

Rufus – 4-Synchro Overdrive Gearbox Refurbishment:

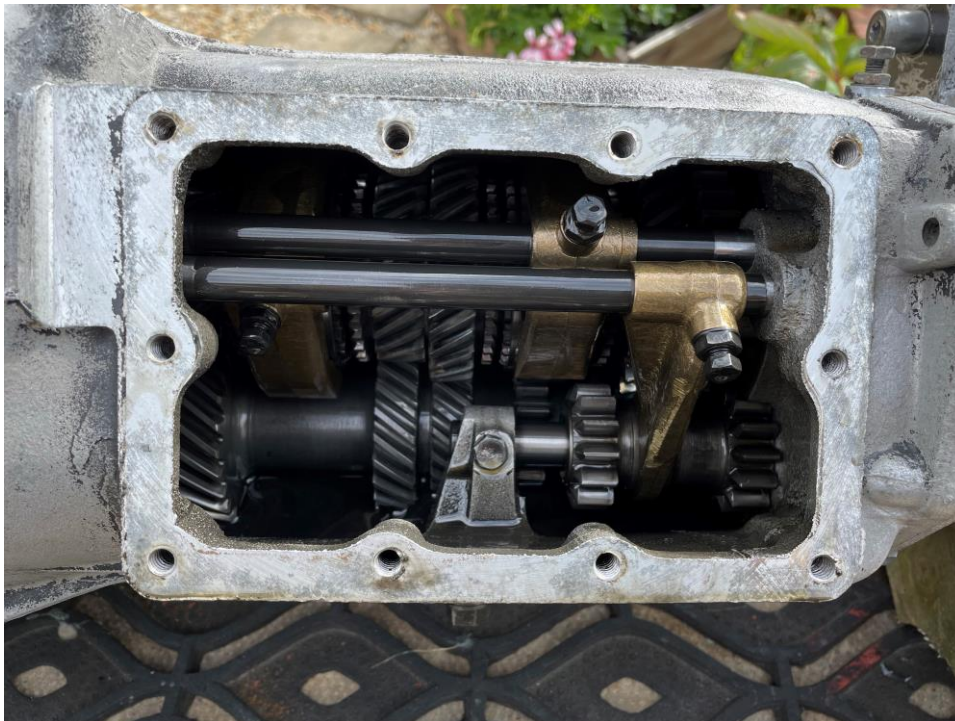
Introduction:

I decided to use the original 4-synchro gearbox with the LH overdrive that was fitted to Rufus when I purchased him. I had previously drained the oil from both the gearbox and overdrive before removing the gearbox and separating the gearbox from the engine.

I had not been able to drive the car at the time of purchase as it was a non-runner so I had no idea of the gearbox condition. The first job was to check for play on the gearbox primary shaft which was negligible, and to rotate the shaft and check the bearing, which felt pretty smooth, so I decided to carry on with the overhaul. Like most old gearboxes it was a bit oily so the first thing was to give it a good clean. I started by cleaning it with petrol and a paintbrush followed by pressure washing. It was then cleaned down again with 'Gunk' and given a final pressure washing. The primary shaft was then dried and sprayed with WD40.

Side cover gasket:

With the gearbox on my outdoor concrete workbench I removed the cover on the left hand side and had a good look in, turning the gearbox over and checking every gear for chips etc. although you wouldn't expect to find any on a fully synchro or constant mesh gearbox. Next I tried moving the lay shaft from side to side to check for excessive end float but all appeared ok. Running my fingers through the oil remaining in the bottom of the gearbox I couldn't feel significant grit, although of course some could have come out when I drained the oil. Everything looked good so I removed the drain plug again and after mopping up the surplus oil which hadn't drained I cleaned round the drain plug area and refitted the drain plug using a smear of Blue Hylomar. Next I checked the security of the gear selector locknuts and then replaced the cover using a new gasket with Blue Hylomar as a sealant.



Side cover removed.

Primary shaft oil seal and bearing shims:

The next job was to remove the primary shaft oil seal housing and replace the oil seal (which can be pressed in by hand if you have strong fingers) before refitting the housing with a new gasket with more Blue Hylomar. That sounded easy didn't it? Unfortunately the first motion shaft shim was breaking up so I needed to fit a new one.

As well as holding the primary shaft oil seal the housing also controls the position of the primary (first motion) shaft bearing. If you replace the oil seal and gasket you need to re-check the shimming. To put it

simply there must be no free play and the clearance is + 0 or - 1 thou. (Plus zero or minus one thou). To check it you need to take three measurements.

