TEE-ONE TOPICS

Issue 90 – April, 2010

A THING OF BEAUTY IS A JOY FOREVER

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Some will have noticed the frequency of 'Topics' has somewhat dropped lately. It has not been for the want of material but I seem to have attracted to myself commitments that at times seem overwhelming. I suspect the latter situation is due to age which it seems I have an excess of!! But I will soldier on since I am quite sure that the recipe for a quick demise is inactivity!

Last night I dismantled the principal bit of the equalizer mechanism on a recovering early S2. This, for those that dabble in other models, is somewhat iconic being the last system of applying brakes on our cars using ¼" diameter rods. The picture shows the linch pin of the rear brakes on all pre-66 models of our cars, the equalizer that converts the fore and aft tug of a brake rod from the pedal to a cross tug to each of the rear wheel brake expanders. The torque on this small component must be very considerable yet it is generally ignored, seldom lubricated and usually covered in filth thrown up by the wheels.

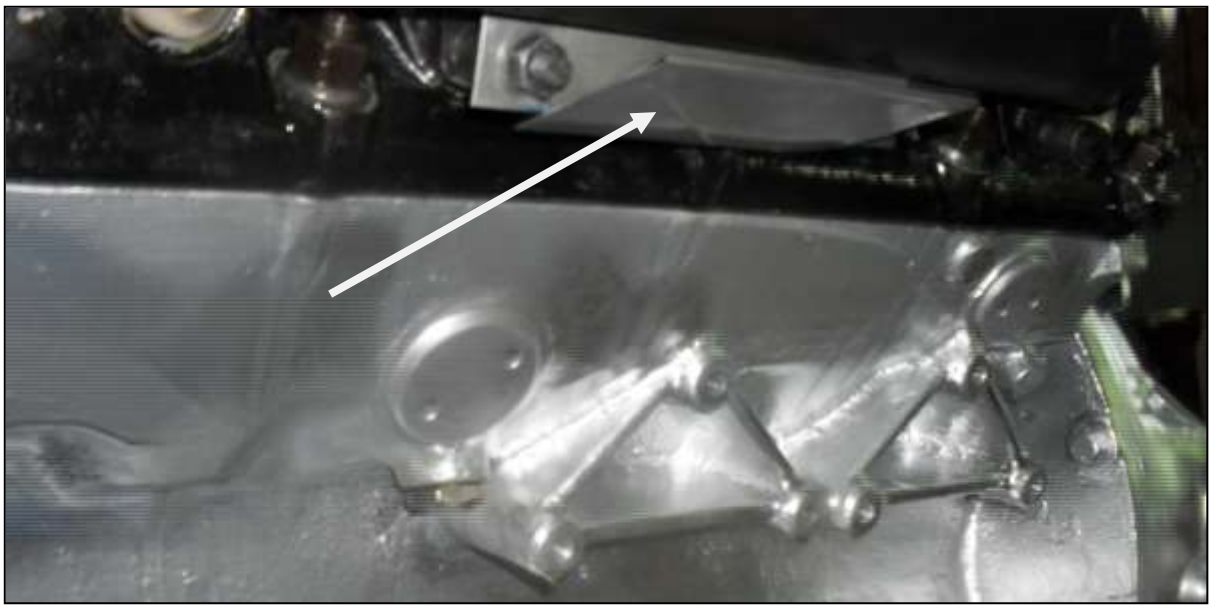
The lever pictured was no exception to this treatment but cleaned up very well. Amazingly the oilite bushes were not worn although dry and rust damage was purely cosmetic. A soak in extremely hot engine oil and left to cool overnight, plus a coat of paint brought that lever back to new.

I share this with you as I got a lot of pleasure just handling the finished product, admiring the detailed design and casting involved and marveling that fifty years of indifferent use had not diminished its function one iota! My experience is not isolated as many who have worked on these cars would have surely enjoyed the pleasure of working on components the genesis of which stemmed from one young man name Henry!!

