Words and photography by Keith Calver

Tech

Our Mini guru Keith Calver shows you how to get the best out of the 1275 engine — without breaking the bank.

Last month we saw what can be achieved from a 998cc engine on a budget. This month we're looking at making the most commonly transplanted A-Series — the 1275 — more entertaining on the cheap.

Someone recently said to me "of course, the old Mini isn't really capable of keeping up with modern day traffic". I laughed, then pointed out the one thing needed to drag the Mini into modernity: a change of seats, as the originals aren't exactly comfortable. He replied that he meant the Mini was wheezy and had unimpressive brakes. I said he must be thinking about drum brakes, not the splendid anchors all Minis got from 1985 onwards, but 'wheezy' I had to agree on. What the engines need to deal with most traffic is extra torque; something that's difficult to get from a small motor, especially an ancient design.

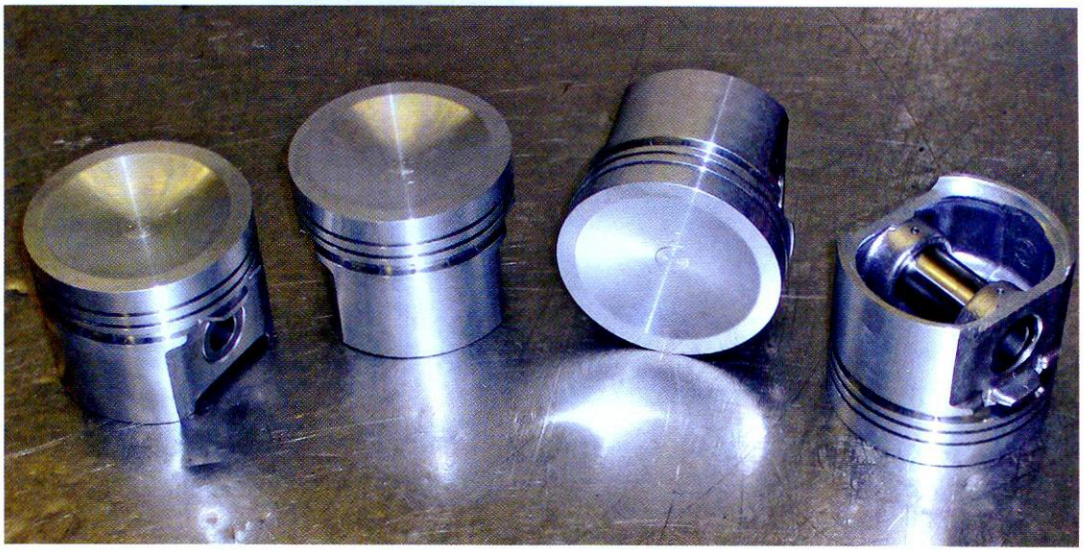
With an eye on the budget, I kept the block assembly as standard as possible. There's no substitute for cubic inches where torque's concerned, so it's simple: bore the block out very big and try out some new 73 mm diameter pistons (from Mini Spares). I also stuck in a RE13 road-burner cam, one of the Australian cam grinds developed by Graham Russell to maximise torque, a reasonably modified head and Stage 1 kit induction and exhaust systems.

The result? Take a look at the table on page 114. On its own it doesn't mean a lot and many will be chuckling at how low these figures appear. The problem is I don't have anything that directly relates to this type of build other than Mick Barratt of MBE's assertion that it's better for peak power and in the torque/driveability stakes. It'll also pass the emissions test easily — not something the usual suspects manage without a lot of work.