1. How much the bearing protrudes past the part of the bell housing that the gasket sits on.
2. The depth of the recess from the gasket surface of the cover plate to the surface where the shims make contact.
3. The thickness of the gasket.

The shim thickness required = Measurement #2. + #3. - #1. (To an accuracy of + 0 or - 1 thou).

Obviously to check to this level of accuracy you need some specialist measuring equipment, which fortunately I have, but there is an easy way, proceed as follows.

1. Clean all the mating surfaces thoroughly.
2. Position a couple of shims against the recess in the oil seal cover.
3. Offer up the oil seal cover.
4. Holding the cover firmly against the bearing measure the gap between the cover and gearbox (where the gasket fits).
5. You can measure the gap by inserting feeler gauges through the hole utilised by the clutch operating fork.

I measured a couple of gaskets and they were both 10 thou so, as an example, assuming the gap measured with the feeler gauge is 8 thou then you will need to add a 2 thou shim which will bring the gap up to 10 thou which is the thickness of the gasket. The slight compression of the gasket when you tighten the nuts should result in the required tolerance of + 0 or - 1 thou.



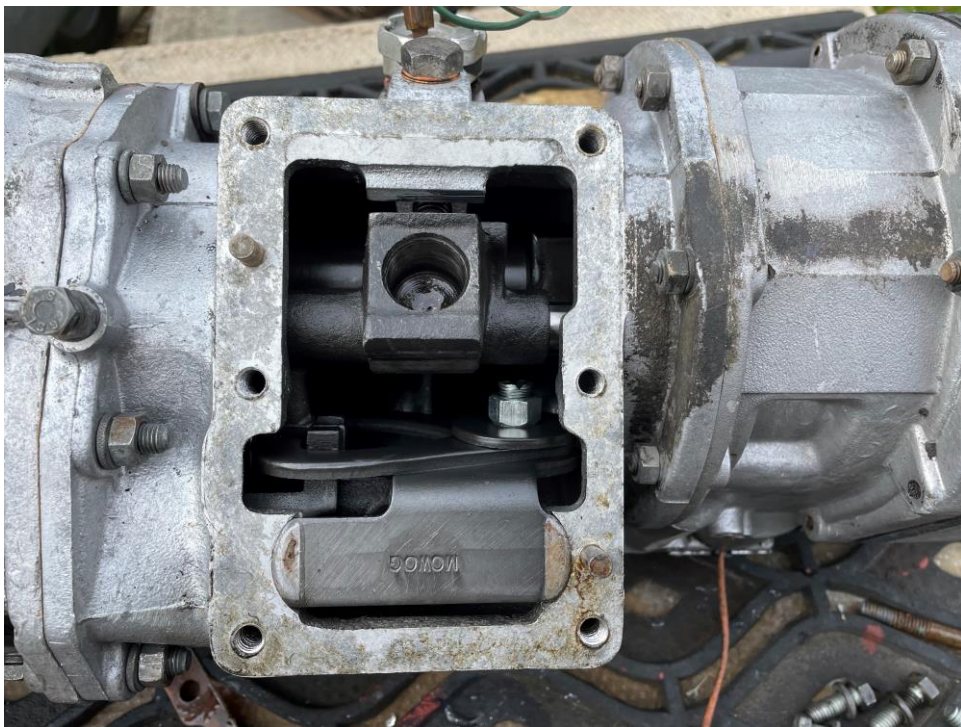
Oil seal cover removed.



Position of broken shim in cover.

Remove control unit:

The next job was to remove the gearbox remote control unit. This is a simple enough job and after removing the six locating bolts it can be gently tapped loose from its spigots with a plastic mallet (before doing this it is worth pulling the gear lever anti-rattle plunger and spring from the bolt housing at the right hand rear of the control unit) the remote control unit can now be lifted away. With the area nice and clear I check tightened the bolts at the front and rear of the overdrive unit which secures it to the gearbox and tail shaft casings respectively. There's not a lot under the remote control which requires attention but it's worth renewing the split nylon bush that connects the gear change rod of the remote control with its mating socket. The remote control rod was oiled and it was replaced using a new gasket and Blue Hylomar.



Gearbox with remote control removed.



The nylon bush on the remote gear selector shaft.

