TEE-ONE TOPICS

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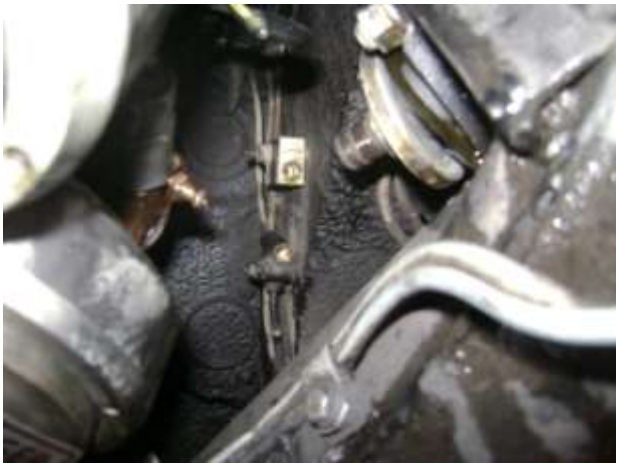
SOMETHING TO TRY WHEN YOU HAVE A SPARE MOMENT

Well you will also need a patient friend with a side lift hoist, some more friends to help with the separation and a courageous heart to tackle the job of removing the engine on a Shadow. What you are looking at is the entire front end assembly of the sub frame, the complete

suspension, all the steering, the transmission and the entire engine. This is actually the original Factory approach using a different hoist and quite a bit more gear. If you are curious look it up in the Technical library. Most engine removals involve separation of the engine from the transmission and lifting the power unit straight out of the chassis. This is possible with the Shadow but extremely awkward given the surrounding clutter and unlike former models it has a very important structural bit across the front of the car that is welded very firmly and exactly in place!

Having removed the bonnet and drained everything in sight including the hydraulic reservoir, the sump and the transmission, the coolant (including the block plugs under the exhaust manifold, if they are blocked try a long sharp screwdriver to drill through the muck and if that doesn't work get ready to have coolant over you, the floor, the hoist and several of your helpers.) You can leave the exhaust manifolds on but most of the exhaust system forward of the 'B' pillar should come off. The radiator can stay in but the fan and belts need to come off. Actually we took the radiator out to avoid possible damage and give a bit more room to manoeuvre.



At left the two central items are the connection points for the whole high pressure circuits for the brakes and suspension. These connect to the accumulators seen at left of the picture through wire bound high pressure flexible lines, the cost of each will get you a

wonderful night at one of the country's premium hotels! The message is treat them with respect!

These two flexible lines send and receive transmission fluid via steel pipes seen to their left close to the car floor, to the lower end of the radiator where a separate core is fitted for cooling. The output flange at the rear of the transmission can be seen unbolted. It is not necessary to remove the propeller shaft. The cover for the legendry rat trap is at left.

The aluminium plate at the left is the front closure for the rattrap. The pipe ends at left are the two flexible lines between the body and the sub frame. Until early in the Spirit run which is basically the same it was thought provision should be made for movement between the two. Later Sprits have simple rigid pipe connections. These lines carry hydraulic fluid from the brake distribution lines to the myriad of pipes that infest the car. Each represents a separate system.

The connecting hoses seen on the previous page can be seen dangling from the junction blocks mounted on the rear of the sub frame. One of the four mounts of the frame to the body of the car is seen at left. The heavy cable draped over the frame brings all power to the car from the rear mounted battery and connects directly to the main starter terminal.

The complete mess has been left sitting on a very stout steel table and the body lifted away. The front mounting points for the sub-frame can also be seen as well as the anti-roll bar mounted beneath.

Incidentally the concertina cylinder immediately on the right hand end of the exhaust manifold is a transmission filter. I have fitted these to a myriad of cars to filter the returning oil for the power steering that comes back from the cooling matrix sitting on top of the radiator core. The main feature of these little units, readily available at any transmission place, is the incorporation of a magnet which pulls all the bits of steel nasties that circulate in the steering circuit.

Surely this is a testimony to structural engineering. Even with the engine and transmission in place the lifting points are the same – there is no sagging!

