

ESCORT COSWORTH/MIKE RAINBIRD

TOP GEAR



Running big power and massive torque means Mike's Cossie needs the right gearbox that's up to the job.

ON a 4wd Cosworth, if the engine is running above 350 lbf.ft of torque at 3500 rpm, upgrading the standard transmission is absolutely crucial. The weak link is actually third gear on the MT75 4x4 gearbox and any car running above this limit is living on borrowed time, and if used aggressively (such as on track), it won't be many miles before the dreaded death rattle signifies the gearbox's demise, with the teeth having been stripped off this particular gear.

It is actually the point that the torque comes in that seems to cause the problems, and you can actually help the gearbox by fitting a more laggy turbo, which means that the car is up to a higher engine speed (thus road speed) before the peak torque comes in. So a car equipped with a T4 or bigger will get a longer life out of the standard gearbox, although it will still eventually fail, but just not as soon as one with the peak torque generated lower down.

The previous owner of my Escort found this out to his expense! When the engine was originally built and mapped on a T34, it had a mid-range spike of 2.2 bar and

419 lbf.ft of torque at 3500 rpm (in the days of benzene-equipped 98 RON fuel), and lunched the standard 'box in less than three hours after the boost had been set to it's post running-in level!

At the time (way back in 1998/1999), the only real solution was the first-generation Swedish Fixit gearkit, which was only rated to 450 bhp, so was just about man enough for the job and was purchased and fitted. This is how the car was when I bought it, and being semi-straight-cut, it had that love-it-or-hate-it, authentic rally car noise.

Despite the gearbox being uprated, it still had the standard diffs when I bought it and these are also a known weak link. If launched too aggressively, the front diff has the propensity of the gears climbing on top of each other and this actually cracks the diff casing in half! Also, the rear diff does the same thing as a high-powered 2wd car, and lanches the planet gears.

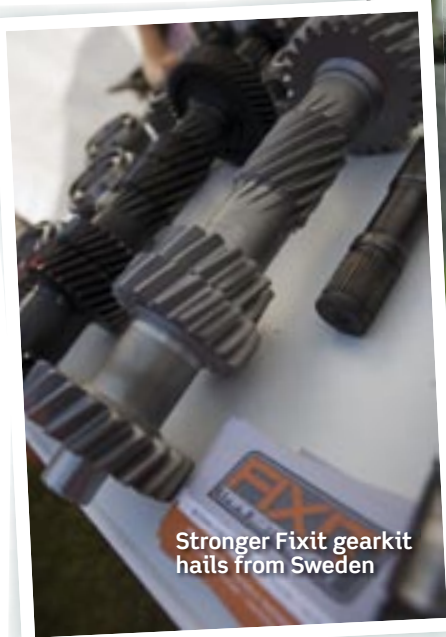
Obviously wanting to build into the car as much reliability as I possibly could, the standard items had to be ditched. Fortunately, Quaife offers replacement items in the form of its Automatic Torque Biasing diffs, which work on large interlocking worm gears making this part of the diff unbreakable.

To combat the front diff casing splitting in two, Quaife makes its own casing which is significantly beefier than the original Ford item. These are not

indestructible (as Kevin Sharp will testify in his 10-second

quarter Escort!), but are far superior to the standard items.

The Quaife rear diff is built into the original Ford casing and both front and rear diffs retain the standard crownwheel and pinions.



As I mentioned in my first article (January 2007 issue), I rebuilt this engine to a higher output of 477 bhp, and due to the short-duration cams, even with the T4, the car made a huge slug of torque at 3500 rpm, where the turbo spooled up to its 2.2 bar peak (which equates to some 420 lbf.ft of torque). Unfortunately this exceeded the Mk1 Swedish gearkit's rating, and it chipped a tooth on the main input shaft,

kit, so had the choice of either purchasing a one-off main input shaft from someone like Quaife or Pete Doherty (both of whom said they could do it), or buy the latest-generation Swedish kit.