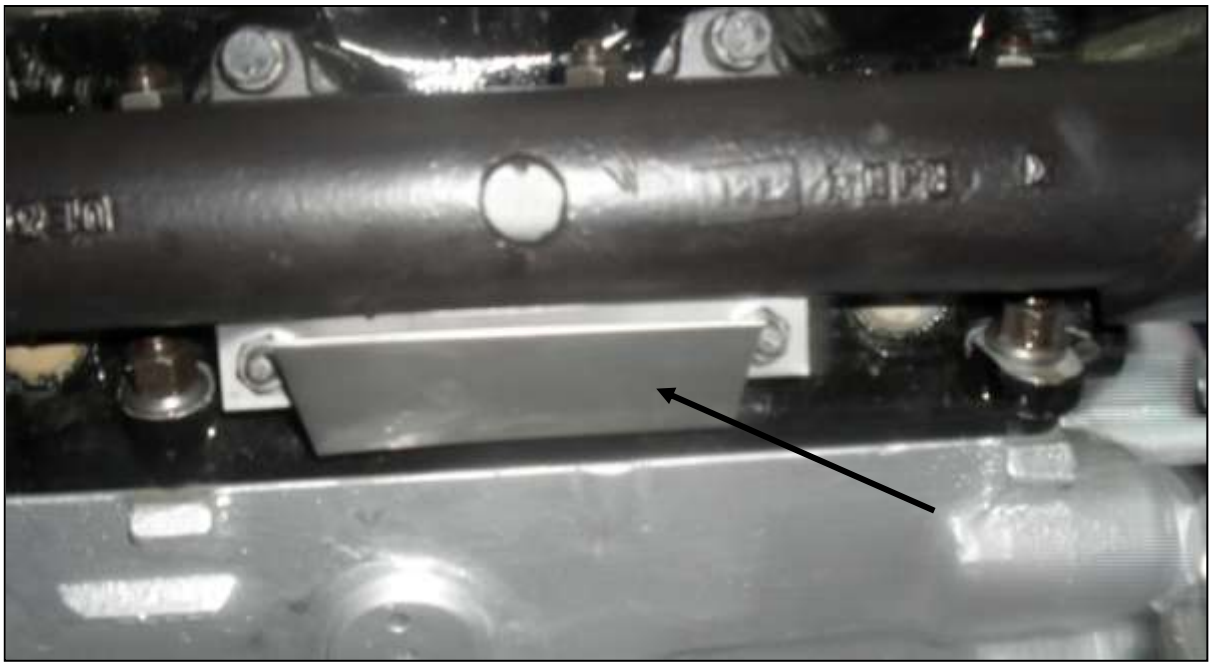
A thing of beauty is a joy
for ever:
Its loveliness increases;
it will never
Pass into nothingness;
but still will keep
A bower quiet for us, and
a sleep
Full of sweet dreams,
and health, and quiet
breathing.

HAS YOUR SHADOW ENGINE LOST THESE?

For most Shadow owners, the area beneath the exhaust manifolds is no-man's land since viewing it requires a torch and access from below. Shoehorning the vee eight engine into your car was an achievement in itself but there's still the need to monitor what is happening in the out of way places around it. The shields shown here protect flexible pipes beneath the manifold, from the great heat that the latter can radiate.



The above picture shows the left hand side of the engine. Here the shield located at the rear end of the manifold, is protecting the small flexible return pipes that emerge from the top of the accumulators, the latter being bolted to the crankcase where the triangular projections can be seen.

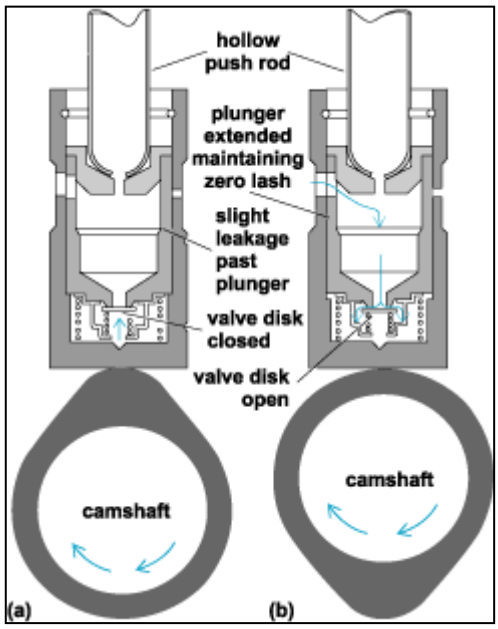


The above picture shows the right hand side of the engine. The shield here is midway along the manifold and protects the high pressure power steering hose which coil around from the steering gearbox before heading to the power steering pump.