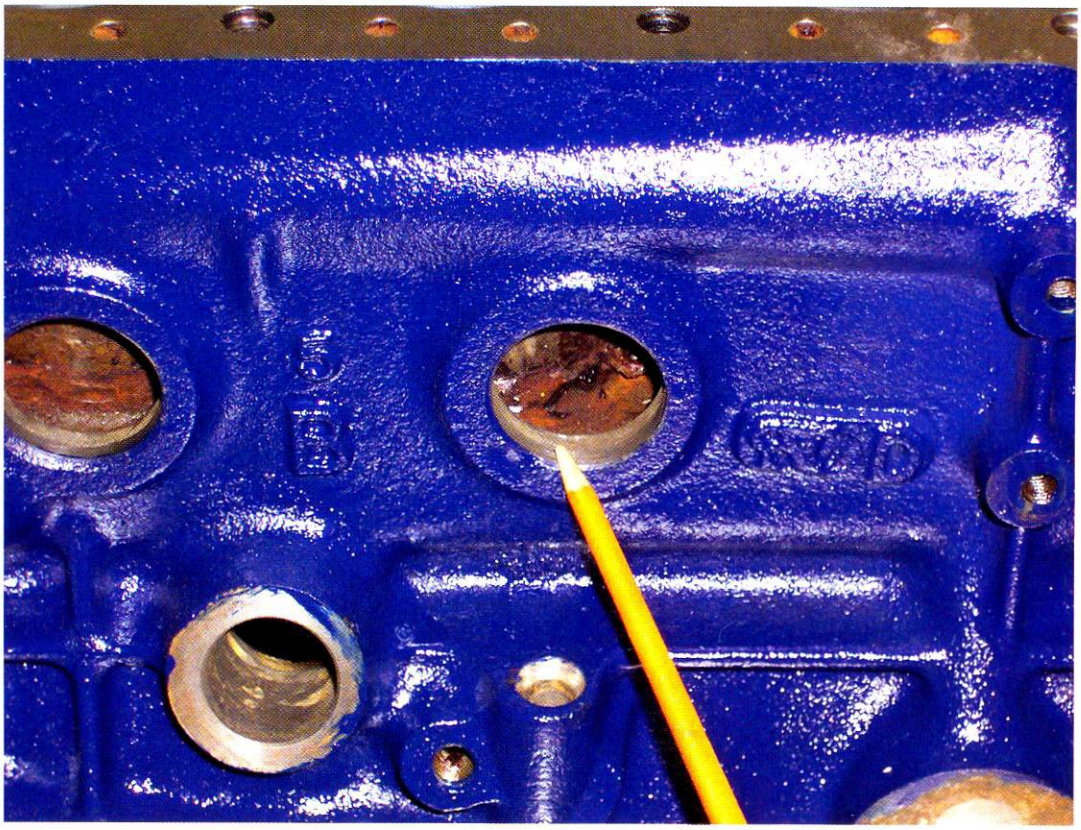
Mick had to rebuild the roller's electronics recently and the machine is now showing slightly lower than before, so these readings aren't comparable to older ones. That's the danger of comparing readings from various dynos and various engine builds — even the final drive ratio causes differences. Hence the testing at specific mphs — it's more relevant on the road.

Which is where the real test is, and the results there are astonishing. The Mini will trickle along in traffic without the stuttering experienced with sportier cams, and at speed taking even the briefest over-taking opportunity is easy.

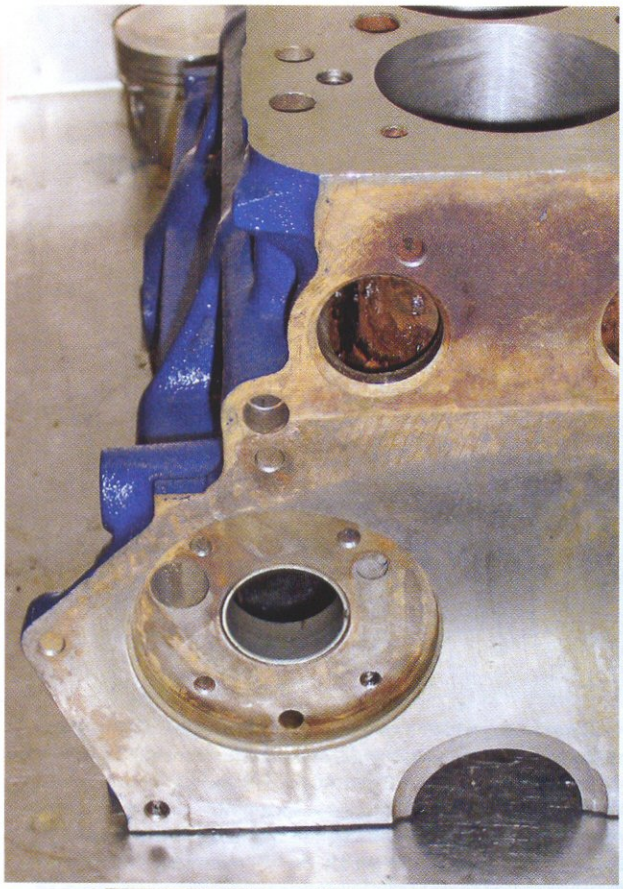
My only change would be from a 3.44 to a 3.15 final drive. The motor develops so much torque from low down that it feels seriously under-geared. This kind of engine is exactly what you need in the modern world — not as civilised as the high-torque mild road cams, but far more entertaining.

