

## Swivel Housing Rebuild, part one

---

At some point you will need to rebuild a swivel housing; Eventually the chrome swivels (chalices) get badly pitted and rusty, and the oil seal fails and will no longer keep the oil in the housing as a result. You get oil all over the tyres!

Of course, if this happens you can drain out the oil, and fill the housing with a sachet of swivel housing grease available for just this purpose. You will then probably get several thousand more miles from the unit.

But, for when the day arrives for you to replace the whole caboodle, here are some pointers for you.

Firstly you need to ascertain which type of axle your landy has fitted, mainly because there are some differences in the parts used ~ particularly in the oil seals and wheel bearings. The work featured in this article was done on a late SWB SIII of 1982 vintage...it has the 'rationalised axle' which has 24 spline half-shafts. Earlier SWB models had 10 spline half-shafts. As long as you state the year of manufacture to your parts supplier, and the model you own, you should get the right parts.

Not only will you need the 'rebuild kit' which includes the gaskets for the housing, the Railko bush and thrust washer, lock tabs, and shims, it is advisable to get a wheel bearing kit, a new swivel housing oil seal, the chalice (!) new bolts and lock nuts to secure the new chalice to the axle, a new axle oil seal, stub axle oil seal, and new half-shaft roller bearings for each side.

To business then! Jack up the side with the wheel you are working on first, and remove the road wheel. Please, remember to use axle stands! You might not see them in the photo's that are to follow, but believe me they are there supporting the weight of the Landy. The jack you will see is just supporting the weight of the axle itself. I never fail to say this, but just remember, squished folk don't get driving Landies!!

Having removed the road wheel and supported the Landy, back off the brake adjusters (or adjuster, depending on which type of axle you are working on). This allows the brake shoes to be as far away from the drum as possible... Turn the adjuster until it will go no more, and then turn it back in the opposite direction so the heel of the adjuster does not push the shoe towards the drum.

Drain the oil out of the swivel housing before you go any further.

Whilst the oil is draining, you can busy yourself removing the brake drum. The screws holding the drum to the hub can be awkward to remove, the best tool to use is an impact driver.



In this instance the drum was stuck solid to the hub, so rather than spend an hour or two trying to remove it, I removed the hub and drum together. Ordinarily, you would remove all three screws, and lever the drum off the hub. There is a fourth hole in the drum, which is threaded the same as the 3 screws, and a bolt can be turned in here to facilitate the removal of the drum.

As I mentioned, as the hub has to come off anyway, I removed it and the drum together, and removed the drum on the bench, but let's imagine that you now have the drum off, and are now ready to remove the hubs. This Landy was fitted with Fairey type Free Wheel Hubs (FWH). To remove, first undo and remove the screw on the body of the hub, under which there is an 'O' ring, and then a nyloc ring. You need to lift the ring out of the screw hole with tweezers.



Then, whilst pressing the hub towards the vehicle, gently pull the nyloc strip out of the hole. The hub then comes apart.



Then you will need to remove the outer half of the FWH. This is similar to removing the standard drive flange after taking the 'top hat' off. Drift out the cotter pin, roll pin, or split pin that is fitted, and remove the castle nut. Later models have a round castle nut, which can be removed with a couple of taps from a hammer and cold chisel, but they are often quite loose.



There is a felt washer under the steel washer on earlier models; there will be a new one in the appropriate wheel bearing kit.

Remove the drive flange



You will need the cold chisel again to undo the hub locking washer, just bend back the tab holding the outer lock nut in place. Using the big LR hub-nut box spanner, remove the outer nut



and the lock washer. There is then a second nut, remove that whilst supporting the hub (and drum, if it's still on), and then the thrust washer and bearing. You should now be able to remove the hub.

Once the hub is removed, you can check the bearings and races for wear, and replace them if necessary. If they feel at all 'gritty' you may as well replace them. You must always fit a bearing and race as matched pairs. Put the hub on the bench, and after removing the oil seal (note which way round it's fitted) drive out the bearing races with a drift or cold chisel, going round the race evenly until it comes free of the hub. Repeat with the other race if you are doing that one as well. Grind an even amount off the races, until they will fit in the hub without getting stuck; you can use the old races as drifts to get the new races fully home. Do it carefully, and evenly drift the new races home. Now fit the inner bearing (pack it with grease first) and then the oil seal,



which should fit flush with the hub along its outer edge. Be careful how you fit the seal, it must go in evenly. That's the hub ready to refit when it all goes back together.

On the back of the housing, remove the 6 nuts that hold the swivel oilseal retaining ring in place,



two of these bolts hold the brake flexi-hose in position on this model. Soon, you will be able to suspend the brake backplate up and out of the way.

Remove the backplate.



