

Words Andrew Everett
Photography Michael Whitestone

Box Clever

If gearbox ignorance is bliss, let us educate you.

Ah, the manual gearbox. You know it's there, hidden away under the floor, but you don't give it a second thought. I mean, you look after your car, don't you? You get the engine oil and filter changed every so often and when you open the bonnet, an engine is all you see... OK, if you own an old 518i you see most of the gearbox too, but you know where we're coming from.

But what's that whining noise? Why does it grumble in third gear? Who cares?

The manual gearbox has a hard life. Every time you accelerate away from the lights, those poor old gears and bearings take a hell of a strain. The lifeblood is the oil, and once a BMW leaves the dealer network you can guarantee the oil will be in there until it gets dropped into a smelting plant. "Change gearbox oil every 50,000 miles," says Neil Waterhouse at All Gears in Worksop, Notts.

The vast majority of BMW gearboxes are made by Getrag but more recently ZF has started making them again. BMW gearboxes are very, very strong and the 'box in your four-cylinder 316 is all but unbreakable, with 200,000 miles a doddle. To find out what goes into a gearbox, we went to see Neil who can do things with BMW gearboxes that others can't. Fixing a gearbox is best left to the pros, and All Gears are well qualified for the job. Six-speed M3 Evo gearboxes? Yep. Five-speed E30 M3 gearboxes where you need a very expensive bit of kit to remove fifth gear? But of course.

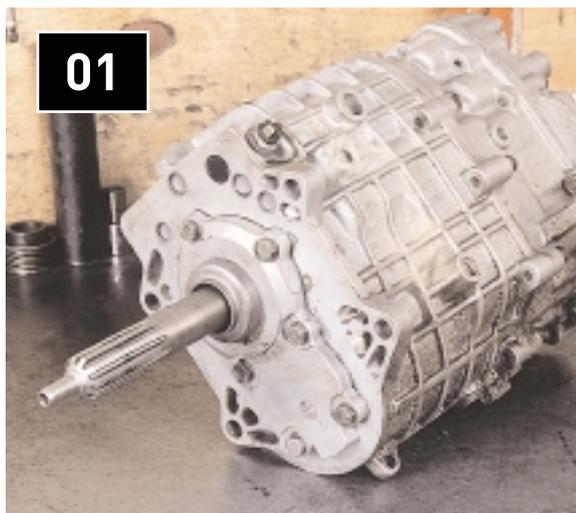
"BMW gearboxes are not DIY," says Neil. "The simple ones like the Getrag 245 (E30 320i, for example) aren't too bad but they're strong and you might as well buy a good used one. But bigger gearboxes need special tools and often the parts are not

available from BMW. I have to search long and hard for new parts but I usually have them in stock. ZF gearboxes are the worst to rebuild. They are a nightmare to strip and rebuild but I love doing them for the challenge."

Our patient for the day is a five-speed overdrive Getrag 265 gearbox from a 1980 735i with a problem — it's making a lot of noise and it won't engage any gears. It's a similar unit to the E30 M3, which has the same bearing problems in old age. Scrap? Not quite. Here's how Neil resurrected it.

Contact

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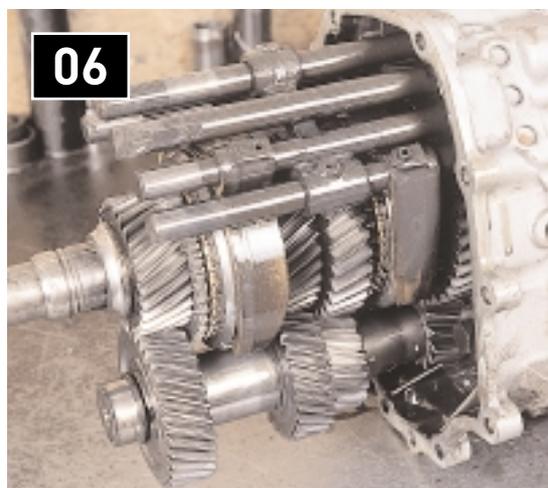


Safety

The first rule of working on cars and using tools of any kind is don't take risks:

- If you're using power tools, protective gear is essential.
- Never work under a car without supporting it, using axle stands first.
- When cars catch fire, they burn fast. Always have a fire extinguisher to hand.
- If you're not completely confident in your ability to complete any task safely, don't even start it. Leave it to the experts.