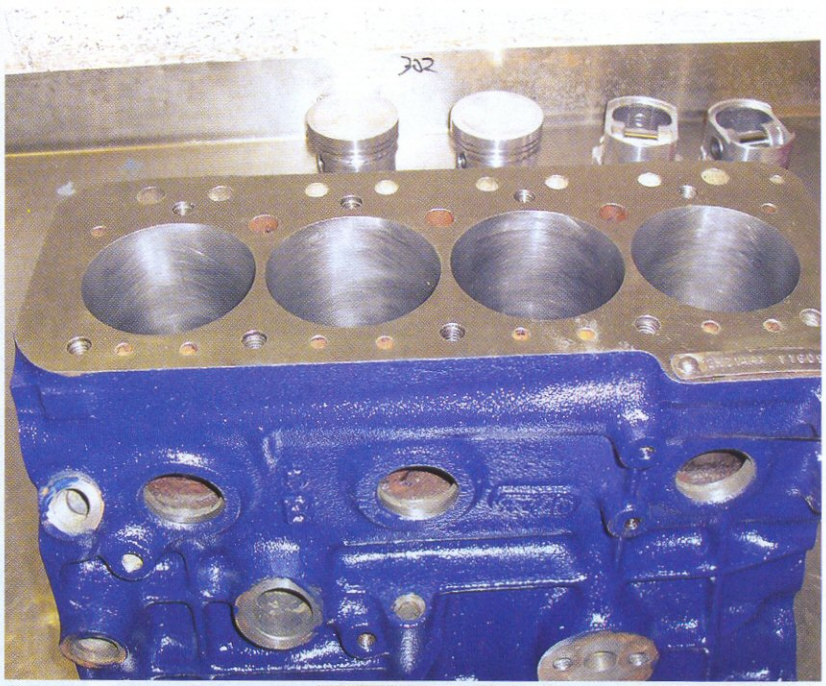


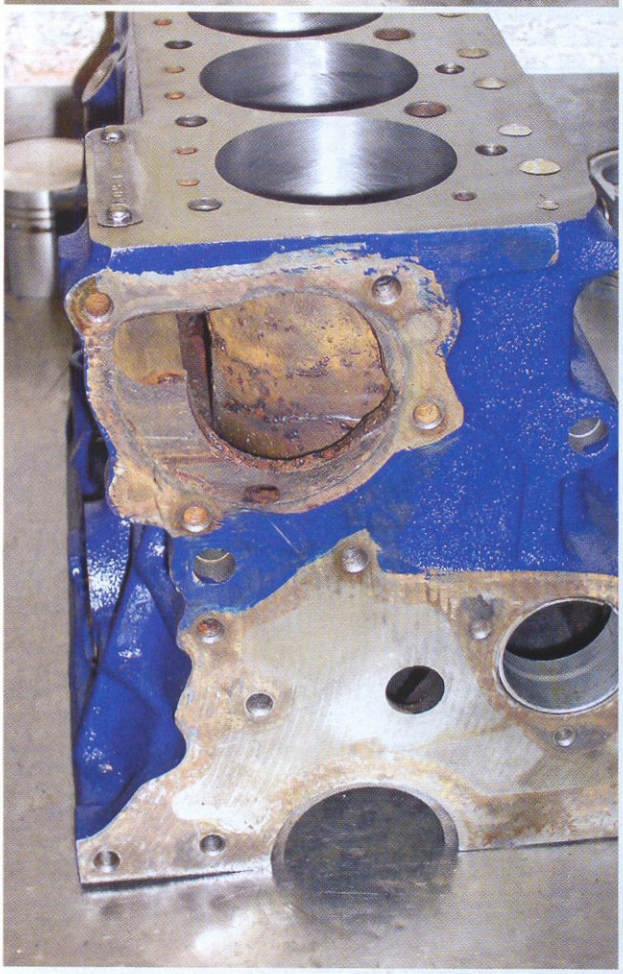
1. A very new piston line from Mini Spares — 73 mm bore size slipper-type pistons. They're robustly made, using a special aluminium alloy that contains a much higher than usual silicone content, with a slipper design used to lighten the pistons while retaining maximum strength and reducing drag. 1275 engines are becoming a whole lot rarer and more expensive these days, so we need to make the most of them. Mini Spares is doing just that: along with the plus-0.08 inch pistons for maximising 998 engine block use, these 73 mm ones give you a second shot at the block when it's worn to the more common 73.5 mm size.

