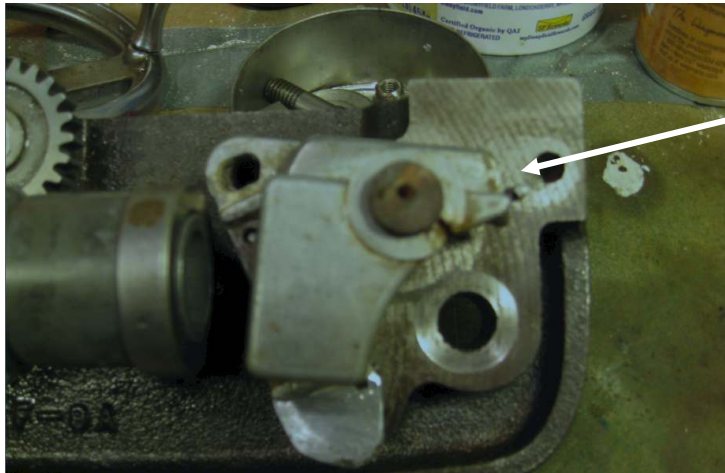


# Making a Zamak Repair

By Lance Eggleston as told to R. G. Sparber

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Many things in this world are made with Zamak, also called “pot metal”. Zamak is an aluminum-zinc alloy with a melting point far below aluminum. Yet it is very strong stuff. Because it is strong, manufacturers tend to cast it in thin cross sections which makes the part weak. Hence, pot metal gets a bad name. What do you do when a part made of this material breaks? That is what happened to me. Here is the story of how we made the repair.



Here is a part from inside the apron of a lathe. The foot broke off.



And here you are looking at the almost completed new foot for this part. It was cast using aluminum brazing rod.

<sup>1</sup> You are free to copy and distribute this document but not change it.

## Needed Materials



You will need a heat source with a small diameter flame. This torch is from Harbor Freight<sup>®</sup> under the name Micro Torch. Expect to pay under \$10 for it.

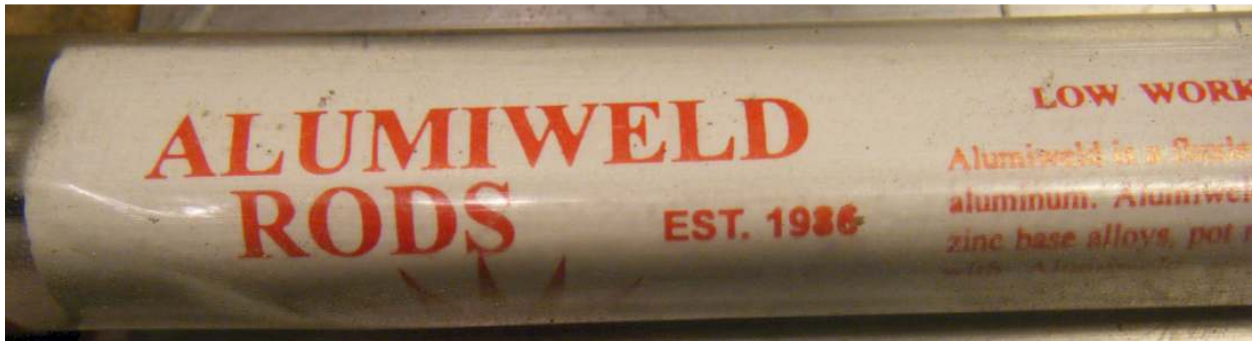


In order to provide a work area and controlled work cooling environment, you will need to fill a steel pie tin with play sand.



Acetone will be needed to degrease all surfaces.

Care must be exercised since you now have a torch plus a can of highly inflammable liquid. Keep them *far* apart. The acetone is most dangerous when vaporized in a poorly ventilated area. That is no time to start up the torch.



This is a package of aluminum brazing rod. At the present time, it can be bought at

