

GEARED UP FOR THE JOB

On the pre 72 “Ford 3 litre” Marcos, by far the best mod you can carry out is to alter the gearing, this being totally wrong for the engine installed, and not really tough enough if the car is used to its full capability. An engine whose power is starting to tail off at 4750 rpm needs far higher gearing for the road.

Volvo 3 litre models benefited from correct gearing, Ford motor company having introduced the 3 litre Capri “heavy duty” axle, and now making it available to the likes of Marcos, Volvo also gave the gearbox well spaced ratio’s unlike the MK4 Ford Zodiac box which had 2nd not very well spaced between 1st & 3rd.

The benefits of this axle were obviously its strength, but more importantly raising the gearing to 3.22-1 from the 3.77-1 in the original Cortina/Corsair axle, and incorporating an increase in brake shoe width from 1.75” to 2.25”, with a brake cylinder reduction in diameter from .75” to .70” to maintain brake balance between front and rear. (Marcos/Triumph Vitesse/GT6 front brakes were similar in size to the Capri already).

The original axle can have the diff fitted from Corsair 2000E (if you can find one) or Escort RS 2000 raising the gearing to 3.54-1, which is a slight improvement, (but no stronger).

This was the first modification I tried on my car, fine while the overdrive is working! But hopeless when it doesn’t as it’s still the “Top gear”, and not an overdrive! It still also does nothing for the worst part of the gearing 1st & 2nd), great for destroying the tyres, (you needed 3rd gear for 60mph!!) no need to wonder why the Volvo was quicker to 60 then! (Achieved in 2nd).

Tyre aspect ratio’s have also changed since the cars were new from 80% of tyre width to 70%, when you do the maths it’s a surprise what a difference this makes alone,. To maintain original gearing you really need to change to 14” wheels with 185/70 or 195/65 tyres!

The next mod I tried was altering the gearbox ratios, by obtaining a “3 rail” Mk11/111 Capri / Mk1 Granada “3 litre type E”, 4 speed box. When stripped this will allow you to use the complete lay gear and 2nd gear from the main shaft, and fit them in the Zodiac / Overdrive box changing the ratio’s from:

1 st gear 3.163	1 st gear 3.163
2 nd gear 2.214	to 2 nd gear 1.940
3 rd gear 1.412	3 rd gear 1.412
4 th gear 1.000	4 th gear 1.000

While the 3 rail box is stripped you can also use any gears & syncros / shafts & bearings that are worn, plus you could change the selector forks which are steel in the 3 rail but bronze in the zodiac.

This has made 60 mph achievable at 6000rpm in 2nd with 185/70/13 tyres and 3.54 diff ratio instead of 53 mph, gearing was now far better spaced but overall still not

good enough, I had to “bite the bullet” and go for Mk 1 “3 Litre” Capri axle, with 3.22-1 ratio.

The original axle is a 48” casing and drum face to face 52”. The new axle is a 50” casing, and 54” drum face to face, therefore an inch extra width each side, which didn’t seem excessive at the time, so with new plasma cut “Marcos” brackets welded on it was fitted to the car, the gearing was transformed and exactly what the car needed, 66mph at 6000rpm in 2nd gear, a gain of 13mph from where I’d started!!

With the new set up the car was much better to drive, but my satisfaction was about to come back to earth with a bump!! I had 7x13 Wolfrace type wheels with 185 tyres stretched on and the car looked ok, but I wanted my “Marcos alloys” on the car. I was doing concours competitions and these were the correct wheels which I loved on the car, (what other manufacturer at the time had their own wheels produced!!)

From behind the car looked utterly ridiculous, I was absolutely gutted, it looked like the body shop had not talked to the chassis dept when designing the car, surely no one would seriously produce a car like that? Marcos perhaps had seen this when they fitted the Volvo 3 litre with “Cosmic alloys” correcting the back, but leaving the front like it was fitted with “space saver” spares!, but at least you could space them out if you wanted to

My car looked so horrible, and not wanting under any circumstances to fit add on wheel arches I took the axle off and sold it, and refitted the original axle with a 3.54 limited slip diff to strengthen it.

All was ok for a while until the overdrive packed up again, was rebuilt, and packed up yet again AAAARGH!!!!

The gearbox was exchanged for a 4 speed 3 rail with the lever fitted at 180 degrees (perfect fit and gear change, and will take 300bhp). The type N “5 speed” Mk11 Granada /Injection Capri could be adapted to fit but was weak, with 1st gear easily stripped and so gradually I got fed up with the gearing, and the car got left for 10 years!!.

I had purchased a new Mantis and after driving it for a while I questioned myself like a number of us who’ve kept the old and bought the new “do I still want the old banger in the garage”!!

Looking at the poor old thing it did look sorry for itself. I realised how much I had neglected it and how much work it required, I heaved the drivers door open, chased the spiders out, and sat in the seat remembering the good times we’d had together, as I sat there I was astonished how much more room the Mantis had inside! I could not move my legs, and my knees hit the tripometer extension & pedal adjuster wheel, I thought, “how on earth did I drive this”! (you’ll do anything with rose tinted specs on!!)’

The cars seemed the same inside; in fact the Mantis should have less room with its higher seats!! I was confused??

The 3 litre, I decided had to go, but by the morning I'd changed my mind. I've owned it 20 years and although not worth much now it would still be a wrench, another look at the car, and then it dawned on me "it was the steering column that was so much lower"!!,

Out came the dash, up went the column, and bingo!! Someone could sit on my lap now!!

The trouble was I'd never really bothered, you'll put up with anything as long as it looks good!! I'd never really considered basic engineering solutions, that's it!!! the old girl is staying whatever work is needed. The work now underway "to make the car enjoyable!!!"

