

Beginners guide to Morris Minor gearboxes

Andrew Bywater guides you through some of the pitfalls of replacing or repairing the "A" series in-line gearbox.

INTRODUCTION

Firstly, let me explain how I entered into the "world of gearboxes". I have owned and run Morris Minors for about 15 years, currently using two white convertibles for wedding hire. As wedding hire is largely seasonal, I was looking to generate income in the winter months. I had about a dozen gearboxes of unknown origin and originally considered rebuilding them to sell online. Although trained as an engineering apprentice I had no specific transmission rebuild experience. The problem with gearbox rebuilds is that there are so many parts! Most people find them scary and one silly mistake can result in an awful amount of extra work, not only to rebuild the unit, but also in refitting it to the vehicle. I have even considered building a test rig to test 'boxes before sale, but it is very difficult to replicate driving conditions, particularly in the area of the synchromesh. Time-served transmission builders will be wondering at this point what all the fuss is about, but as is usually the case with many trades, they learn by repeating the process time and time again, until it becomes second nature. This experience is, of course, not available to the averagely competent home mechanic. New original parts are hard to come by, new parts are not being remanufactured due to tooling and setting-up costs; second-hand boxes are now over 35 years old and of unknown serviceability. Many of our fellow enthusiasts overseas have rust-free cars, but are wearing out their transmissions. I reasoned that it would be easier to post them a couple of gears, than a complete gearbox! So I decided to strip my gearboxes and sell the parts. What follows is the story of my "journey", hopefully passing on to you what this "lay person" learnt on the way.

IDENTIFICATION

There are three basic types of gearbox fitted to a Morris Minor, excluding the side-valve, which is completely different. The two early variants known as "smooth case" fit the 803 and 948cc engined cars. The 948cc has a "remote" gear change similar to that of the later 1098cc "ribbed case" type and in many respects is interchangeable with this later gearbox, with some modification.



The ribbed case gearbox can be fitted to the earlier cars, but you may encounter issues with gear ratios, i.e. poor acceleration, clutch clearance, gearbox front cover and clutch release arm etc. Conversely, if desperate, a 948cc smooth case box can be fitted to a 1098cc engine, not really recommended, as you are putting more power through a weaker box as well as dealing with far more problems in the area of the clutch. There are several articles covering these issues in various popular modification manuals, which go into this in more detail.



They use the same gearbox floor cover; i.e. the gear lever is in the same place. The early 803cc Morris Minor "smooth case" box is similar to that of the Austin A30, but beware, as there is a "trap", one, which I once fell into. All three types of Morris Minor gearbox are the same length (26? inches approx.). The 803cc Minor box achieves this "consistent" length by having a longer tail casting unique to the Minor 803cc car, meaning that the same propshaft is used but a different floor cover, as the "magic wand" gearlever is longer, emerging from a different place in the floor. The Austin gearbox is about 4" shorter, using a different tail casting, so be careful!

The 1098cc "ribbed case" gearbox is the later variant fitted from about 1962/63 until the end of production. It is stronger



Workshop

than the smooth case 'boxes that preceded it. One major advantage is in the synchromesh. 803 and 948cc gearboxes employ a cone-type synchromesh, identified by a "gold" coloured band on the gearwheel whereas the 1098cc box employs a separate baulk ring. The 803 and 948cc "new old stock" gears normally come with the "gold" cone fitted, but it is shown in the parts book as a separate item, although to fit this cone in practice requires the services of a machine shop.



To summarise, things are easier for the Minor owner than that of the Austin. The gearboxes are all the same length, as are the propshafts. Austin 948 and 1098 gearboxes can be fitted to the Minor just by swapping the clutch release arms and ignoring the threaded holes in the bell housing casting as the Austin's hydraulic clutch slave cylinder would bolt to these,



the Minor system is mechanical using a release arm with a hole in the end rather than a fork.