Tail-shaft oil seal:

At the rear of the gearbox I removed the drive flange coupling for the propshaft and renewed the tail-shaft oil seal (You will not be able to press this seal in with your fingers so tap it in gently and evenly so it is fitting flush with the surrounding surface). It is essential to refit the special propshaft securing bolts before re-fitting the drive flange as they cannot be removed and replaced with the drive flange fitted. The securing nut was really tight, it felt far more than the 55-60 ft lbs recommended on assembly.



Homemade locking bar.



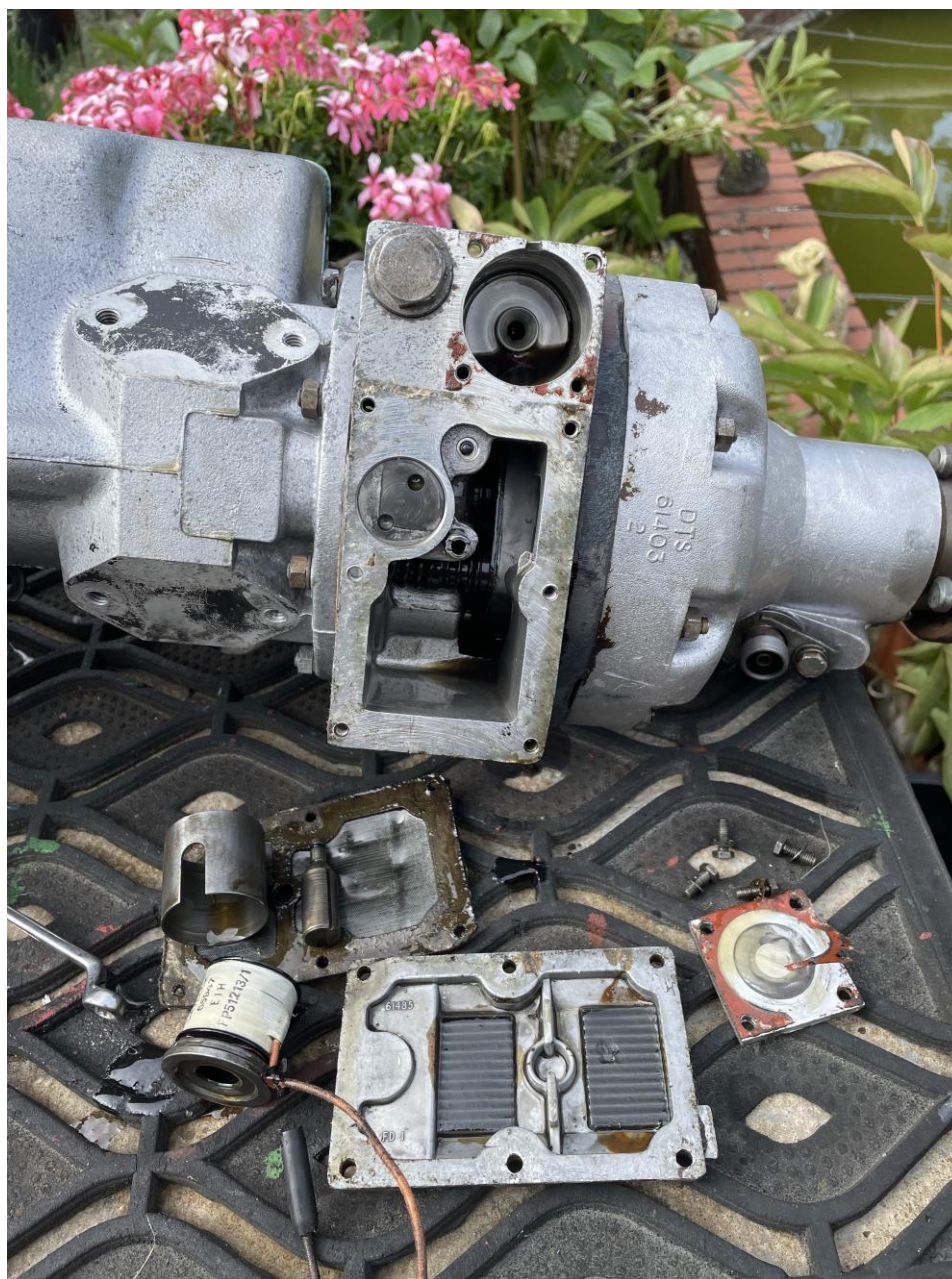
A big bar helps.