The car had to have the Capri axle ratio but now with 3.09-1 that came with the Mk11 onwards and I would stick with the 4 speed for now. Talking to people about the width problem I was introduced to the world of "Ford rallye sport" who had manufactured the "Narrow Atlas" axle, also known as "baby atlas". This was a Capri axle strengthened and shortened, now only available second hand, but you could build one yourself using any Capri axle, and "Quaife Engineering" half shafts cut to the required lengths. These are beautifully made in two pieces, with separate flange & shaft all stronger than standard.

I obtained a Capri Mk1 axle from fellow member, Dave Parslow who was advertising parts for sale, very useful with Marcos brackets already fitted and should be a straight swap once shortened.

I took the axle to Gartrac Engineering in Surrey; they have been involved in rally cars for years and still shorten Capri / Atlas axles for Mk1/11 Escorts which are still very popular in club rallying. (When the work is completed, you simply cannot tell.)

They agreed to shorten my axle to "Cortina width" at 48" and put different ends on to accept the larger wheel bearings, (introduced in late 74 with the Mk11 Capri) and supply cut down Quaife half shafts with blank flanges drilled to Triumph p.c.d. (usually supplied drilled Ford pcd), the shafts are supplied with longer splines at the diff end so when cut, enable any length to be chosen; shot blasting the axle for ten quid was a bargain. They also supplied a new diff cover that had rusted through, and a rear cover clamp, a very useful half moon shaped piece of metal ¼" thick bolted over the diff cover to ensure that when the car is raised on a trolley jack the diff doesn't drip oil because you have distorted the cover. (In rallying, when the car grounds.)

The only mistake made was the brakes, no one had realised there was a different offset depending on which bearing is fitted, (because most people go for disc brakes). Although I had a 48" axle casing I now had 52.5" once the half shafts were fitted which has left it similar to the early Marcos 3 litre "Salisbury" axle which was fitted to wooden chassis and early steel up to "H" reg , (can't find

anything written on this axle, can the gearing be updated ? - I believe parts are scarce?)

I had to use the original Cortina brakes and back plate with the Capri drums. This allowed the 6m/m extra each side to be taken up i.e. 1.75" shoe in a 2.25" drum, not perfect but will have to do till the car is on the road and perhaps I can obtain the later brakes. So, if you wish to go down this route stick with small bearing/floating brake cylinder, large bearing/fixed brake cylinder, but bear in mind small bearing/floating cyl axles are now very rare with all brake parts unavailable from Fords. The wide axle can be picked up for peanuts, although 2.8 lsd axles are now harder to find. There were a few large bearing/floating brake cyl wide atlas axles from pre Dec 74 Mk 11 Capri's (rare).

The wider large bearing/fixed brake cyl axle 52" casing 56.5" drum face to face from 74 onwards was the reason Marcos widened the Mantula with wheel arches, the 2.8 injection axle being available new. All wide axles had 3.09-1 diffs, the narrower axle came with a 3.22-1 (unless they've been modified).

The axle now is always referred to as the Atlas (although strictly not true) but everyone knows what you mean by this term i.e. narrow atlas & wide atlas, it is also usually described in casing width i.e. 50" 52" etc. (minus shafts) the differential is removed from the back. (Shorten 52" casing to 47.5" with this axle, 52" when shafts installed). The original axle is known as the "English axle", also described in casing width.

With the differential removed from the front in its own housing, fitting up in the car was easy, every thing bolting back in the same place. Shot blasting was also vital as I could now see cracks around the panhard rod locating bolt, this was renewed and strengthened, (lose this, you'll lose your car!!).

At last the car had the correct gearing and looked good!! (i.e. you'd never know). Some cars will need the prop shaft flange changing but mine was the same.

For those wanting to up rate the "English axle" you can renew the diff side gears from 22 spline standard to 16 spline Atlas gears and then use the "Quaife" atlas 16 spline half shafts cut to length. With a steel limited slip diff (lsd) fitted, this would be a strong axle but the crown wheel and pinion would be the weak point, speak to Gartrac.

For those wishing to uprate an "Atlas axle" (really for competition use) this time you change the 16 spline side gears for 18 spline "Quaife Atlas" gears, this then allows you to fit the larger Quaife 18 spline half shafts. With this set up you can go to fully floating shafts, vented discs etc and you can spend £3000!!, for an all bells & whistles axle capable of 500 bhp plus!!!

This article has been written with the steel chassis in mind, but the "Atlas" can be fitted to the wooden chassis cars with some wood work (Mike McCullough 3 litre wood chassis). You should take some advice on strengthening where you have to relieve the wood, perhaps from Rory at Marcos Heritage or maybe Richard

Falconer (in club directory) seems to be an expert in all things wooden, I'm sure its fairly straight forward once you know what to do.

I would urge anyone with wood chassis car to go for a shortened axle and avoid wheel arches, apart from the 1800's you have the most valuable / desirable cars. In the seventies / eighties it was fashionable to adorn the cars with deep offset wheels and arches (mine included!!) but today the cars are proper classics and should now be treated as like.

COSTS

Atlas 16 spline shafts £90.00 each

Flange £62.00 each

Shaft bearing/plate £26.00 each

Shorten axle casing £160 total. To any length

Back cover plates £30.00 pair. (Strengtheners)

All plus vat

Atlas "new" back cover available from Marcos Heritage (see website)

Telephone Nos

Gartrac Ltd 01428 682263/4 fax 01428 682265

Very helpful company; will give you all sorts of advice

Quaife Engineering Ltd 01732 741144

Very busy!! Company; long wait if out of stock but produce amazing kit for major car Manufacturers

Anybody needing further advice just give me a ring.

Phil Ward