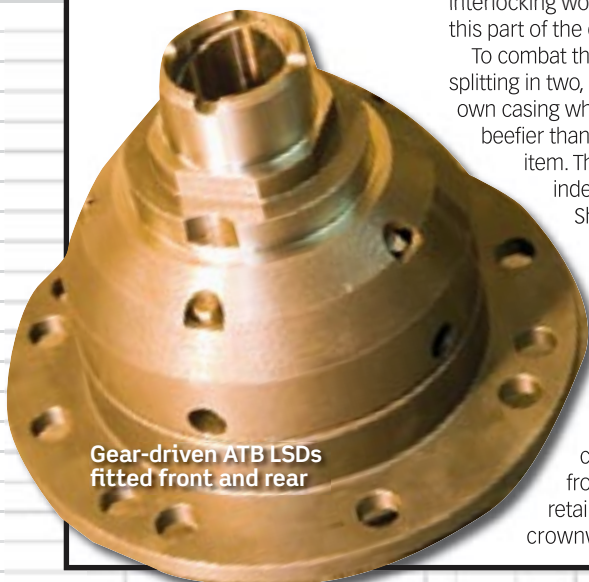
At £1500, it worked out cheaper to have a one-off main input shaft made, but then given the limit of all the gears still left, if these ever went wrong it would have meant one-off items being made as well. I could see the

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which although didn't do any terminal damage (being able to still select all the gears and drive without problem), it just sounded like a bag of spanners in every single gear!

As the Mk1 Fixit gearkit had been superseded by the current generation (serving cars of over 700 bhp), I couldn't actually get any spare parts for the older

costs to keep this gearbox in one piece amounting to significantly more than the latest generation Fixit kit. Logic therefore dictated that I had to delve deep and buy the current generation of Fixit kit. Unfortunately, as seems the case with these gearkits, demand far outstrips supply and I had a six-month wait until I could get my hands on one.



Gear-driven ATB LSDs fitted front and rear





Thickwall front diff casing much beefier than the OE item

Hard track use means the Escort's transmission must be up to the job in hand



Clutch operation is now hydraulic

Luckily for me, I have some good friends in all the right places and Chris Flint of Carnoisneur Southend came to the rescue, lending me the Quaife one he had acquired in the purchase of his orange track car. Fortunately, his car was nowhere near completion, so he very kindly just told me to give it back when mine was ready — top man! This meant that my car was still on the road for the full duration of the lengthy wait!

When the gearkit finally arrived from Sweden, it was immediately dispatched to the guys at CTS for installation into my gearbox, using the latest Ford synchro rings (FINIS code 1096271). At that stage, the Fixit kit used the original standard first gear and mainshaft, so CTS sourced me some good-condition second-hand items. Again, I wanted to protect my investment so I had

Bernie send everything away (including the standard items) for shot-peening and polishing to stress-relieve them. This also improves the strength of them by a small percentage, as well as insuring perfect mating surfaces.

Once assembled, unlike the standard MT75 gearbox, which uses Automatic Transmission Fluid, the Fixit kit requires a fully-synthetic 75w90 gear oil and I always use Mobil SHC for this and the diffs.

Obviously any gearbox is only as good as its clutch, and at this power level it has to be at least a six-plate paddle with heavy-duty cover of either AP or Alcon flavour. Unfortunately just fitting these items can bring their own problems, as the heavy-duty cover can put a huge strain on the standard ratchet and clutch cable. In fact, this can be so

severe that the cable can snap or the teeth break off the plastic ratchet.

The flywheel also has to be surface ground to remove any raised hot spots created by the clutch slipping. If this isn't done, the clutch can grab on the raised points of the flywheel, which makes it both juddery, and if fitted with the standard cable, can sometimes not disengage fully and be difficult to engage first gear and/or wear the clutch prematurely. In fact, some people report as little as 4000-6000 miles with the original clutch operation.

Obviously, being a perfectionist, this wouldn't be acceptable on my car, so the solution is both relatively simple and cost effective — hydraulic actuation.

Martin at Reyland Motorsport supplied and fitted this, and the difference it makes is like night and day. Firstly, the feel it gives is a significant improvement on standard, but due to the fact that it always fully disengages, clutch life is increased by several thousand miles (I manage to get 15,000 miles per clutch, which is more than acceptable at my power level).

As a testament to the strength of all these items, my car has done in excess of 35,000 miles on the diffs and 30,000 miles on the gearbox — without having to be taken apart at any time. Although I would point out, that I am very mechanically sympathetic and have very rarely launched the car.

As a comparison, I understand from my dealings with Cossies that where people have chosen other gearkits, they haven't had anywhere near the same kind of reliability, so my motto is 'do it right, do it once' — it's the only way to do things.

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