Taking the side cover off the gearbox will expose most of the "innards" for inspection, but be careful not to trap or lose the two plunger springs that will be released. You will be looking for anything obviously awry, broken, chipped or rusty gearwheels. Emulsified (milky) oil indicating moisture or even water, which will have done the bearings and shafts no good at all!



IS IT A GOOD ONE?

As they say, the 64,000-dollar question! Proudly cradling this oily £50 lump in your arms bought off e-bay, is this baby going to save you the £400 extra that a fully reconditioned, guaranteed unit would have cost? If you're lucky, you're in the "pound seats", if not, you're £50 down and spent the weekend lying under the car for nothing. That's the gamble you take; here are a few pointers to minimise the risk:

Insert the gear lever, and select all of the gears while turning the input shaft. Does it turn easily, and does the output shaft turn as well (opposite way for reverse). Grab the shafts both ends and "jiggle" them. Is there much play? There will be some, but unless you have several gearboxes it is difficult to judge good from bad bearing play. One consequence of front bearing play is wear in the scroll-type oil seal in the front cover caused by excessive ex-centric movement in the input shaft. If this is left, oil will be lost, contaminating the clutch and the resulting lack of lubricant will limit the service-life of the gearbox. A modified front gearbox cover incorporating a lip-type oil seal and carrier is available from parts suppliers as an "Owen Burton" mod. At a price...

Having bought many second-hand gearboxes, one popular statement I've heard is "she was a good-un when she came out of a car I scrapped". The seller genuinely believes that they are selling you a really great unit, and price it accordingly. They forget to mention that this was 10 years ago, that it has been stored in a damp garage, stood on it's bell housing, draining all of the protective oil down the 1st motion shaft! As a consequence, once fitted the gearbox bearings howl like a banshee



until the resulting bearing play causes premature gear failure

Another classic is "she's a genuine BMC gold (or silver) rebuilt unit mate". This

usually means that the 'box has been reconditioned sometime in the last 50 years, and that it has done 80,000 miles since the rebuild! It turns out that this gearbox is worse than the one that you have just taken out! I have even known unscrupulous people set to a dodgy box with a gold or silver aerosol can of paint and some BMC transfers!



The best bet for buying a second-hand gearbox to fit "as is" is to obtain one from a recently scrapped car where it has lain in the frame horizontally full of oil.

I have sold gearboxes of unknown origin that have appeared to be OK on the bench, and most have worked. I generally sell these on a 90-day money-back guarantee, the buyer's risk is his fitting time or garage charge, however the savings with this gamble can be considerable, particularly for a summer Sunday afternoon hobby car.

REBUILDING YOUR OWN GEARBOX!

There is no reason why a reasonably competent home mechanic armed with a manual, a basic toolkit and plenty of patience, working in a methodical manner cannot rebuild their own gearbox. I shall not go into great detail here as the subject has been covered many times before. Practical Classics magazine ran a very good 3-part article on the subject in the spring and summer of 2008 – the back-issues should be still available. Rather, I shall offer a few pointers and observations based on my experience of stripping scores of Morris Minor gearboxes.

Every time you rebuild a gearbox there are certain parts that you will always need, as follows:

Gaskets. You can make your own, but are almost cheaper to buy from the popular specialists. **Tail seal.** Always worth changing for what they cost, and it saves a mess on the garage floor! **Bearings** can be obtained from Minor suppliers or from your local bearing specialist. Beware of bearing supplier prices however, as they use astronomical retail prices sometimes discounted by 80% to the trade. Find a friend with a trade account. 803 and 948 "smooth case" boxes use the same main bearings front and rear, which is the same as the front one on the 1098cc, ribbed case gearbox. The 1098 rear bearing is a different "thickness". You will also need a pair of layshaft bearings and a smaller needle roller bearing for the 3rd motion (mainshaft) spigot. This is a brass bush for the smooth case gearbox.



There are a number of transmission specialists who advertise in the classic car press or on the Internet who supply bearing/seal and gasket kits for about £75 + VAT & delivery. Layshafts in my experience virtually all show signs of break-up of the case hardened surface. I have only found 1 or 2 to be re-usable in the scores of boxes I have dismantled. Be careful when buying replacements, as quality is variable, and new old stock is virtually extinct.