The original shields for these engines appeared to be made of tin plated mild steel sheet, doubled over to improve the insulation. Heat and the inevitable water splash combine to destroy these shields; they rust through and drop off. The shields pictured were copied from the original but made of stainless steel sheet and should last between major overhauls. If you want to make a quick check you can slide your hand down between the manifold and the body of the car and feel if your engine is complete! It is preferable that you do this when the engine is cold!

THINGS THAT GO CLICKETY CLACK

One of my earliest memories of car maintenance was probably immediately after the last World War. Petrol rationing put most cars off the road or at least severely limited their use and sadly many cars were simply left in their garage while the driver went to war, not infrequently, never to return. I would be no more than 8 years old when I noticed a garage door rolled up for the first time in a block of flats across the road. There was an old man working on the engine of his late son's car. He was kind, seldom smiled and simply toiled away at his sad task while I chattered on asking the interminable question. He taught me how to use a spanner and rather cleverly, how to clean engine parts! I suppose that could be how it all started.



At left is an excellent diagram explaining the basic action of the hydraulic valve lifter. The units are a mind boggling achievement in design and particularly machining and mass manufacture.

The earliest procedure I remember was 'grinding' the valves and setting the tappet clearances, something about which today's mechanics would probably have to seek advice. Most of the bits in our engines are made very precisely particularly at wearing surfaces. Dimensions between the working bits are also quite precise and everything fits together very nicely. But then the engine starts and some of the energy given off from the combustion chambers is dissipated as heat and heat expands metals! And metals expand usually in all directions.

So you have a cam shaft which axially stays in place, the cams probably grow a bit with heat as do the cam followers sitting on them. Then there are the push rods sitting on the cam followers and butting in under the over head rocker arms bolted to the cylinder head. Finally, the valve its self on the other end of the rocker arm is subjected to periodic infernos as the engine runs and surprise, it gets hot and expands and gets longer but it can't push the rocker arm all the way up so that it can close. This means that the valve can't close and that means that when the cylinder fires some of

the inferno rushes back past the partially open valve. If it is an exhaust valve, the gas goes out the manifold and no damage done except that the seat of the valve becomes far hotter with all this flaming combustion ripping over it, eventually burns out or worse, expands the stem of the valve to the point that it seizes!

Here is where it all happens in the valley of a Shadow vee eight engine. The cam followers here doubling as hydraulic valve lifters are located by carefully designed 'blocks' which in turn are bolted to the cylinder block connecting with the main oil galleries beneath.

Well, you will be thinking something has to give. The 'tappets' adjustment was the long standing solution. All our six cylinder engines are designed to have a clearance between the end of the rocker arm and the end of the valve stem, or for the side valves, between the end of the stem and the cam follower beneath. This clearance which can be set by an adjusting screw and lock nut is measured by a thin piece of fine steel. Typically the clearances are to the order of •006" to •012", the larger being for the exhaust tappets which have to cope with so much extra expansion. Any gap however, is a candidate for producing noise hence 'tappet'.

Pierce-Arrow, that magnificent American automotive icon was the first to use hydraulic lifters in the thirties and apparently various makes tried them after the war until the seventies when they became virtually standard.

Here a lifter from an engine that has done some 90,000 miles sits beside a new item. The circlip which retain the piston in the follower have been removed. One is shown. The new lifter is not of Rolls-Royce manufacture in this case since the cost of a set of the latter would exceed the total value of the entire car!

