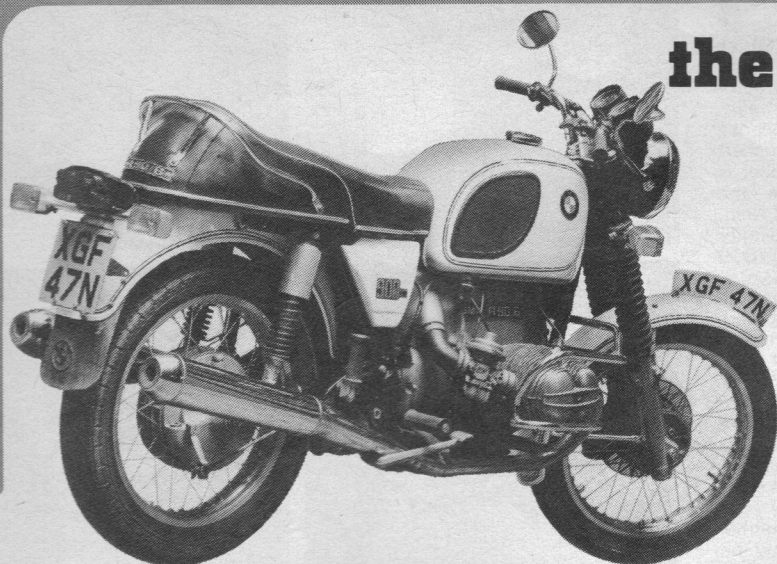




the INSIDE story, 6

BMW R90/6 engine strip

TWO thousand brand new BMWs take to the roads each year in Britain, fulfilling the ambitions of two-wheeler enthusiasts to own what is generally considered to be the ultimate in luxury motorcycling.

Editor John Thorpe has been running a BMW R90/6 for almost a year now and come rain, snow, frost or shine, he rides over a hundred miles a day to and from the office. Already the bike has clocked up over 15,000 miles in its short but arduous life (see full Road Test in May 1976 issue) and minor problems have been encountered.

However, although there appeared to be no indication of any serious defect within the motor or transmission, it was decided to dismantle the power unit to check. The sump beneath the motor was thickly coated with oil from the clutch housing which indicated a 'weeping' rear main bearing oil seal. Our strip revealed all.

If you own a BMW or intend owning one in the future, we must point out that major mechanical work is extremely costly due to the number of special tools required to complete a strip-down. For example: a simple camshaft sprocket puller costs £35 plus VAT, while clutch dismantling tools, including spigot, cost £21 plus VAT to buy.

So how can you save money on maintenance? The answer is quite simple; remove the motor from the bike, strip off all easily removable components and present the crankcase assembly to your BMW main service agent who has the vital extractors and special tools to do the overhaul work.

* * *

THE horizontally opposed twin cylinder BMW/6 range of machines are basically simple to work on due to the accessibility of engine components. A considerable amount of major mechanical work may be carried out with the motor still in the frame, but if you have to replace either the crank, camshaft or the clutch, then the motor will have to come out of the frame.

However, before contemplating the work, make sure you have the complete engine gasket set, which costs £12.00 plus VAT, as well as an excellent set of metric spanners, a torque wrench and Allen key set. Under no circumstances attempt the work with a make-shift toolkit.

The first stage is, of course, to remove all ancillary components such as the fuel tank, h.t. connections to the sparking plugs, etc. Also, undo the sump drain plug and allow the engine oil to drain while the motor is warm.

Next stage (1) is to undo the exhaust pipe rings with either the special tool which costs £6.90