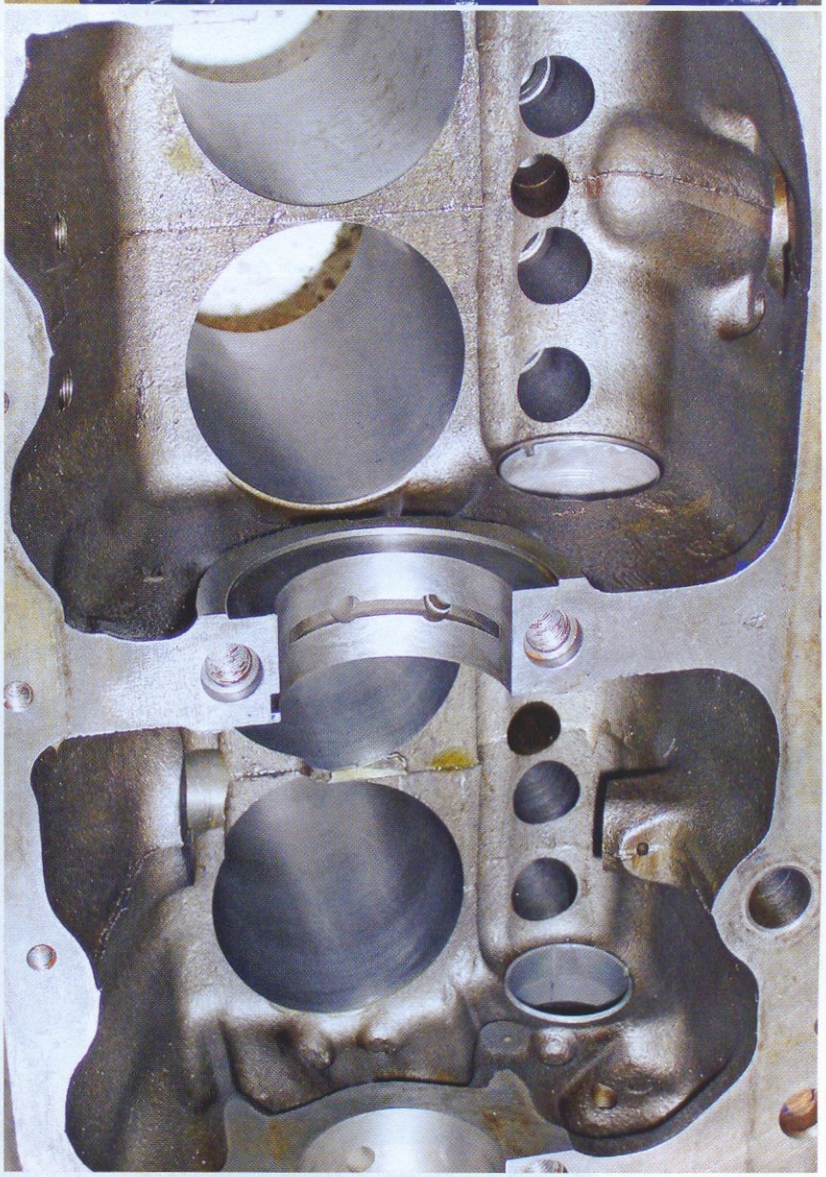


2. Many people have quizzed me about problems they're having with getting new coolant jacket core plugs to seal. I suspect the problem is rust in the core plug bores: it's essential that they're thoroughly cleaned of the nasty stuff. I use a small flap wheel in a drill — very effective and quick. Then, before fitting the core plugs back in, smear some Loctite sleeve and bush retainer around the plug bore 'walls'.