Hydraulic lifters or cam followers are vaguely similar to shock absorbers. They sit as before on the cam shaft but as a telescoping compression strut in the valve train. They consist of a small piston and cylinder full of engine oil which is supplied from the main galleries. With the cylinder head valve shut and the follower on the back of the cam, a spring in the follower extends the strut eliminating any clearance in the valve train. This also allows the follower to fill up with oil, the latter under considerable pressure from the main engine supply. The 'fill up' comes via a small one way check valve.

When the cam comes around again and starts to lift the follower against the tension of the cylinder head valve spring, it is pushing against a follower that is now full of oil and fluids, as you know are incompressible for all practical purposes. However, the clearance between the strut piston in its cylinder allows a tiny bit of oil to escape while under compression, this

means that when the follower is back ‘at rest’, the column of oil is slightly less in height and allows the cylinder head valve spring to fully close the valve.

So, when the follower is on the back of the cam there is no clearance to go clickety clack and when having opened the valve and lost a little bit of its column of oil, the cylinder head valve is able to return to its seat, tightly seal it and wait for the next push.

The one difference between aftermarket lifters and the genuine ones is in the head of the piston

where the base of the push rod sits. The solution is to swap the items from the old to the new.

Above can be seen the disc valve and piston head and the piston with its small tensioning spring that ensures there is no slack in the valve train!

The tensioning spring mentioned above and a comparison between old and new. The valve that shuts and retains the oil in the follower while it is under pushing pressure can also be seen in the spring.

Having assembled the new lifter with the genuine piston top it is desirable to fill the cylinder with engine oil. Trying to push the piston cap down to insert the retaining circlip will be practically impossible so the solution is to push the disc valve beneath the cap away from its seat with a fine steel wire, the piston can then be pushed into the follower cylinder and the circlip fitted.

‘Priming’ the followers before assembly ensures quiet initial operation and avoids occasional problems of bleeding air out of the system!

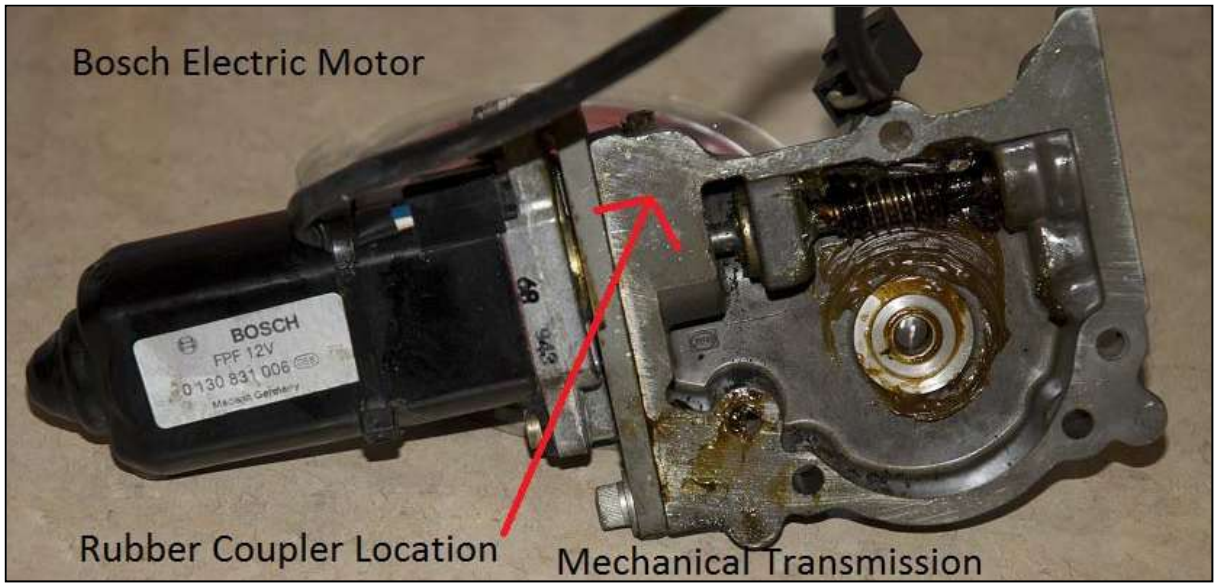
Footnote: - By now you will be thinking, if I shave the cylinder head the dimensions are going to change. How will the followers cope with that? A serious consideration often overlooked.