The overdrive essentials:

The last item on the gearbox refurbishment was the operating mechanism for the overdrive. The electrical switches are very reliable so there is no need to fiddle with them (I will renew all the wiring when I make a new loom). The solenoids are also very reliable; any problems will most likely be related to worn/perished 'O' rings or poor electrical connections.

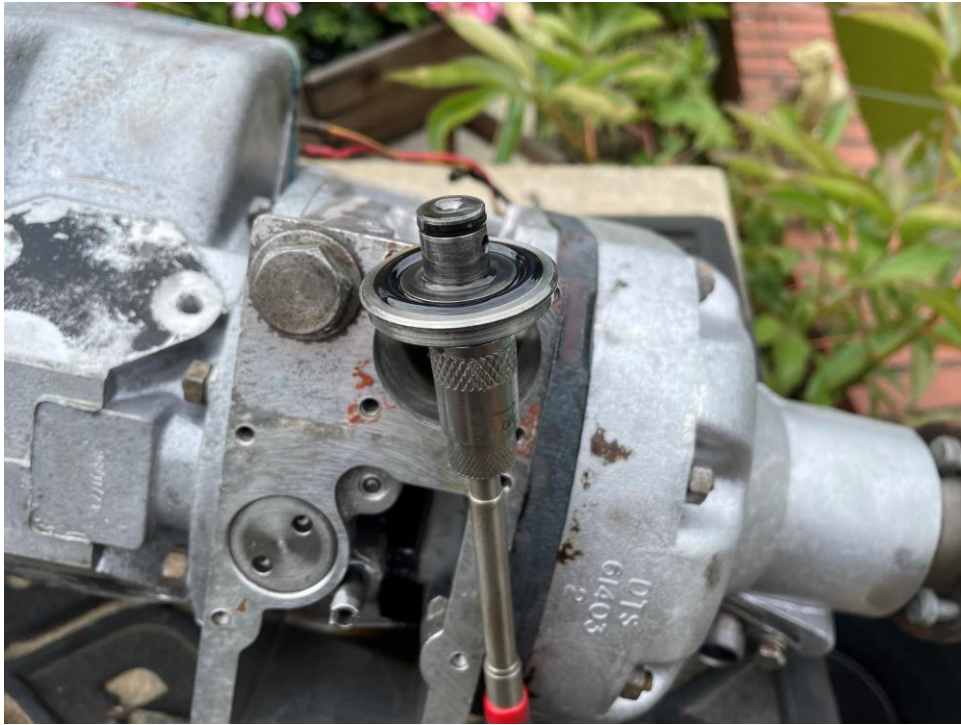
I started by removing the filter plate under which is the relief valve which can be accessed by a peg spanner. With everything nice and clean I fitted a new filter gauze and replaced the cover.

Four small screws retain the solenoid cover, with those removed the solenoid can be eased out. Be careful not to damage the wiring. There is a small grommet which seals the wire, this should be replaced.



Partially stripped.

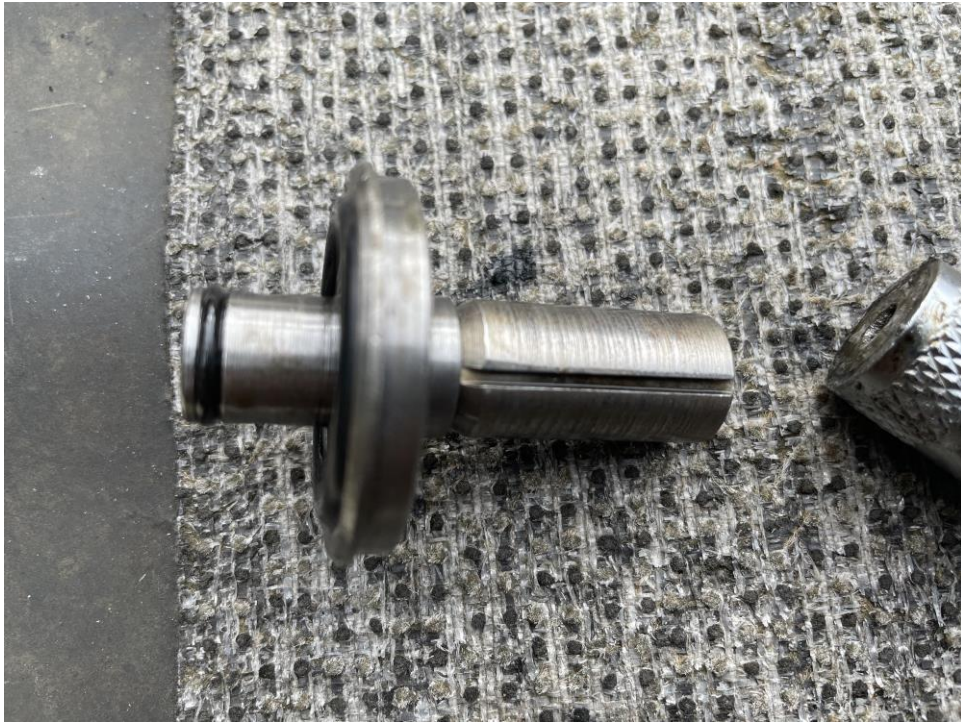
Using a magnet I removed the inner part of the solenoid in order to change the two inner 'O' rings; be careful not to lose the small ball bearing, it could fall out (gravity) if you are doing this job with the gearbox still in the car.



