Rebuilding Worn 9N/2N Shift Covers

by John Korschot - www.johnsoldiron.com (March 2010)

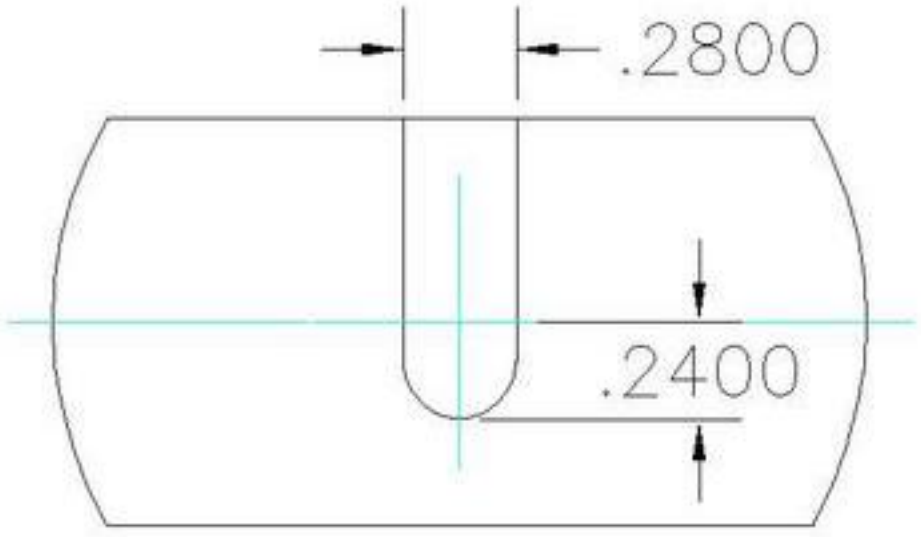
If you have a 9N, chances are that your shift cover looks like this. This particular shift cover is an aluminum one off of an early 9N. I don't see why you couldn't repair a cast iron one the same way.

The top cover shift lever socket wears in several areas. The most obvious is the slot for the hardened pin that's pressed into the shift lever. The socket also wears as does the shift lever ball body. The result is that the shift lever sets lower and lower into the casting over time and in advanced cases contacts the gears in the transmission as mine does. My tractor makes a bad grinding noise in neutral if you roll the tractor and the bottom of the shift lever has been worn down.

I sent my cover to the weld shop and simply asked that the worn slot be welded shut. It came back welded up and roughly shaped. The part required additional working with die grinders and a Dremel tool. Once I had the shape dialed in it was time to cut the slot.

This sketch below was provided by Rust Bucket Dan DeGroot.

I wanted to cut the slot myself as I suspected that there would be wear and that simply cutting it to spec would not work



The slot was cut by locating the center for the bottom radius and drilling a hole of the proper size. The sides were cut with a Dremel moto-tool with small abrasive cutoff wheels.

It's hard to tell from this picture but after cutting the slot to spec, and finding it to be pretty close to the dimensions, I dropped the gear shift in. The problem is that with the wear, the hole in the lever does not line up with the slot and if used like this the gear shift would have to lean to the left. I'd been thinking about this for some time and had already planned to find a way to shim the lever back up. I figured it would be easier to add to the lever than the socket.

After much thought, I had an idea. Trying to build up the surface would be difficult as unlike a shaft with a low spot there would be nothing to gauge the depth of the fill. Additionally, this part won't go into a lathe so you can't turn it back down. I decided to make a shim that could be brazed to the lever to provide consistent dimensional gain and use the brass as filler. The socket area is wide and the level pivots near the outer diameter (OD) of the lever. The shim needed to be close to the OD of the lever but a bit smaller and the brass would fill the transition area The next hurdle was finding something that would fit the shape of the ball.

I decided to make a die to make a shim. I finally chose a 1.25" diameter machine bearing that was .030 thick. The shim would never be an exact fit so I planned on gaining more than .030.

After looking through everything I decided on using a 1.125 box end wrench as part of the die and made the other half from an extra shift lever. The lever was straightened and cut to use as a piece to beat on the bearing with.

The wrench was placed in the vice; the bearing was set on the wrench. I heated the bearing bright red then punched it with my die. The first set was close, but it didn't fit the lever tight enough yet and didn't fit well in the wrench any more.

I changed over to a 1.0625 wrench and did the same step again, this time the shim fit the bottom of the shifter ball like a glove. Here's a picture of the new shim prior to being brazed to the shifter lever. In this picture you can really see how much lower the lever is and keep in mind when moving the lever to the right the slot would have to be lower yet. I could have simply cut the slot lower but I wanted to try to fix this one as my shifter drags on the transmission gears in neutral.

Somehow I managed to overlook taking a picture of the part after brazing. It was not pretty as I added a lot of brass to build the transition areas next to the shim. Here's the final product after cleaning up. The brass was carefully removed until I saw the steel from the bearing, this served as the depth gauge. The areas next to the shim were tapered off from the shim to nothing in order to make a smooth transition area. While not clear in the photo there is a steel band which is the shim visible near the bottom of the shifter with brass on either side. I carefully shaped it first with a grinder wheel followed by a sanding wheel, then files, 80-grit emery cloth and finally 400-grit emery cloth. The part is actually quite smooth. The light coming in through the shop window makes the part look odd; it’s actually nice and round.

With the shift lever built back up I placed it into the shift cover. While I didn't have the exact fit I wanted, it was getting close. With no other options, I went ahead and filed the slot a little deeper than spec to get the shift lever hole lined up. I probably removed about another .125 and you can see the slot is now a little lower then my lowest mark. The hole lines up with the slot and my gear shift is straight up. It actually works smoothly in all directions following a little more hand work with the files and Dremel. The biggest job was getting the contour correct inside the shift cover socket where it had been welded