little more wavy. I start with a grinding disk, and then finish it with a flap disk.



Now cut the damascus billet in half, add the center 1084 steel and the copper. The copper I use is .2 mm X 4" X what ever was left in the roll. I need to cut this down so that the copper is slightly less than the size of the billet. This is so that when I weld up the edges, I dont get any copper in the welds. I also double up the copper to give me .4mm of thickness.

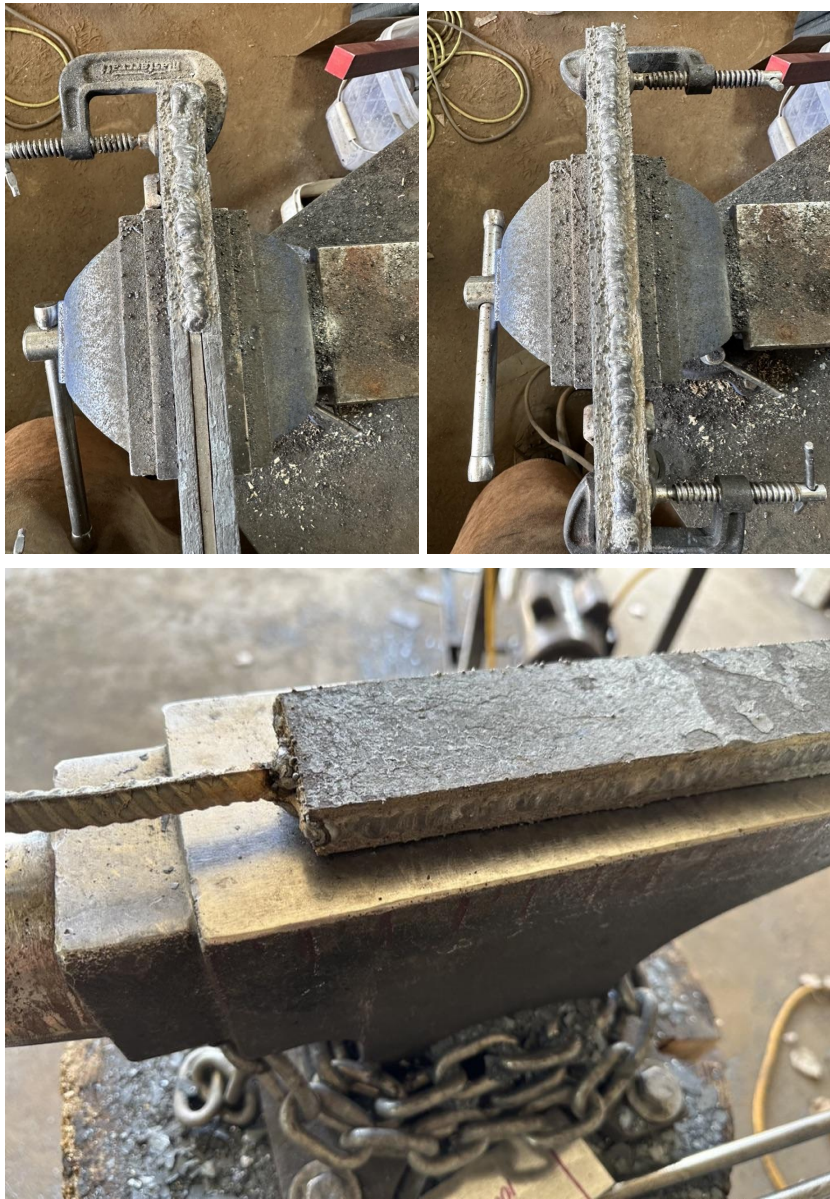




Be sure to sand and clean the copper before you weld it all together. I usually sand the copper down with 240 grit sandpaper. You can see the color change as you get rid of all of the oxides. Wipe everything down with acetone and clamp into the larger billet.



Next you will need to show off your welding skills, or my lack of, and weld the entire edge of the billet together. This is why the copper is 1/16" smaller than the steel to avoid getting copper in the weld. If you do, this will create a hole where the copper will squeeze out of.



With the whole billet completely welded together its time to throw it back in the fire.

This is now critical. The melting point of copper is 1900F. Make sure you dont cross this line. I monitor the temperature close. My forge will hit about 2500 full open, which is way too hot, so I have both the propane and air turned down to try and keep this under control.

Now it is simply time to start forging out the billet for the knife.





It is important to make sure you are keeping the center 1084 core in the middle of the billet and pressing each side the same. I use a simple technique of using a hardy tool and pointing it up and down to track which side to press next. If you can always remember, this step is not required, but I suffer from shiny nickels on the floor distractions.



After drawing out the billet close to final length, I use my ladder dies to “crimp” the steel and then press it flat again. This aggressive crimping also helps to create a bit of the wavy copper.



Once you are down to your final thickness, it is time to grind off your welds. Do NOT try and forge a CuMai to shape, it will only cause the copper to delaminate from the steel. From here on out we are in stock removal mode.

You can see the copper line and the 3 different layers of the billet once you start grinding off the welds. I only really check the ends because in the stock removal stage I am going to cut off the bulk of the welds.



I lay out the blades and head over the to the band saw. You should have a nice solid weld all the way through.





Before I start to grind out the bevels, I check the edges to make sure the 1084 is still in the center. You may have to do a bit of creative grinding, more on one side, or at a bit of an angle to make sure the final thickness is even and the 1084 is centered.



As you start to grind out the bevels, the copper starts to reveal itself.



I leave my CuMai billets a bit thick before heat treat because fixing warps can be much more difficult and risk delaminating the copper in the process of fixing a warp.

Heat treatment is just a normal heat treatment. I coat the blades with ATP 641 Anti Scale from Maritime Knife Supply and I use a pottery kiln for heat treatment. It works nice as it allows for a fully programmable 16 segment temperatures and times. I normalized the steel at :





1. 1,650°F / 898°C (10-15 min)
2. 1,500°F / 815°C (10-15 min)
3. 1,350°F / 732°C (10-15min)

Then its back to 1,450°F / 801°C (10-15min) and into some Parks 50 at approximately 180°F.



AND after all of that, this can still happen. One successful, one not so much. When this happens, repeat parts one and two. This is why damascus and it variants cost more...





2nd time everything was successful and now its onto finishing.



After grinding and etching



And the finished blades.

Solar Storm Forge
1678653 Alberta Ltd
<https://www.solarstorm.ca>
1 780-953-0016
Bob@solarstorm.ca







