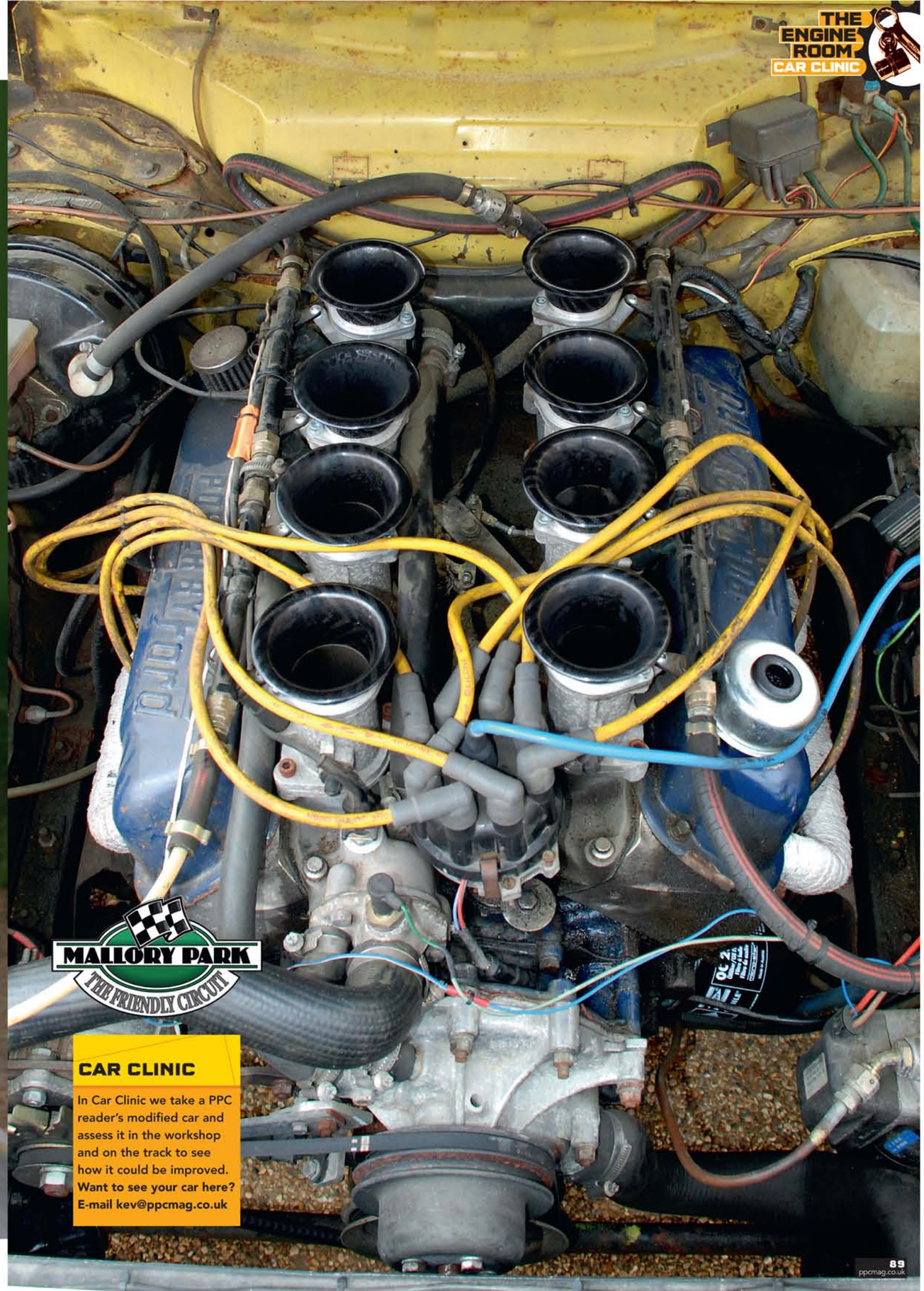
THE ENGINE ROOM CAR CLINIC

CAPRI 5.0 V8

TROY ROBINSON INVESTIGATES TO SEE JUST HOW MUCH OF A PIG'S EAR WILL HOLMAN'S MADE OF HIS CAPRI V8



MALLORY PARK
THE FRIENDLY CIRCUIT

CAR CLINIC

In Car Clinic we take a PPC reader's modified car and assess it in the workshop and on the track to see how it could be improved. **Want to see your car here? E-mail kev@ppcmag.co.uk**

Most regular PPC readers will know that Mr Holman is the editor of this wonderful magazine and I did wonder if I might need to dig out the rose tinted workshop goggles. He's owned this car for nearly 10 years and clearly has a soft spot for it. But I need not have worried as Will's realistic about the extent of his mechanical expertise and told me to tell it as it is, so here we go.

The first thing that strikes you about this car is the sound; as soon as you turn the key even the sound of the starter tells you it is struggling to rotate multiple cylinders with lots of capacity. When the engine fires this is immediately confirmed by the somewhat erratic burble of a US V8.