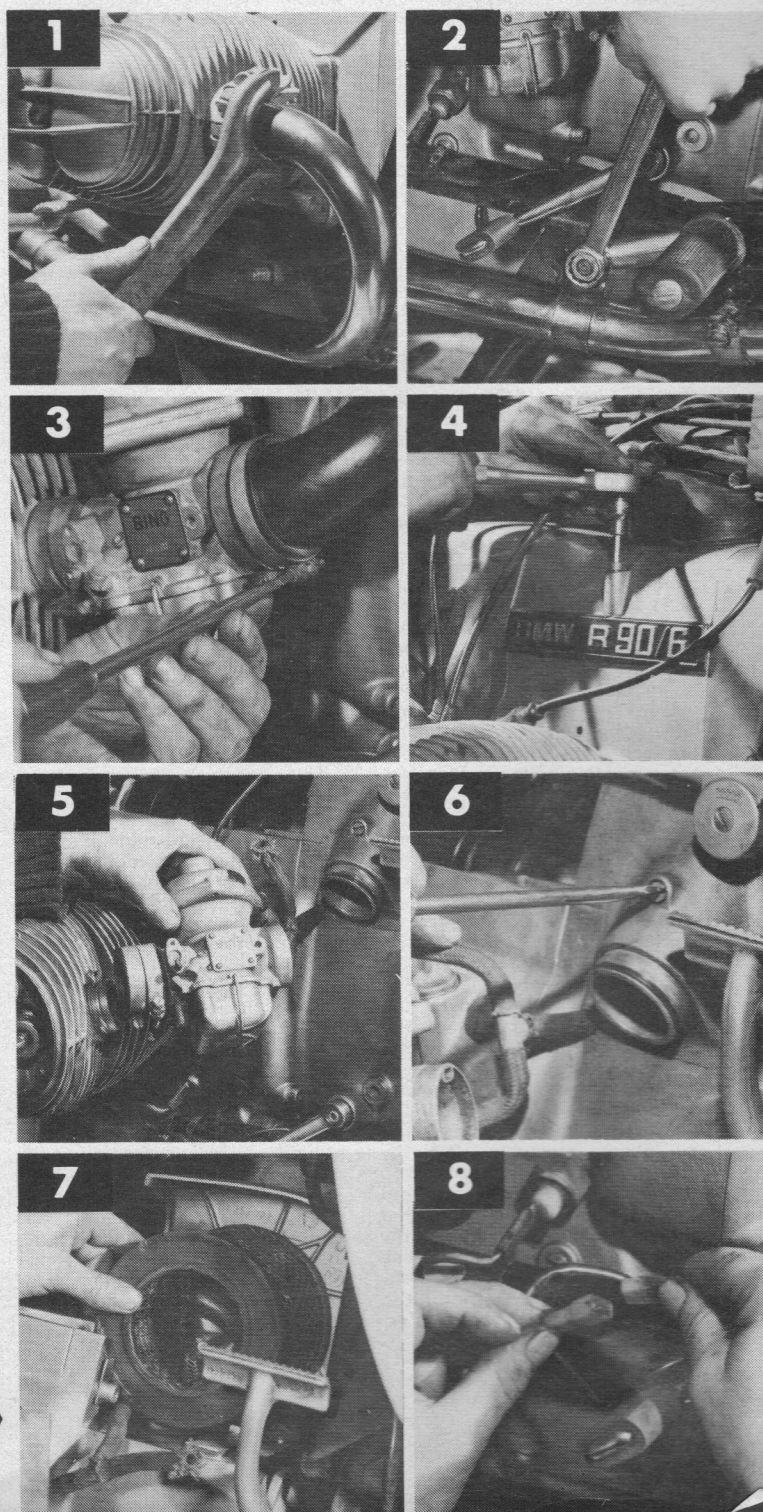
plus VAT or a strap wrench. DON'T USE A HAMMER AND DRIFT as this will break the finning.

After removing the exhaust system, both footrests (2) can be unbolted. The next items to be disconnected are the inlet pipes (3) to the carburettors.

On top of the motor is the cover to the electric starter (4) which is removed by undoing two Allen screws and the air filter. But before uncovering the filter, undo the retaining clamps on the carbs (5) and tie them clear of the motor.

A single screw holds the air filter casings together (6) and with this undone the air filter (7) can be lifted out.

Electrical connections to the motor must now be broken including the neutral indicator terminal (8) to the rear of the left hand cylinder. The final stage in severing connections between the motor and final transmission is to remove the sleeve covering the universal joint at the rear of the gearbox (9) and undo the bolts on the drive shaft.



BMW R90/C engine strip

At the front of the motor it is also necessary to remove the cover and disconnect the rev counter drive (10) as shown.