<http://www.alumiweld.com/awpricing.html>

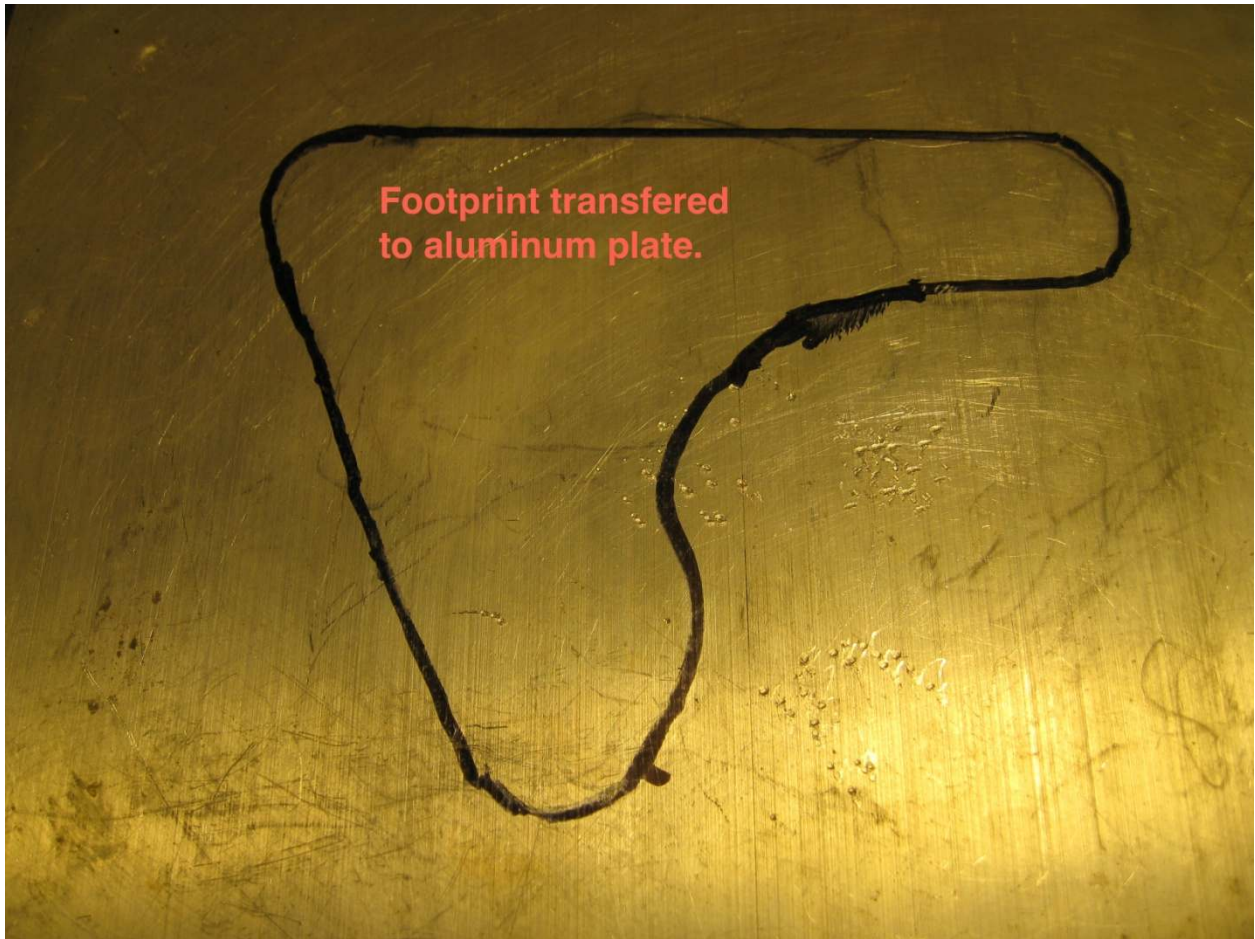
for \$35 for a pound. You will need it as the filler material for the casting.

## The Process

We must cast a new foot and attach it to the main casting.



We start with a paper template of the required footprint.



The outline of the paper template was transferred to an aluminum plate. This was to give a flat working surface. Alternately, you could glue the paper to a flat solid backing.