When Will bought the car it had its original 3 litre Essex V6 and in standard trim it was never going to deliver the sort of performance Will had in mind. The Essex motor has been used in more Fords than you can shake a big stick at but in reality they never gave much more than 120bhp and the action was all over by 5000rpm.

Like any reasonably large capacity V6 they did have good torque so when you jumped out of your 1600cc rep mobile into the top of the range 3-litre you instantly felt like Bodie or Doyle depending on your preference of hair styles. Move this on 25 years and your average rep mobile has got at least 120 horses and is probably a bit lighter too so you can see why the standard V6 wasn't really very exciting.

Will weighed up the options for the Essex but worked out that a rebuilt and mildly tuned Essex would cost well over a grand and yield perhaps another 20 to 30bhp. We've seen these engines produce over 200bhp but they're heavily tuned and all have had triple Weber conversions and have had a lot more than a 1000 pounds poured into them. Luckily Will had heard of the Basil Green's Capri Peranas which were built by a South African Ford dealer back in the 70s these cars boasted a 5-litre Ford V8 engine stuffed in the front. This sounded more like it and he instantly started the search for an engine. Once sourced he rebuilt the engine with a rebuild kit from the States which included pistons, gaskets, seals – the lot for £270. No that's not a typing mistake.

Initially the car had a four barrel Holley carb but this was replaced by some Edelbrock heads and Jenvey 50mm throttle bodies. Will used the injectors from a Supercharged Jag V8 and it's all controlled by an Emerald ECU. Currently the engine still uses the distributor to dish out the sparks but this is all it does as the ignition timing is controlled by the ECU. Eventually Will plans to fit a phase sensor into the distributor and go to sequential injection and wasted spark ignition using coil packs. This should further boost power and also make driveability better.

Sequential as the name suggests is where the injectors are triggered to fire in time with the induction stroke of the engine, batched injection is where the injectors fire in pairs. If we take a four cylinder engine as an example, injectors one and four will fire together so with number one cylinder on its induction stroke, number four will be on its exhaust stroke and the injector will fire fuel into the inlet tract when there is no real airflow to atomise it.

This inevitably results in some fuel clinging to the inlet wall (wall wetting) and dribbling into the cylinder when the inlet valve does open. This fuel isn't properly atomised so doesn't burn completely or efficiently. As a result unwanted emissions are increased and slow speed driveability can be compromised. When the engine's pulling hard at mid to high revs this wall wetting doesn't seem to matter as the speed of the incoming air picks the fuel up and atomises it before it gets into the combustion chamber. Going sequential will improve the low rpm performance and the wasted spark will boost the ignition spark energy giving a more complete burn and hopefully increasing power.

ON THE ROLLERS

Having said all this, the Capri rumbled into the workshop running like a complete dog. It was just about on six cylinders occasionally rousing itself to seven. As soon as we put the engine under any real load on the dyno it would drop back to four and was missing and spitting back through the throttle bodies heavily. After connecting up the engine analyser we could see that the spark pattern was all over the place and the coil energy was very low so we knew this was going to be ignition related. It's always worth checking the basics before getting too involved in any diagnosis trail so we pulled the plugs out to check them and do a compression test. It soon became apparent why it was running so badly as four of the eight plug electrodes were completely fouled with a cauliflower like deposits. It then dawned that this was actually baked on foam from the filter socks that we had taken off the throttle bodies before we started tuning the car.

Because of the lack of space Will had fitted some Pipercross filter socks to give some protection to the engine but the trumpets on the bodies were carbon fibre affairs and had a very sharp edge to them, as the filter socks were stretched over this edge the vibration and movement of the socks had resulted in the edge of the trumpets sawing through the foam. These bits must have found their way onto the end of these plugs causing them to foul and then missfire. To be honest we're not the biggest fans of filter socks as we've seen them at best rob 30 horsepower from a strong engine and at worst heard of them actually being sucked into carbs or throttle bodies. This is because they often slip down the trumpet leaving only the very end of the sock to actually flow any air, as the engine pulls harder this gets worse and worse as the sock is pulled down closer to the end of the trumpet. If you do have to use filter socks due to space always try and get the type with some internal support which helps to stop this to some degree.

With a new set of plugs and the socks installed in the bin we ran the car up again. This time the engine pulled healthily and gave 289bhp @ 5500 rpm and 300ft/lbs torque @ 4300. There ain't no substitute for cubes, as the Yanks like to say.


Capri: 10bhp less than two years ago.


Balancing throttle bodies at idle.

Will's bumper sticker says it all!

ON THE SCALES

Will's Capri weighs 30kg less than a standard 3-litre, proving his theory that the V8 weighs less than the V6.

321kg		240kg
FRONT		
298kg		256.5kg

Total: 1115.5kg 56%F 44%R Cross weight 48.2%

SUSPENSION GEOMETRY

In true PPC style the rest of the car hasn't been left untouched. Although the suspension is relatively standard it does have 2.8i parts all round with Bilstein dampers and a Caprisport axle bracing kit which helps to keep everything where it's supposed to be. The Atlas axle also has a plate type LSD from the 2.8i Special. Brakes are uprated with mix and match selection of 260mm Sierra XR4 discs and Mondeo calipers the front and the rears are Escort Mk 3 front discs with Sierra rear callipers – try explaining that lot down the local motor factors when you want some new pads!