Only the two engine mounting bolts (11) need to be removed before the motor can be lifted out of the frame (12) as shown.

ON THE BENCH

Both rocker covers may now be taken off after undoing the central retaining nut and two small 'base' nuts. Take care to catch the oil which will spill out from the covers.

The rockers may now be removed by undoing the retaining nuts (13), which also act as cylinder head nuts. When reassembling, along with the other two cylinder head nuts, they should be tightened to 28 ft/lbs. The rockers simply slide off the studs (14).

The process is repeated both sides of the motor and then all four pushrods (15) may be pulled out of their 'tunnels'.

Next to be pulled off are the cylinder heads (16) which, if stuck should be gently tapped at the exhaust port to free.

The barrels (17) should also slide easily from the crankcase as shown. Circlips (18) retain the gudgeon pin in place and are prised out but renewed on rebuild. After heating the top of the piston (19) the gudgeon pins are easily pushed clear (20) to allow the piston to be removed from the con-rod.

A special 'star' Allen key is needed to undo the big-end bolts (21) which should be retightened to 36 ft/lbs on assembly. Note the con-rod pegs on the big-end must go to the front of the motor on rebuild (22). After removing two of the flywheel/clutch retaining bolts, the special compression bolts are inserted while the remaining bolts are removed. The compression bolts (23) are then released.

After lifting off the complete clutch assembly, a locking bar (24) is bolted to the flywheel assembly while the centre bolts are undone. These should be tightened to 70 ft/lbs on reassembly.

Another special extractor (25) is required to remove the flywheel from the end of the crankshaft before hooking out the main bearing oil seal (26) as shown. This should be renewed on rebuild.

The next step is to remove the oil pump assembly (27) by undoing the retaining screws on the cover plate and hooking out the rotor. On rebuild, note that the 'pop' alignment marks on the rotor and its housing should line up.

On the front of the motor it is now possible to remove the alter-

nator assembly (28) and after undoing the centre bolt, take off the auto-advance unit (29) as shown.

Another special extractor **MUST** be used to remove the inner timing cover (30) to expose the timing chain and camshaft drive-gear. A two-prong puller is required (31) to remove the outer camshaft bearing. Next, after releasing the tensioner spring the cam chain slipper (32) is pulled off.

At this stage, it is also possible to pull out the cam followers (33) before removing the retaining screws on the camshaft drive sprocket (34) and using another special extractor to remove the complete camshaft drive assembly (35).

Another special BMW tool is required to extract the crankshaft main bearing housing (36).

Before complete dismantle, the oil filter (37) can now be removed and the oil strainer gauze (38) may also be taken out for cleaning. The final step is, of course, to lift out the crankshaft (39).

REBUILD

Reassembly is basically a reverse procedure to dismantling the motor. But with the BMW engine, many components have to be heated as they are a 'shrink' fit. For example: the camshaft sprocket has to be heated to 'spit and bounce' temperature (40) before being aligned with the crankshaft sprocket (41) in the timing chain. Two marks on sprocket teeth must align before fitting to the crankshaft and camshaft.

Also, the outer timing case (42) must be heated before refitting as the camshaft bearing is a 'shrink' fit.

Finally, when the motor is rebuilt, the tappet adjustment must be set at six thou. inlet and eight thou. exhaust when the motor is cold and the ignition timing set (44) with a strobe light on the flywheel aperture to align with the 'S' mark on tickover (approximately 2,000 rpm) and on the 'F' mark at 4,000 rpm when fully advanced. The 'OT' mark indicates top-dead-centre for static timing.

Oil capacity of the motor is four pints plus to the level mark on the dipstick. Any premium grade of 20/50 oil should suit the motor.

Other points to remember on rebuild or carrying out routine maintenance are that there are two 'o' rings on the oil filter — one which should be placed at the front and the other at the rear. Also, never attempt to turn the motor over on the centre bolt holding the advance/retard unit when adjusting the tappets as this will strip the thread of the bolt.

It should be remembered that although the BMW engine unit is basically simple in operation, it is a highly sophisticated piece of engineering that requires careful attention to detail when dismantling or reassembling. All tolerances are critical and it is advisable to obtain a full workshop manual before attempting the complex work we have described in this feature.