Undo the six bolts (there are locking tabs on earlier models which you will need to bend back), remove the oil catcher ring where fitted, and then carefully lift off the brake backplate complete and suspend it out of the way. Make sure the flexi-hose is not strained.



Now it is easy to get at the track rod ends and remove them. You could have done this earlier, but I find they help to keep the housing still whilst working on it.



Now remove the stub axle.



The earlier type had a collar, or 'land' that the hub oil seal runs on.. if it is scored, you can drift it off and replace with a new land, but the later types are a one piece part. If it is scored on here, you will need to replace the stub axle I am afraid. Now you can withdraw the half-shaft.



Use a cold chisel again, and knock the oil seal out of the swivel housing, it won't come off completely at this point, but it needs to be free or the housing will not separate from the chalice. Bend back the locking tabs and remove the four bolts holding the top pin (the 'king-pin') into the housing.



Lift out the king-pin whilst supporting the housing, the housing will now come loose allowing you to drop it down and off the chalice.



Now to remove the old chalice.... These nuts can be a real pain to remove! I just cut the heads off with the angle grinder, and removed the chalice. Remember though, wear goggles and gloves, as blind folk don't get driving Landies either!!

**Swivel Housing Rebuild, part two**

---





Shiny isn't it? Far better than this one....



That one really did need replacing, as did the bearing races!



Looking at the photo of the new chalice, the top of the photo shows the top of the chalice; the hole for the Railko bush is nearest the axle than the one for the bottom bearing. Remember that!

The best tool to use when pressing the Railko bush in is the old king-pin! Using a suitable copper faced hammer knock the bush in carefully and evenly until it is fully home.



Then do the same with the bottom bearing race



again being careful to drive them home evenly; I cannot stress this enough, you must be careful not to damage the races as if they are out of shape, the new bearings will not last long.



Now fit the new halfshaft bearing.



Once again slow and even is the way! There will have been a 'collar' with the new half-shaft bearing, this is effectively the race. This fits onto the half-shaft, but unless the original is badly scored you shouldn't need to replace this.

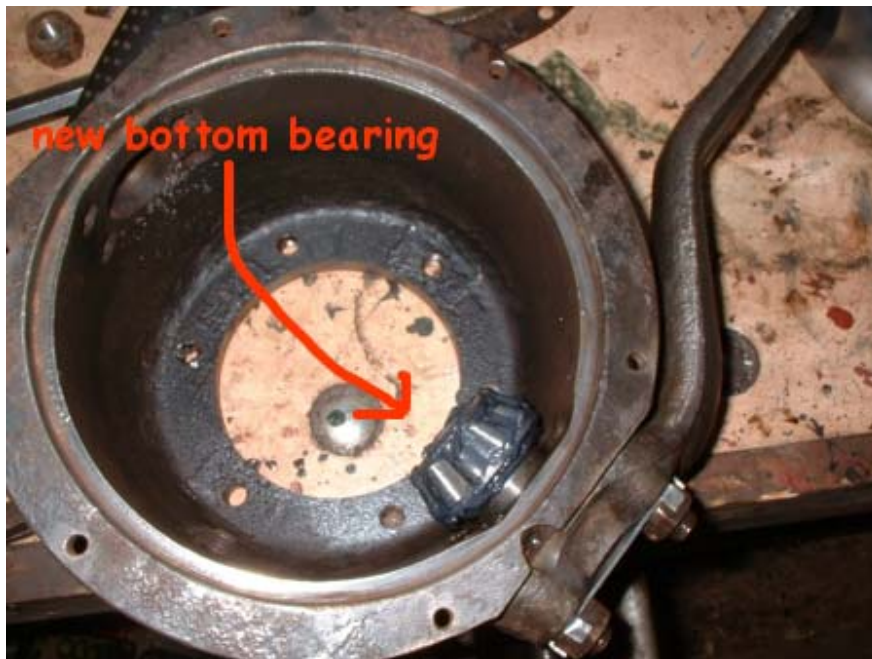


If it needs to be replaced, you will have to cut off the old retaining collar and the race from the halfshaft, (probably you will need to split the collar and the race with a cold chisel) and then press the new race and a new collar on to the shaft with a hydraulic press.

I cleaned all the old paint and rust off the swivel housing and steering arms with a wire wheel in the angle grinder (goggles and gloves, remember!). I also removed the studs from the bottom of the housing, some of them will come out with the nuts attached, and it is very important to make sure that the nuts are taken off the studs before refitting them. They may require a bit of heat from a blowtorch to ease them off. Then you can be sure that the nuts will grip the steering arm properly when they are replaced.

Now fit the new 'O' ring to the steering arm pin, and fit the arm, followed by the new lock tabs. Torque the nuts down evenly to 50 – 65lb/ft (68 – 88Nm) and then bend and tap the lock tabs over the flats of the nuts.

