

## Muffin's Axle Overhaul Part 4. - Assembling the Axle:

I removed both halfshafts because I wanted to check and clean the bearing.\*\*

### Notes.

\*\* Axles develop sludge which collects at the lowest point; i.e. the bottom of the diff. In normal use the bearings are lubricated by the EP90 axle oil which they get a plentiful supply of (even if the oil level is low) by centrifugal force when going round corners. The problem is that old axles (or axles waiting to be fitted to a kit) are often stored on end as they take up less room. Such a practice results in all the crud leaving the diff housing and collecting round whichever bearing is at the bottom. This also tends to result in a leak at the hub oil seal. My 'new' axle from the abandoned kit I bought off Mark Sadler was swimming in oil in one brake drum; to me this indicated the axle had been stood on its end at some time and the bearing was most likely contaminated with crud, hence my decision to remove the halfshafts and clean the bearings properly.

*After cleaning my bearings were good but if they had required replacement I would have fitted sealed-for-life bearings.*

*If you're not going to use the axle for a while it's worth lubricating the hub bearings with some wheel bearing grease.*

The first task (if you completely removed them) is to fit the halfshafts, proceed as follows.

1. If you have removed both halfshafts then fit one completely in and the other one so that it's extends from the housing by 7/16".
2. The halfshafts can be fitted by reversing the oil seal carrier and pulling the bearings into position with two bolts. The old seals will locate and centralise the seal carriers, hence the reason for not removing them yet. Please see first photo.
3. When you have pulled the first halfshaft bearing into position it will need final bedding in so that a maximum of 3/16" protrudes from the bearing housing. Tap it in with a brass drift against the outer race using a big hammer, a club hammer is ideal.
4. Slide a fibre washer over the two gears that go on the ends of the halfshafts and push the gears onto the inner ends of the halfshafts.
5. Pull the last halfshaft fully into place and seat the bearing with a brass drift.
6. Turn the **crown wheel** so the two holes for the bearing pin are vertical with the roll pin hole in the housing at the top.
7. **LEAVE THE BRASS THRUST WASHERS IN THE BOX OR OTHER SAFE PLACE; YOU STILL DON'T NEED THEM YET.**
8. Place the last two gears into mesh with the gears on the ends of the halfshafts keeping them 180 degrees apart and at approximately 90 degrees to the retaining pin holes; now hold them in position and **turn one halfshaft** while holding the other one stationery, turn the halfshaft until the gears rotate around the stationary halfshaft gear, enter their seatings and are located vertically instead of horizontally: i.e. they line up with the locating pin holes.
9. Look through the gear pin locating holes and check the holes and gears are in line, if not then you didn't get the gears exactly 180 degrees apart.
10. If the gears are not in line then reverse the last two steps and start again at step 8. **KEEP DOING THIS UNTIL THE PIN CAN BE INSERTED THROUGH THE DIFF CAGE AND BOTH GEARS.**
11. Turn the **crown wheel** until the gears are horizontal again; i.e. so the pin if fitted would also be horizontal.
12. Now take the new brass thrust washers and slide them into place between the outer ends of the gears and the diff cage/carrier; the thrust washers are curved so you need to push them into

position using a curving action. Imagine you are holding two bowls slightly apart and sliding another bowl in between them.

13. Rotate the **crown wheel** again until the gears are vertical and the roll pin hole in the housing is at the top.
14. Look down the hole and line up the gears and thrust washers.
15. Insert the pin with the two flat faces towards the crown wheel.
16. With a drift etc. through the roll pin hole in the pin twist and press the pin in (finger/hand pressure only).
17. Stop when the pin has 1-1/2" to go and rotate the **crown wheel** approximately 90 degrees.
18. Look through the hole at the other end of the pin and make sure the second gear and thrust washer are still in line.
19. Twist and press the pin in as far as it will go.
20. Using the drift line up the pin hole with the roll pin hole in the diff cage/housing.
21. Tap the pin in the rest of the way.
22. Centralise the roll pin holes with a pointy tool.
23. Tap the new roll pin in.
24. Check both ends of the roll pin and continue tapping until the roll pin is central. On mine I had to tap it approximately 3/32" below the surface.
25. Have a cup of tea, you deserve it!

With the halfshafts back in position and new thrust washers etc. fitted we can finish off the axle refurbishment, proceed as follows.

1. Remove all traces of the old gasket on the differential cover and the housing.
2. Clean and if necessary de-rust and paint the outside of the diff cover.
3. Use Hylomar Blue or another sealant on both sides of the gasket and refit the diff cover.
4. Clean the hub oil seal housings, tap the old seals out with a drift and fit new oil seals. In the absence of special tools the easiest way to fit the seals is with a hammer, taking care to insert the seal evenly.
5. If the axle is going to be stored for a while press some grease into the wheel bearing and rotate the halfshaft a few times.
6. Position the oil seal carriers and brake backplates and bolt into position, please see second photo.\*\*
7. Fit the brakes and hubs.
8. Fit the handbrake cable.
9. Tighten the hubs to 150 ft lbs.##
10. Refurbish and fit the brake drums.
11. Fit the wheels.
12. Adjust the brakes.
13. Level the axle and refill with a good quality EP90 oil, I used Castrol Classic EP90.
14. Briefly lift either end of the axle in turn to allow oil to flow down the axle tube and round the hub bearings.

#### **Notes.**

*\*\* I still need to send my brake backplates for grit blasting so I fitted the original hubs so I could fit the steel wheels and keep the axle mobile. I will complete items 6. to 14. at a later date and possibly publish it as Part 5. to these axle refurbishment articles.*

In the last photo the new shims should just be visible; If you look at the photo carefully you will notice that wear on these shims will cause the gears to come out of mesh slightly and the increased play will cause a clonk, hence the anti-clonk kit!

#### **Conclusion:**

My axle is untried but it didn't look as though it had been previously dismantled. Sometimes when you strip one of these axles you will find the brass shims are very thin, or even in pieces, surprisingly the fibre ones seem to last better than the brass ones. If I'm honest once I got it apart my axle didn't really need an anti-clonk kit as there was only very minor wear on the brass thrust washers. But if you're going to refurbish your axle you might as well play safe and renew them. If you're not removing the halfshafts completely or repainting the axle etc. then it's a relatively easy job to fit the anti-clonk kit, a new pinion nose seal and new hub seals.

To be continued (maybe).