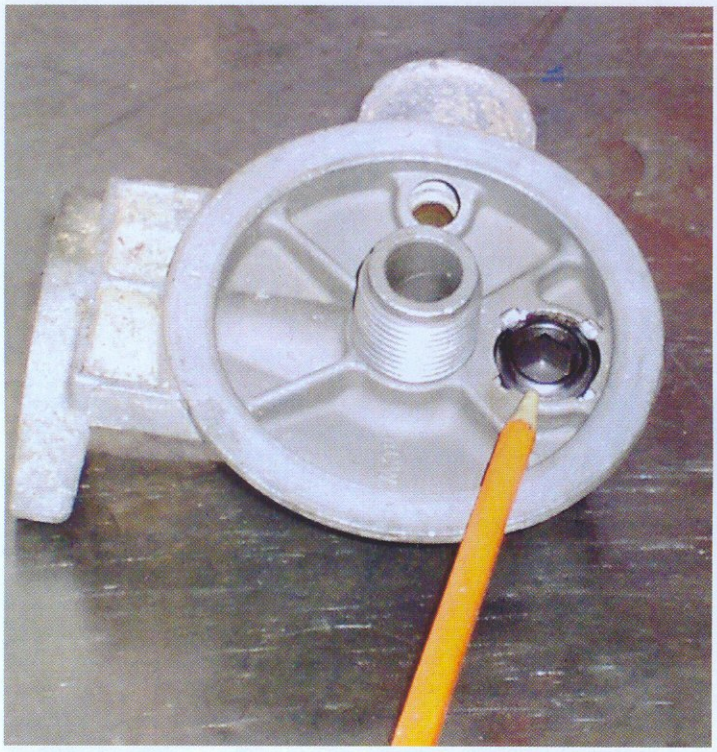




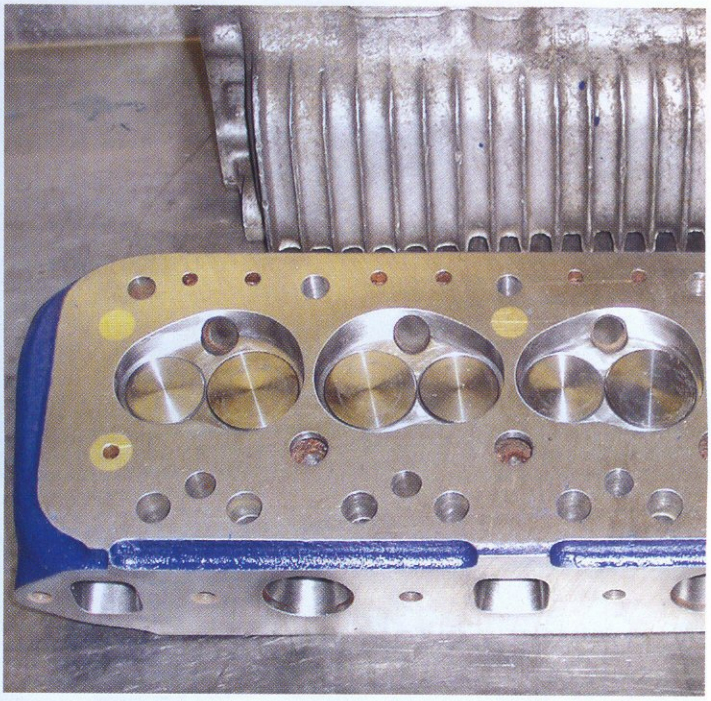




3, 4, 5, 6. This was a 'you can do this at home with little experience' build, so here's some pictures of the block being used to prove no magic was utilised. Just a straightforward bore to 73 mm, clean off and paint. The cam bearings were left untouched as they were fine.