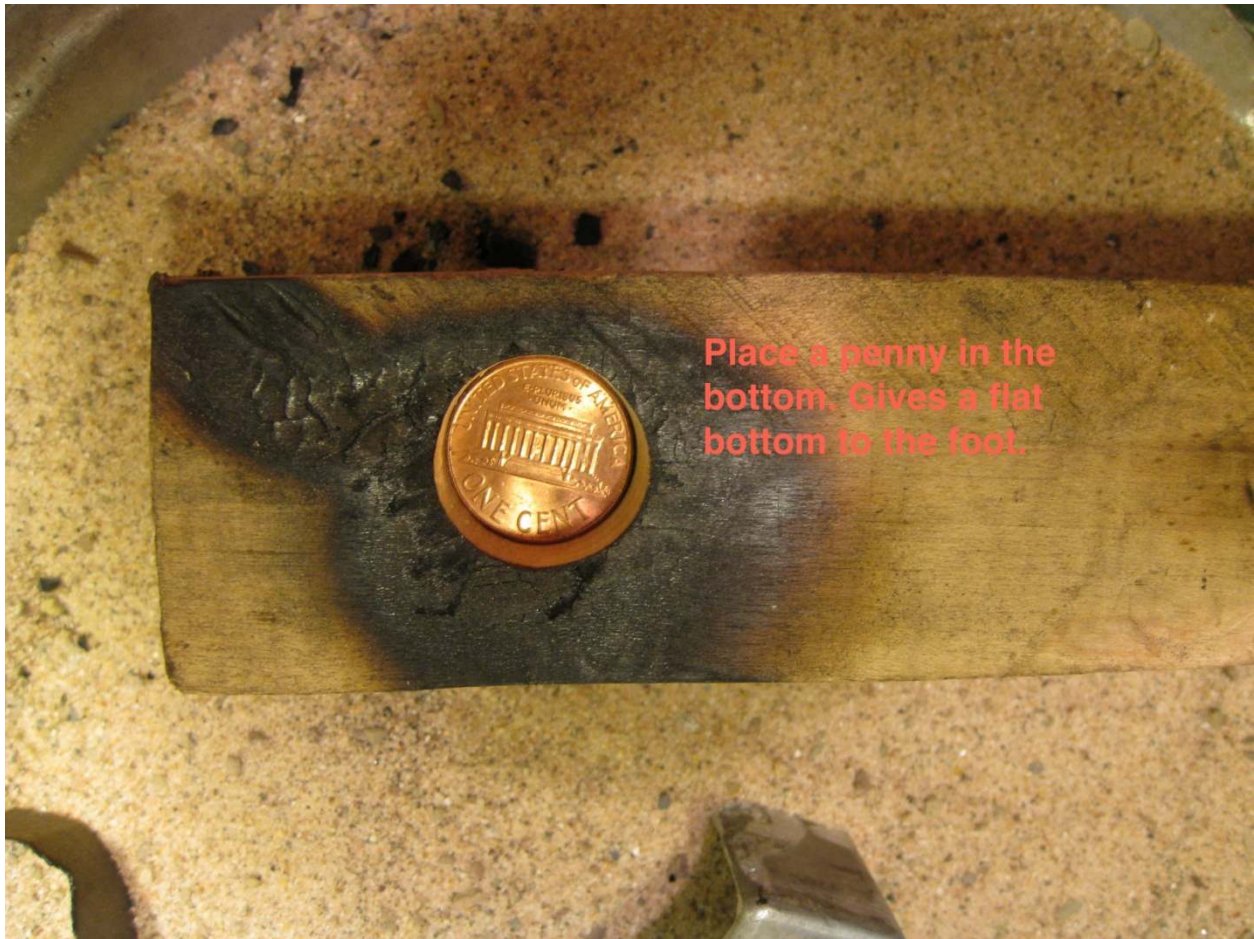


Next we prepared the mold for the foot that was broken off. Recall that we are making:



Since the aluminum brazing rod melts at such a low temperature, we can get away with a wooden mold. On the first round, we just drilled the hole  $\frac{3}{4}$ " in diameter and  $\frac{1}{2}$ " deep with a spade drill<sup>2</sup>. This drill cuts a flat bottom except for the guide point. You will see later that the hole/mold had to be modified slightly.

<sup>2</sup> [http://en.wikipedia.org/wiki/Drill\\_bit#Wood\\_spade\\_bits](http://en.wikipedia.org/wiki/Drill_bit#Wood_spade_bits)



In order to achieve a relatively flat bottom for the foot, a penny was placed in the hole. After casting, it will be removed.





Using the torch, the aluminum brazing rod is melted into the mold a little at a time.



Using the butane torch, slowly melt Alumiweld into the mold hole. Stir the melt with the Al rod.

As metal is added, stir with the end of the brazing rod so we get a uniform casting.

The mold is now full. We covered it with a puck of metal to slow the cooling process.



Cover and let solidify.



It is time to dislodge the cast foot. We did this by first drilling into the back of the wood block acting as our mold. You can see the face of the penny in the center of the hole with black around it. The black is from the heat applied to the mold from the other side.



**Rough foot.  
It's HOT.  
Penny will come off  
later.**

The metal cover was removed and the foot pushed out of its mold from the back side. The penny is still attached but will come off later.



This is the top of the foot;

and a close up of  
the bottom.





Our aluminum template was used to position the newly cast foot relative to the rest of the part. If you look closely, you can see about a  $1/8$ " space between the right side of the foot and the right edge of the template.

The wooden foot mold was modified to add an extra  $1/8$ " of space. Then a second foot was cast.



The surfaces to be brazed must be absolutely clean. Here you see the parts soaking in acetone to remove all traces of grease.



Using the sand to hold the parts in position, the new foot was reattached to the rest of the part. The sand also slows the cooling rate to minimize cracking.



We must apply heat and brazing rod to both sides. Heat was carefully applied just to the gap. We don't want to melt the rest of the part. The foot is relatively massive so would be least likely to melt.





Foot attached and rough ground to shape. Off to the finishing process. Note the crack in the bottom foot was Alumiwelded.

The foot has now been attached. All that is left is to do the final fitting. The trick is to shape the foot so it fits while leaving as much of the added metal as possible for strength.

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