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1 So, here it is — the Getrag 265 stripped of its bellhousing and gearlinkage. It looks as though it's been rebuilt before, and already Neil has a clue what the problem might be.

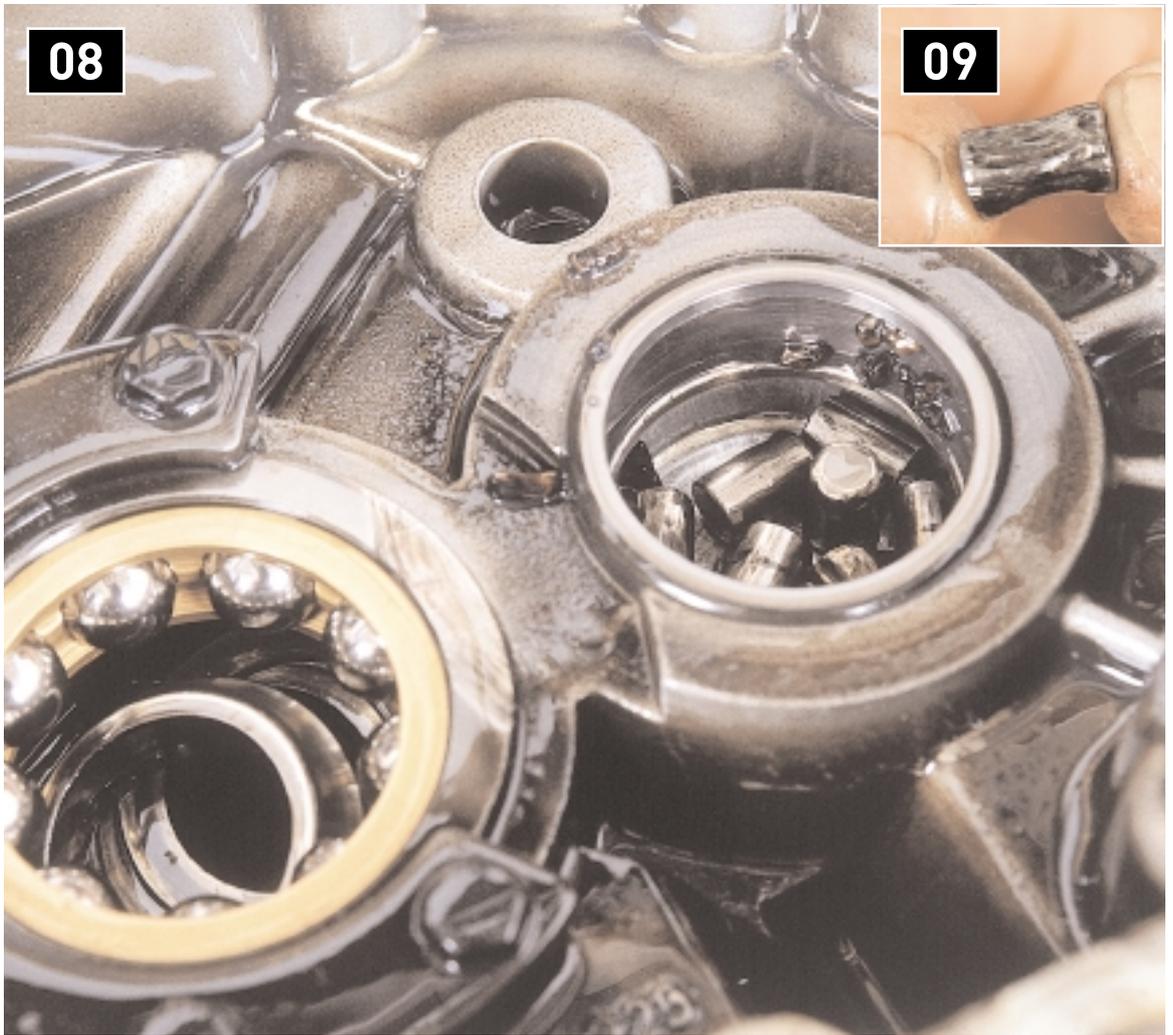
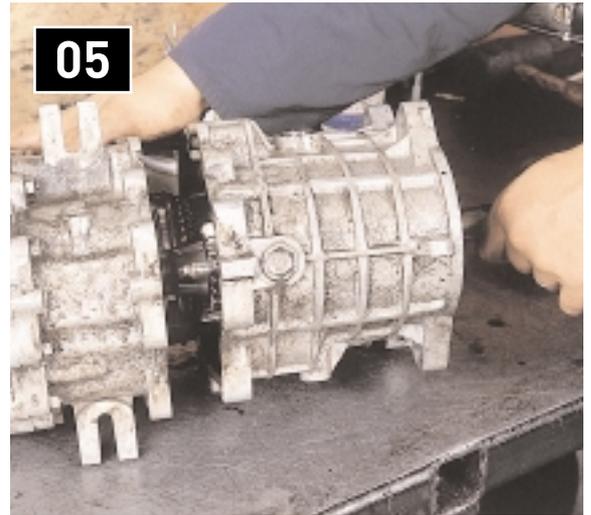
2 Here's where you find the reversing light switch, which is the cause of many an oil leak.