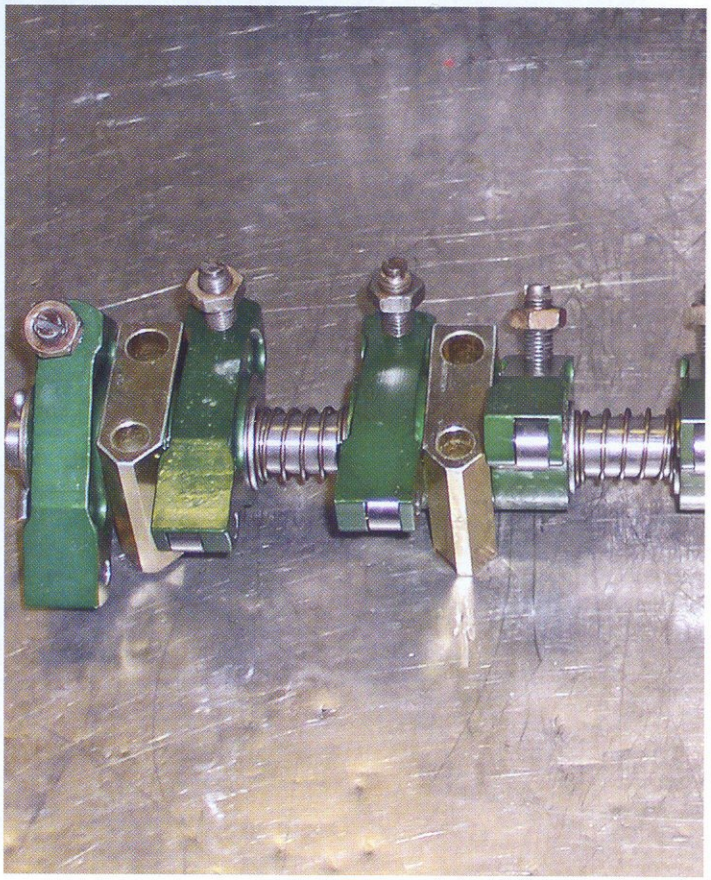


7. There were a couple of concessions to the 'no mods' rule. This one I always do to avoid unfiltered oil being fed to the crankshaft and bearings. It's simple enough: just lever out the staked-in ball-bearing-retaining washer of the filter relief/bleed-off valve, remove the relief valve assembly, tap 5/8 inch UNF and fit a 5/8 inch UNF x 5/8 inch grub screw. Mini Spares sell these.