With everything nice and clean I lubricated the three new 'O' rings and fitted them. The solenoid and cover was then replaced.



Note the ball bearing still on the end of the magnet.



This two part assembly contains the three 'O' rings.

Gearbox mountings:

The original mountings were badly perished** so they will be replaced with new items when I put the gearbox back in the car.

Note.

*** Whilst I have not experienced it on an MGB I have found that a common cause of jumping out of gear (normally top gear) is worn gearbox mountings, especially if the gearstick gaiter is applying pressure to the gearstick. (It is often better to have the top of the gaiter low down on the gearstick and to avoid fitting any aftermarket gear lever trim).*

Lubrication:

Although recommendations have differed over the years as far as I am concerned the MGB gearbox with overdrive takes 20/W-50 engine oil, anything else can cause problems. Many years ago I had a friend who put Wynn's additive in his gearbox, it bugged up his synchromesh. I don't use oil additives of any description in anything. For Rufus I used Castrol Classic XL 20/W-50.

The cost:

I get most of my parts from the MGB Hive, which is located reasonably close, so rather than pay postage we drive over to collect them and visit my farmer cousin on the way. The parts used were.

1. Gasket set plus primary shaft and tail-shaft oil seals = £10.79.
2. Overdrive filter plus gaskets and solenoid 'O' rings = £7.46.
3. Grommet/seal for solenoid wire = £2.35.
4. Speedo pinion 'O' ring = £0.79.
5. Gearbox mounting kit = £7.08.
6. Anti rattle plunger and spring = £1.42 (to be fitted after the gear-lever is fitted).
7. Nylon bush for front end of the remote control = £2.86.
8. Gearstick bush = £3.95.
9. First motion shaft shims = £3.
10. Oil 'Castrol Classic 4.54 litres (1 gallon) 20/W-50' = £34.36.

Total = £74.06.

Improving the lifespan of clutch and gearbox:

I hate to see people rocking backwards and forwards on a slight uphill slope in stationary traffic as they play silly buggers with the clutch! Don't these people know that they are wearing the clutch unnecessarily? Another pet hate is people who drive with their foot resting on the clutch pedal and one hand resting on the gear lever, that's definitely not good news for the clutch release bearing and the gearbox selector forks!

Summary:

So for a total outlay of £39.70 for parts and £34.36 for oil I have hopefully** given my gearbox a new lease of life. The time taken, including cleaning was less than five hours. However the most important thing for me is that I can now fit the gearbox and hopefully forget about it!

Note.

*** I use the word 'hopefully' because unless you do a total strip down you can never be sure of a gearbox's condition; e.g. the synchromesh could be shot, however the percentages of a successful outcome are on the side of the restorer.*

I had my first experience of Laycock overdrive gearboxes in 1965 on a mate's Sunbeam Rapier. That taught me a valuable lesson, if I get a problem on an overdrive gearbox then the first thing I do is check the oil level. With the correct grade of oil kept at the correct level overdrive gearboxes are very reliable. Any problems are likely to be electrical or related to the solenoid 'O' rings.

I don't have a lot of faith in the overdrive switches in the gear knob. Rufus had the dashboard switch which was in poor condition so I treat him to a new switch and engraved escutcheon from the MGB Hive, this added another £21.95.

One final point! How should you engage and disengage the overdrive? Different car manuals/handbooks give different methods for what is essentially the same gearbox. "I know what I do but I will leave you to make up your own mind."