3 Neil removes the front bearing cover. There are supposed to be shims under here and a gasket, but there is no gasket, which means that the shims are putting too much pressure on the rear layshaft bearing.

4 This is the detent spring and plunger for the gearchange. If the spring breaks (not very common), the gearshift becomes very floppy.

5 Separating the two halves. There is no gasket, but precise machining allows an oil-tight fit.

6 With the casing split, the works are visible. This is what the gear train looks like before the selectors are removed.



7 This is a gear selector. On the E36 316i and 318i gearboxes they're made from aluminium and not brass like these. Too heavy a hand results in a worn-out second gear selector and a trip to Neil for a repair.

8 And here's the source of the problem — the rear layshaft bearing has broken up.

9 This shows just how bad the bearing got — the rollers have been badly chewed up. The noise must have been pretty grim.

10 Selector forks are removed by punching out the roll pins and sliding the selector shafts out.

11 This is the notorious fifth gear after removal. You need the special tool and a 30 ton press to get them off. They rely on a serious interference fit to transmit power in fifth gear without use of dowels, so if it's not tight enough it will 'fret' and lose drive.



12 This is what happens when you let a very noisy gearbox go. This was a Getrag 290 from a six-speed 850 CSI gearbox that was run too low on oil.

13 Ever wondered what happens when you change gear? The brass ring is called the 'balk ring'. When you change gear, the synchro hub activated by the selector fork presses the brass ring onto the gear's tapered seat. It locks the gear to the same speed as the synchro hub. When the ring is worn out, it can't grip the gear and that's what gives you the 'crunch' when you change gear too quickly.

14 All Gears do differential rebuilds as well, including the ZF limited-slip units used in the E30 3-Series cars.

15 What causes diff noise? Pinion bearings (the small gear on the left) cause whining under load or on the over run. However, a constant whine or grumble will be the main diff bearings. Don't confuse this with wheel bearing noise though.

What It Costs

As a rough idea, Neil charges £350 to freshen up a tired E30 M3 gearbox with new bearings, oil seals and balk rings. Most gearboxes will cost the same, and it may be better to have a gearbox expert rebuild yours than to buy a used unit privately without a guarantee. This is especially true of the E36 316i and 318i units, where a new selector fork costs £135. Most of the dismantlers advertising in *TBMW* can offer a guarantee with a used gearbox, though.