The bottom bearing is now ready to be fitted to the steering arm pin.



Now fit the new thrust washer into the Railko bush and oil it with some EP90. I held the new chalice in an engineering vice, and then slipped the bottom bearing into its race, and inserted the King-pin through the top of the housing and into the Railko bush. (I found it easier to hold everything in the vice, but you could fix the chalice to the axle end with a bolt through the top hole to hold it steady if you wished) Now you can make a guess at how many shims you will require by seeing how many will

fit in between the kingpin and the housing.

You can now remove the king-pin and fit the shims. Without fitting the new lock tabs at this point, torque the bolts to 50 – 65lb/ft and check the preload with a spring balance.



The swivel oil seal is not fitted at this point, as it is easier to check the preload without it fitted. The steering arm should move with a steady pull of 8 – 10 lbs after the initial resistance is overcome. If it takes more than that to move the arm steadily, then you need to add some more shims, and if it takes less, then you will need to remove some shims. Ideally, both swivels should end up having the same preload. You will find it may take a few attempts to get it right!

Once you are happy with the amount of preload, fit the new lock tabs, and torque the bolts home, again to 50 – 65lb/ft (68 – 88Nm), then bend and tap the lock tabs over.

Put some EP90 into the lips of the new swivel oil seal, and then slip it over the end of the chalice, and fit it into its recess in the housing. I usually put a smear of grease into the recess, but you could use sealant. Fit the seal retaining ring, remembering to fit the steering lock bolt into the front centre hole. Leave off the two top bolts at this time, as these are for the brake hose retaining plate.

### Swivel Housing Rebuild, part three

---

You are now ready to fit the rebuilt swivel housing and chalice to the axle.

There is an oil seal in the end of the axle casing, and this needs to be replaced as a matter of course.



The new seal needs to be level with the chamfer on the inside of the axle casing.



Only tap lightly on the outside edges of the seal, or it will distort, and fail prematurely. Pour a little EP90 onto the seal lips to lubricate it.

Fit the new paper gasket to the end of the axle casing, having previously made sure there are no remnants of old gasket left behind. Again, I use multi purpose grease to hold the gasket in place, but you could use sealant.

Bolt the new swivel to the axle casing using new bolts and lock-nuts,



Fit the top ones first, as it makes it easier. Tighten all six evenly and in turn. They are a bit awkward to get to, so take your time, and watch your fingers!

Refit the half-shaft.... Smear it with some EP90 so it slips through the oil seal in the axle casing easily. Carefully slide it into place, ensuring that the inside end engages with the splines in the differential.

Make sure there is no gasket material left on the stub axle, and then fit the new oil seal. It should fit flush, or be recessed very slightly. Again, press it home evenly and carefully using its outside edges, and oil it with EP90, as before.



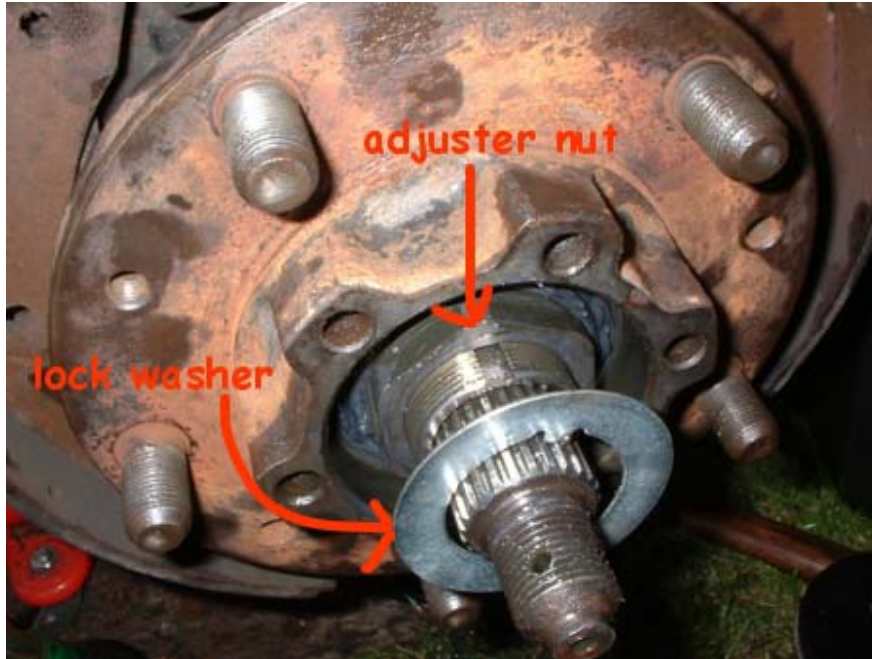
Fit the new gasket, once more using grease or non setting sealant, and slide the stub axle over the end of the half-shaft. The keyway, or slot, in the stub axle should be at the top. There is a slot at the bottom of the outer face of the later type of stub axle which allows oil to leak out of the area if the oil seal fails, rather than contaminating the brake shoes.