For more information see **http://cranecams.com/?show=techarticle&id=2**

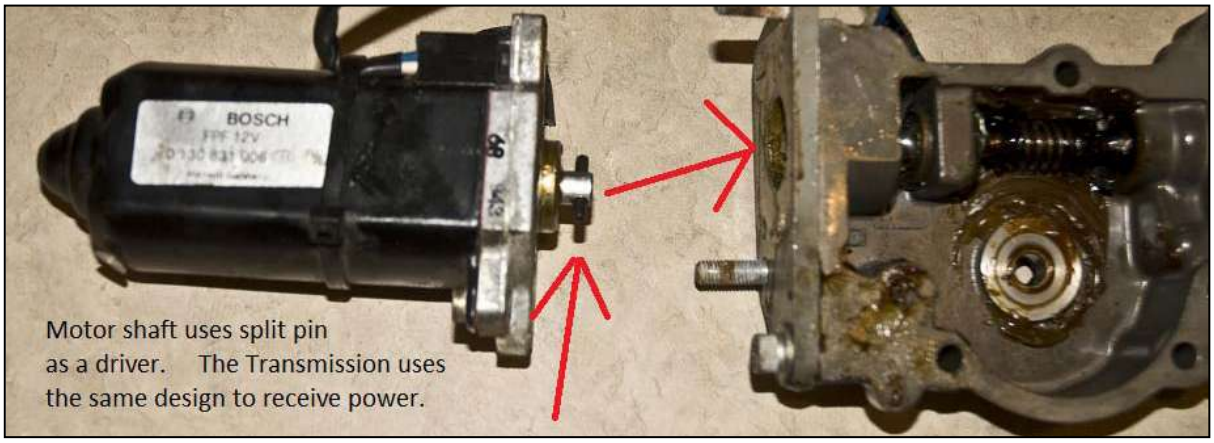
WHEN THE WIND GETS HARDER

I have a friend who is part of the welcoming team to our Northern Shore invaders. From time to time he visits places of interest to check bookings etc and recently was using a cab in a nearby Asian country. He took particular note of the window winder which consisted of a vice grip on the stub of the winding mechanism. He said it worked quite well so I pass it on as a backup tip for members! More pleasantly an owner of a fairly tired Spirit wrote to describe his treatment of slow windows, for which we thank him.

Three of the power windows on my Spirit have been dreadfully slow. Sometimes erratic and even this had no pattern, often changing with direction, so I was curious. I dug up the TEE-One (Number 28) from Sep 2003. Quite interesting. I found my Fluke (Meter) and went to work. As I expected it



Once your remove the Drive Motor and Transmission you can see the housing for the bushing.



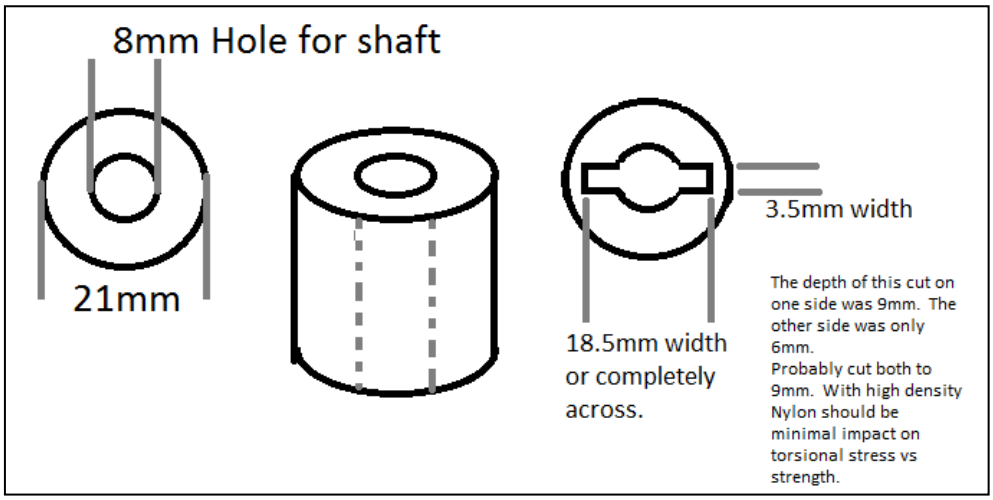
The rubber coupler resides in the housing indicated by the topmost arrow.

was not a voltage problem in my case. The switch worked as designed and the voltage drops are as expected. There must be some mechanical binding somewhere! After removing the electric drive motor and transmission, and running the unit on a test bench, the problem became very obvious.