The only other part that you may wish to consider prior to starting your overhaul is the 1st/2nd gear synchroniser hub. This is the bit that goes "crunch" when you engage 1st gear on the move. This

will have some wear but may be re-usable in 75% of instances.



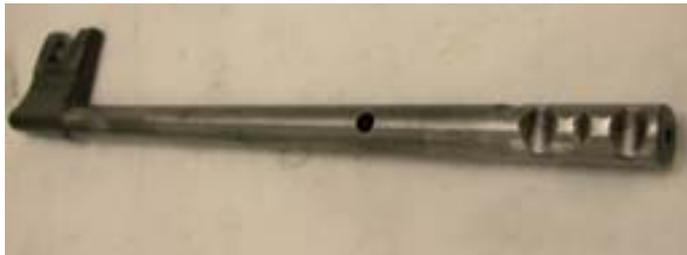
WARNING! When handling this gear, be careful not to accidentally push the 1st gear ring off the central hub. There are 3 spring-loaded ball bearings ready to launch into outer space if the gear ring is allowed to slide too far. I have been able to re-assemble these using a 'Bisto' jar lid, a jubilee clip and a lot of blue language as well as a large supply of balls and springs!



Workshop

The previously mentioned synchroniser springs can become weak/crushed or distorted by the habit of parking the vehicle in 1st gear. Better to park using reverse gear to supplement the handbrake.

Other popular areas for wear are the detent grooves in the selector fork rods, particularly 3rd/4th and the plungers that they work in conjunction with.



Chipped or broken teeth on gear wheels are fairly rare. More common is wear on the synchroniser dogteeth. These are the little teeth around the periphery of the synchroniser cone, especially on 948cc gearboxes. It is possible to replace a single gearwheel with a new or used item, although this may result in a "howling" sound when this gear is engaged. This is because the helical gear teeth present a different wear surface to their opposite numbers on the lay gear cluster. In any event this will only be a problem after replacement of 2nd or 3rd gears as 4th is direct drive, and this is the gear you spend most time in.



Replacement of the lay gear cluster can present more of a potential noise problem as this affects all of the gears. Incidentally, a noise like an enraged bellowing elephant in 1st or reverse gears is normally a sign of wear in the layshaft and bearings.

That about covers the majority of the weaker areas and hopefully will assist the re-builder to identify faults prior to dismantling and to have the necessary parts to hand at the start. For people disinclined to embark on the rebuild themselves, it enables them to source the necessary parts in order to hand them over to their local transmission specialist. They may even be a marine transmission re-builder rather than automotive, and if you obtain the parts, they should have no problem doing the work. After all, it is a 50-year old design!



THE RECONDITIONED GEARBOX ROUTE

As the old saying goes; "you get what you pay for" – never truer than with reconditioned gearboxes. Let's face it, the fewer new parts the re-conditioner has to put in the greater his profit margin. Some of the more reputable re-conditioners are no longer offering rebuilt Morris Minor gearboxes because of poor or non-existent new parts availability. As I have found sourcing "new old stock" is becoming increasingly difficult and when found they are becoming increasingly expensive. Top quality rebuilds are still possible but most owners are unwilling to pay the high rebuild prices on gearboxes for cars, which in the main are used as hobby vehicles.

THE FUTURE

With it being unlikely that new gears will be manufactured, in most cases we shall have to "make do" with what is currently in the system, whether it is in the case of ageing second-hand gearboxes, expensive "new old stock", or increasingly the use of good second-hand gears. At least future annual mileages will



be less and fewer people will be relying on the car to get them to work on Monday morning!

I hope I have been able to impart some information of use. Good luck with your rebuild! If you require any help or assistance in obtaining parts or information on your rebuild please feel free to email me:

Andrew@mirabelle.freemove.co.uk
www.mirabelleclassiccars/gearbox.html