Re-position the brake backplate; there is a hole in the backplate that lines up with the slot in the stub axle, once again this is to allow oil to escape, so make sure it is clear. Then refit the oil catcher ring, where fitted. Earlier models don't have the oil catcher ring, and will have lock tabs instead of spring washers. You should use new washers or tabs. Torque the bolts to 30 – 38lb/ft (42 – 52 Nm). Remember at this point to refit the two bolts that hold the brake flexi-hose in place.

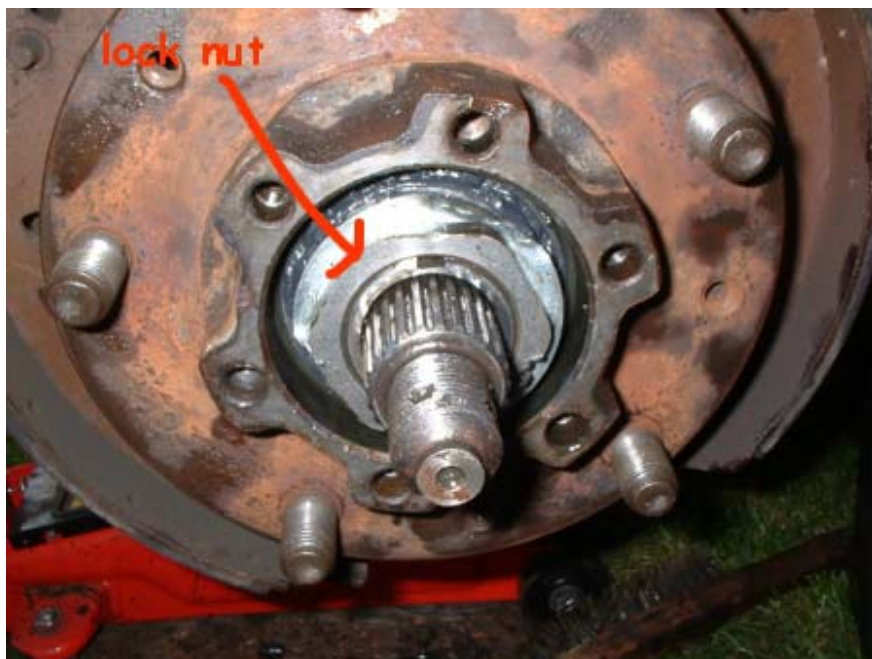


Having previously fitted new seals and bearings to the hub, you can proceed with refitting it. Slide it onto the stub axle, and before fitting the outer bearing pour in some EP90 or swivel housing grease to aid lubrication. Then fit the outer bearing, followed by the thrust washer, and then the adjusting nut. Spin the hub a few turns to settle the bearings into the races, and then tighten the adjusting nut until you feel the bearings start to grip, then back off the adjusting nut until there is no 'drag' on the bearings. If the bearings are too tight they will overheat, and fail, and if they are too loose, they will wear very quickly, and also fail prematurely. Land Rover recommends using a dial gauge to measure the bearing end float, which should be between 0.05 and 0.10 mm.

Fit the new lock washer



and then the lock nut, which should be tightened firmly. Then, fold one edge of the lock washer over one of the flats of the inner, adjuster nut. Then bend outwards another edge over one flat of the lock nut. This prevents both nuts from turning.



Now you can re-fit the drive flange, or F.W.H. (as appropriate) using a new paper gasket. The bolts should be torqued down to 28lb/ft on SII and SIIa, and to 30 to 38lb/ft on SIII. Refit the castle nut, and felt seal where appropriate, and fit a new split

pin or roll pin, and then the top hat. The next photo's show the fitting of a WARN type F.W.H., again, tighten the castellated nut, and fit a new split pin, the outer section of the hub can then be fitted.



Refit the brake drum, and tighten the three screws. With a copper faced mallet give the drum a few taps in the area of the screws to make sure it is fully home. Check the three screws again. Now you can adjust the brake shoes; turn the adjusters until the brake shoes start to bind, and then back the adjuster off a click or two until it no longer binds. Do this with both adjusters on the backplate if you have two fitted. Then press on the brake pedal, and check the adjustment again.

Refit the track rod ends, and torque the nuts to 30lb/ft (40Nm) and replace the split pins with new ones, where fitted.

Refill the housing with EP90, or swivel housing grease, (don't forget to replace the drain plug first!!!), and then once you have replaced the filler/level plug, you can refit the road wheel. Road wheel nuts should be torqued to 75 – 85lb/ft (103 – 117Nm)

Just the other side to do now!