With the possibility, or should that be certainty, that the car would be going sideways a fair bit Will wanted power steering to help him keep up with the flailing back end, so he's fitted a Capri 2.8i rack and crossmember. But there was no room for a belt driven PAS pump so he used an electric pump from a Merc A class.

This is where thing go a bit wrong with the suspension side of things; Will mentioned that the car was really tiring to drive as he literally had to make inputs to the steering wheel all the time. This might sound daft as you always have to steer a car right? Well not really: a lot of the time the driver's making small inputs into the steering and then relaxing that input as they want the steering to return to the straight ahead position. When cruising, the car's natural stability should keep it pretty well straight with only light input to the wheel.

But on the Capri you have to literally hold the wheel tight with both hands and steer it both into and out of a corner. Once a turn was initiated the steering wanted to increase the lock rather than decrease it when the steering was released.

Once on the wheel aligner it soon became clear that the front end had zero caster angle on the left side and actually had negative caster on the right front. Now a low caster figure is one thing but negative caster is an absolute disaster as cars like this are horrible if not downright dangerous. The really odd thing was we couldn't see why it was like this. The crossmember was bolted in the correct position, both suspension legs were fine, the anti-roll bar looked perfectly normal and the inner wing mounts were the original ones with no welding or plating in this area. But you could even see the leg on the offside was angled very slightly backwards causing negative caster.

The easiest option to resolve this would have been to fit some eccentric top mounts which allow the top pick up point to be moved to adjust caster and camber. When rotated to give maximum caster adjustment the mount doesn't affect camber and when rotated to give maximum camber there's no caster change so using these is always a compromise. Also they use a rose joint top mount which has no compliance and makes the ride very harsh. For this reason Will wanted to avoid using them. The only other option was to shorten the anti roll bar which locates the lower arm, this has the effect of pulling the lower arm forwards and thus introduces some positive caster. The drawback here is that you can't have the lower arm at too great an angle as it will overstress the bush in the inner end of the arm, plus it moves the wheel forward in relation to the wheel arch so it can cause clearance problems on full lock.

Because the Capri's anti-roll bar is not designed to be adjustable on the Capri we had to remove the locating brackets and slot the holes as well as cutting off the front end of the bracket itself.

Once refitted and with the car back on the alignment gear we optimised the position on the locating brackets before tack welding the front portion of the bracket back on. The brackets were again removed and welded properly on the bench to ensure they were at least as strong as they were before we modified them.

I can't stress enough how important it is to really think through anything you do that relates to brakes, suspension and steering on a car. If you engine goes bang then it's just your wallet and pride that gets dented, but have something break on the suspension at speed and the results can be very serious indeed.

On the ramp, sorting the caster.

Rear discs aren't really necessary.

Front anti-roll bar mounts modified...

5-litre Ford V8: CR is only 8.9:1. Will wants 10.5:1.


...to move mounting point...


...and correct negative caster.


Mounts needed rewelding to finish.

ON THE ROAD

We now had some reasonable alignment figures for the car and it was time to try it again on the road – this isn't a track car so a track test isn't appropriate. The torque is almost instant with this engine, the 5-litre displacement gives 250 ft/lbs of torque at 2000 revs which makes it possible to light the rear wheels up from less than 1500rpm in the lower gears, no waiting for the engine to come on cam with this car.

Currently this is actually a bit of a negative in terms of how the car behaves as it also has a sticking throttle pedal. Looking at the linkage it had a very small quadrant which reduces the leverage the cable has to pull against the return springs. Also the pedal ratio was not optimum as the pedal pad and cable attachment point were equidistant from the pivot point resulting in a 1 :1 ratio. Simply moving the cable attachment point down the pedal arm would make the pedal lighter and smoother although it does reduce the amount the throttle opens for a given pedal movement.

Once moving and past 2nd gear the throttle isn't too difficult to manage and you can begin to get a feel for the car. Grip from the 205/60/13 Yokohama A048 tyres feels good and with the corrected caster the steering behaves normally. In the corners the car felt well balanced, although if there was any understeer this would have easily been cancelled out with a stab on the throttle.

In a straight line the car is really quick and just keeps pulling with an urge that barely diminishes as you change up the gears. On the subject of gears; they need attention as it's almost impossible to downshift from 4th to 3rd, which spoils the fun as you end up with a gearbox full of neutrals just as you really want to be turning in and getting back on the gas.

Other than the lack of a swirl pot which resulted in stuttering acceleration out of corners when the fuel level was low, the only real issues with this car are the gearbox and the heavy throttle pedal. I'm sure once these little jobs are sorted you may be seeing a lot more of this car in PPC probably sideways and almost certainly with the driver wearing a big grin!

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THE CAR CLINIC
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