It is here that the owner if he has been properly briefed holds his breath. If the car has had a ‘front ender’, bum repairers do not or don’t care to pick up kinked side members which

buckle under impact. This car is obviously pristine. The other clue to automotive hari-kari is the spring towers themselves, one of which can be seen here. In a repaired car that has been done badly these are clearly not vertical due to distortion, something that is difficult to spot when the car the car is assembled. Again these were perfect. The owner is now breathing.

This is a good time to tart up the parts you can never really get to. The left rear sub frame mounting point (arrowed red) can be seen together with provision in the toe board for left hand drive cars as well as the rat trap mount which also changes side across the Atlantic. The blue arrow points to an often obscenely described rubber pendulous, moulding. There are two of these which drain the heater box, the top of which is open to the weather. The end of them (this one has been 'clipped') is shaped to allow fluid out and keep dust etc out. They perish and fail to do their job. Now is the time to replace them.

At left is the right front mount for the sub frame still with its bolt hanging through. The angled pipes are on their way to the bottom of the radiator core with the transmission fluid and the angled box tucked in behind the mudguard is the bottom end of the air cleaner! The bit hanging off the latter's bottom is a water drain should you do some river fording.

Above, the engine and transmission have been separated from the sub frame. The extraordinary route the transmission filler pipe takes can be seen clearly. Note the slicks on the side of the engine block under the exhaust manifolds indicating the usual tell-tale weep holes leaking.

The steering box is left attached to the sub frame. The front cross member is actually bolted to the box and carries most of the weight of the engine. The high pressure hose that supplies pressure to the box can also be seen.

Have you ever wondered what all the mess is at the back of these engines – well here it is. Wiring looms, some of which are seen here plug into points on the engine toe board. They are unhooked from around the engine compartment and simply left on the top of the engine when it is removed. The hydraulic pump for the number two system can be seen attached to the engine valley plate. The cylindrical gadget to the pump's rear is the collector of noxious overflows etc from the fuel system.

The transmission has been removed. Generally cars with automatic transmissions do not have flywheels since the torque converter when bolted to the drive plate seen here is sufficient in mass to perform the function of the flywheel. The converter is help on by only three bolts the holes for which can be seen here. Later cars used four bolts.

The front end of the converter showing the three mounting points. The converter is bolted on through the drive plate, the bolts accessed through a small plate on the underside of the main housing. Converters are common to many cars. If a transmission is overhauled and there is the slightest trace of damage in the sediment the unit is sent to specialists to be cut open (they are a sealed unit) cleaned out overhauled and returned as good as new for a very reasonable fee.

The sump. They are not easy to get off but well worth the effort. It is likely that this engine at some time was sufficiently overheated to destroy some of the tension in the piston rings resulting in 'blow by' of gasses which contribute to the mess seen above. The sediment can get to the point of restricting the intake filter for the oil pump.

Meanwhile. What to do with a two wheel Shadow. A temporary support for the front end was quickly drilled and a standard jockey wheel welded in place which proved too flexible.

Further work needs to be done in this department as this exercise will not be the last!

By now some will be wondering why all this elective masochism was resorted to. The reason as it turned out is above. The noticeable and definite heavy 'click' was from the A4 piston seen here with a nice skirt couge. This would undoubtedly have distorted the piston and produced an original piston slap. A corresponding score was in the liner. The reason for the event was as likely a local hot spot on the liner due to constricted cooling. The liner at A4 in the earlier models originally had sufficient clearance to allow water flow but when the

passages are not thoroughly cleaned out, silt mounts up and blocks circulation. Apparently later blocks did have greater clearance at the rear.

What a mess but after your eyes have focussed you can see most of the sub-frame, the shock absorbers, the steering box on the far side, the steering shaft and CV joint. The mounts on each corner can be seen also. These are the rubber silentbloc type and eventually perish. A lot of enthusiasts think these are the old pot scrubber mounts but these were superceeded very early in production. While the Spirit uses much the same sub-frame the mounts are much deeper and held in place by screwed retainers.

And at left is what we are aiming for which I will leave for the next issue.