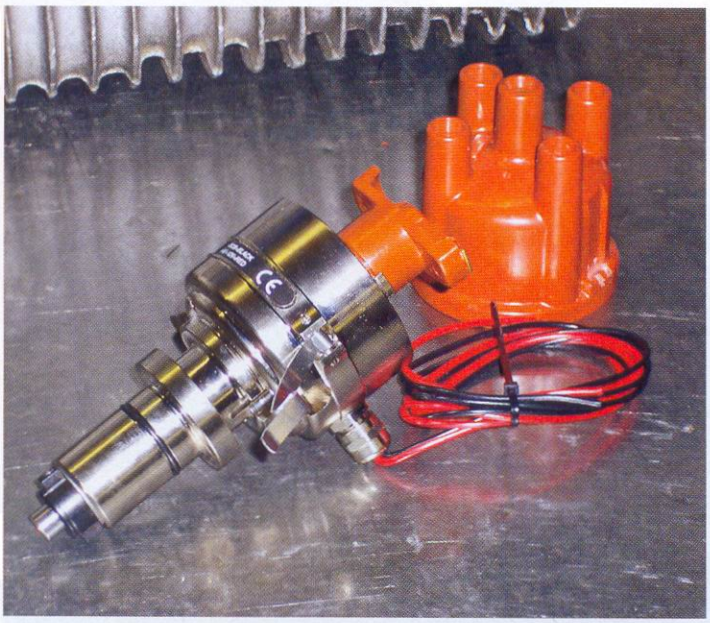


9. This head has been modified to a typical, good quality, off-the-shelf-type specification so as not to falsify potential performance. The valve sizes are archetypal MkI Cooper S at 1.406 inch inlet and 1.22 inch exhaust. Dual valve springs with a suitable spring rate are also fitted, while the guides are manganese bronze and the valves are plasma-nitrided EN21-4N stainless steel. I would use the impressive standard MG Metro valves but unfortunately these are becoming very hard to get at sensible prices. Chambers are sized to give 10.5 to 1 compression ratio.

8. The second concession was this wedged crank, largely because I had one in good condition following a mains re-grind. For this type of engine build it doesn't matter whether the crank is wedged or not — that only makes a difference at higher rpms.



10. The cam type used doesn't need high-lift rockers to make decent torque. I wanted to use cast/forged 1.3 rockers but there were none available, so I used these 1.3 roller tip rockers to save time.



11. There's one thing that can make or break an engine spec and its performance potential: the dizzy. I've seen plenty of brand new mega-spec engine installations with tatty, crappy old standard distributors stuck out the front of it, still using points. There's nothing wrong with points per se but they're only efficient for about 500 miles and then they start to wear. They also suffer very badly from dwell scatter caused by a worn or slightly bent spindle. I always recommend at the very least going to electronic ignition in a dizzy that has had its advance curve altered to better suit the application. Standard ones are generally miles out.

I'll be looking at dizzies in more detail in the near future but this cropped up at just the right time: a new product (well, for the A-Series anyway) made by 123ignition in Holland. It costs around £200, is fully transistorised and has 16 advance curves to play with at the click of a rotary switch. This was an ideal opportunity for a trial.

12. The completed engine, ready to go in the car. Note the use of a Cooper S-type crank split damper pulley — this is another area where going cheap isn't good. Almost every 1300, one-piece type crank damper pulley I take off old engines is clapped out these days. Using one in this state can cause the flywheel to weld itself to the crank taper and mean very rough running, with eventual long-term damage to the crank and bearings.

13. And here's the engine in the car, looking shiny. Trouble is, we shouldn't be looking at it like this... there's supposed to be a head, rocker gear and other stuff on it.

14. The problem was water where there shouldn't be any — in number four cylinder. See that pin-prick of brightness just off the end of my pointer? It's a tiny fault in the casting that goes through into the water jacket. Result? Having to burn out another head rather quickly.

14. Made the rolling road at last — only a day late. Here's Mick Barratt of MBE in Lincoln playing the 'swap the needle' game. The one I threw in it just to get to the rollers was rich at the bottom end and somewhat lean at the top end. Mick says a really decent 1380cc, 73.5 mm bore motor — with all the good stuff in it and the MD286 cam with 1.5 ratio rockers — normally gives approximately 85 bhp at 6000 rpm and 75 lbf.ft torque at the crank. My motor appeared to be draining the fuel bowl at the top end, so I need to get that sorted out and try again. The engine was still pulling strongly before lean-out/misfire, almost no matter what we did with the needle to make it richer.

I've been suspecting issues with HIF carbs like this for some time —

I'm not convinced the fuel bowl has a big enough volume. I'll try an HS6; at least I'll lose that interfering bi-metal strip that alters the jet height as things get a little warm behind the engine. I'm also going to change the fuel line from 6 mm to 8 mm and add a higher capacity pump.

ROLLING ROAD RESULTS

MPH	RPM	TORQUE	BHP
30	1890	65.1	23.2
40	2520	72.1	34.6
50	3230	81.5	53.2
60	3860	88.8	65.3
70	4650	89.6	79.3
80	5110	86.8	89.6
90	5780	82.6	90.9
100	6180	75.1	88.4

Note: Figures calculated to be crankshaft figures, using a formulae worked out comparing several engine dyno'd engines that were then tested on the rolling road.