

# TR6 Engine Rebuild

BY TERENCE MCKILLEN

One Saturday afternoon in late May, together with fellow TR6 enthusiast, Colin Pillar and our long-suffering wives, found us on a leisurely jaunt through the country roads north of Oakville around the headwaters of 16 Mile Creek and then on over to the Credit River at Glen Williams. Somewhere around the junction of 17th Sideroad and Hwy 7 we became separated in traffic, with Colin heading south on Hwy 7. We continued separately in the expectation of a rendezvous at the Copper Kettle Pub in Glen Williams. The fact that Colin knew of our whereabouts and was able to locate us a kilometre or so before he could actually see us, was not due to some satellite tracking device or extra-sensory perception on his part, but due to an inordinate amount of blue smoke being left in our wake - being more reminiscent of the smoke screen a destroyer or frigate on a North Atlantic patrol might have laid down.

Once the air had settled and over some al fresco refreshments across the street - unfortunately the Copper Kettle was not open at the time - Colin and I decided that it was time, sooner rather than later, to tackle what we thought would be a possible valve and ring job to see if we could reduce the oil consumption of my 1973 Six. I had been hoping to get through the summer motoring season before tackling the overhaul in the Fall, but the smoke screen was becoming too much of an embarrassment. Other than the excessive blue smoke which became much more plentiful when the engine had been running for some time, symptoms noted

were excessive oiling of three of the spark plugs (#1, #2 and #4). We had recorded cylinder compression readings ranging from 112 to 120 psi. The motor otherwise seemed to have good power and torque and there were no discernable metallic/mechanical noises emanating from under the hood.

We removed the cylinder head on June 2 and took it over to Howie Cunningham at R&B Automotive in Oakville for a complete overhaul/replacement of the valves, guides, springs, seats and collars, although Howie thought that weak valve springs were probably causing most of the trouble at the head level, but noted that the exhaust valve guides were also worn. While at Howie's, I momentarily debated shaving the head to increase the compression ratio, but decided to keep everything stock.

Meanwhile, we dropped out the sump and removed the connecting rod caps to facilitate an inspection of the pistons. It became immediately apparent that we were in to more than just a replacement of piston rings. The #1 piston head had a small nick on the back edge, the #4 piston had a hairline crack on the wall and the rings on the #2 piston were locked solid - coincidentally the same three cylinders with the fouled spark plugs - note to self, spark plugs do more than just provide the spark! There was also evidence of some modest scoring on other pistons and corresponding cylinder sleeves. We also detected noticeable lateral movement of the pistons within the cylinder liners when the connecting rods were manipulated.



The two Sixes at the Copper Kettle British Pub in Glen Williams

rings were right on specification. A set of new pistons and new con rod bearings were sourced and installed without difficulty. It is important to bear in mind the necessity of keeping each con rod cap and bearing together with its corresponding con rod (they are numbered from 1 to 6 starting from the front of the engine), ensuring that the pistons are attached to the con rod gudgeon in the proper orientation ("front" or arrow on the piston head facing forwards) with the con rod sitting on the right hand side and the gaps in the rings alternately spaced and staggered away from the thrust side of the piston.

A week later, on June 9, the head was back and torqued down, carefully following the proper sequence of tightening of the cylinder head retaining nuts. Two of the 14 cylinder head studs are slightly longer than the others. This is not referred to in the Bentley Manual or the BLMC Workshop Manual, but the Haynes Manual suggests that they should be utilised as the two rear most studs on the right hand side of the engine block.

The cylinders and bearings were oiled and the motor initially turned over by hand and then using the starter motor to provide input for a number of rotations to ensure smooth operation. The cam followers, push rods and rockers were reinstalled, all of which had been carefully kept in order at the time of removal.

Other ancillary parts such as the sump, intake and exhaust manifolds, water pump, coolant hoses and miscellaneous cables were refitted and of course, the rocker pad and valve tip clearances had to be set for each pair of valves in turn.

Cylinder compression was rechecked and now found to fall in the range of 125 to 135 psi, a distinct improvement on the pre-overhaul numbers. More importantly, the blue smoke has been completely elimi-

A check of the gaps in the old compression rings indicated more than double the standard specification of 0.012-0.017 inches confirming our earlier observation of the loose fit of the pistons in the sleeves. However, we were happy to discover that the sleeves themselves still remained cylindrical, rather than ovoid, and after some very modest honing to remove the worst of the scoring, were within normal specification as the gaps on the new (normal size)



The front two-thirds of the Six with arrow showing the nicked #1 piston



Removing the con rod bearing caps

nated and all of the spark plugs depict normal colouration - now I can start to tweak the carburettors!

To facilitate the easy reinstallation of the sump and gasket, we manufactured two studs to act as a guide in holding the gasket in place until the sump could be presented and bolted in place. Once four bolts are in place the studs can be removed and the remainder of the bolts torqued to specification. We applied a very thin, smooth layer of Permatex black gasket maker on all gaskets except the head gasket, manifold gasket, the lower side of the rocker cover gasket and the carburettor gaskets.

Following replenishment of fluids, the motor was cranked using the starter motor (no plugs or distributor) to ensure lubrication and initial seating of the pistons and rings. This was followed by a squirt or two of gasoline in to each cylinder and some further cranking taking care to catch the ejected gas/oil mixture in well-positioned rags. The spark plugs were inserted and the leads from the distributor cap reconnected. A little choke and she fired on the first crank!

The engine is currently being run-in at modest but varied speeds taking care nei-

ther to labour nor to over-rev the motor. After a few hundred miles, the engine oil was drained and carefully inspected for any metallic content - none found. New oil was added and the filter replaced. Sometime in the near future the cylinder head bolts will be re-torqued. This will also require the removal and subsequent readjustment of the rocker arm and valve clearances.

We sourced parts for this job from all of our friendly British car parts suppliers including British Autosport, Peninsula Imports and Obsolete Automotive with some ancillary items coming from neighbourhood Canadian Tire and NAPA stores.

Perhaps the hardest part of this partial engine overhaul was the reinstallation of the exhaust manifold. Two of the six stud nuts and clamps on the lower part of the manifold are extremely difficult to reach, especially if the carburettors are not removed, and require an inordinate amount of dexterity to get back in place, to say nothing of the risk of skinning the back of one's hands!

I am greatly indebted to Colin and his neighbour Sean, a former MGB aficionado, for their unstinting help with this project. We completed it in 11 days, but in effect spent about 18 working hours (or a total



Normal colouration returned to all 6 plugs



The two longer head studs are at the rear right side

of 36 man hours, including breaks for beer or other refreshments) to get back on the road without missing too much of the summer driving season.

Now, if only the Copper Kettle was open! **RAGTOP**