The rubber (polythene-Ed) “coupler” between the motor and the transmission was broken into 2 large pie ces and one small piece. Running the motor in one direction would cause the rubber pieces to “bind” and therefore it was “slow” in operation.

I am sure there are commercially available couplers available and I may put some research effort into this in the coming weeks, but for now I’ll just go to the lathe, mill, and cut 4 new ones, and replace the couplers in all of my windows. Probably though I will use a lightweight high density nylon or brass for longevity. If anyone wants to cut their own I will also provide the dimensions. Once you remove the Drive Motor and Transmission you can see the housing for the bushing.

Ed note:- Australia among other countries still insists on electric window operation in cars being overall controlled by the ignition switch. Allegedly, this was to prevent small children and the odd mother-in-law being inadvertently decapitated. The gearing you will note from the picture is very powerful and I suspect the rubber coupling is there to disintegrate before total decapitation occurs. For this reason I suggest a brass facsimile as the writer suggests could be unwise!



A MORE INTIMATE VIEW

Thought I would share this view with you as it is a sight not seen by the average owner. Earlier we talked about cam followers and here we see the cam itself stripped of encumbrances.

The flat machined surfaces are the mounting places for the tappet blocks; four have three cam followers and two have two followers. I think that adds up to 16! Beneath those machined surfaces are the two main oil galleries that pump oil at full pressure to these blocks and thence to the followers to make sure that they stay full at all times.

And here are the two sized blocks. The concave groove locates the block relative to the camshaft. These grooves engage dowels which can be seen in the above picture. The 'three' cam block is held down by two bolts and the 'two' by one bolts. All bolts are washer locked.

One important signpost that should be noted considering the detail of the camp followers themselves and the blocks that they run in, is it is most important to have regular oil and filter changes.

🛠

KEEPING THE AIRWAYS CLEAR

Given the drought we have all been suffering, more so dare I say it in the higher inland reaches of our country, I was astonished to feel a very definite drip of water on my right foot in the Spur. I popped around the corner from our place onto a gentle down slope, wound down the windows turned off the engine and gently coasted very slowly. Despite no power assistance I was able to wobble the car from side to side and was rewarded by a very definite slosh in the forward bilges.

The picture above shows the top of the plenum chamber for the air conditioning, normally covered by a grille, coarse gauze and thin plastic sponge sheeting. All this, to prevent muck getting into the ducts; yet it does.

The proof that I was not imagining getting wet feet in the middle of a drought!

Water of course runs unimpeded through all this and at the bottom of the plenum a

bit above where the steering column leaves the cabin there are two rather obscene looking rubber valves dangling in the engine compartment where the water can escape.

The wire gauze seen in the top picture is the last bastion to guard the air intake and is easily removed after lifting one screw. Hopefully you will find no water and if there is dirt leaves etc they can be removed with the household vacuum cleaner. Since vacuum cleaners were not considered by Rolls-Royce designers when cobbling these cars together, you will have difficulty getting around the corner at the bottom of the chamber. Try some largish rubber heater hose taped to the vacuum nozzle which you can slosh around corners to pick up the nasties.

And above is the culprit. This is one of the two valves at the bottom of the pipe seen lower left, at left and below. The slit in the end is designed to let water out and keep smells and dust from the engine room getting into the car. It is intended that the usual vibration with car movement would keep the lips apart but with no rain or car wash the lips stick together and you have a stoppage and subsequent wet feet. The slit also becomes distorted through either poor initial fitting or being moved during repairs and left jammed against another component which is what appears to have happened in the lower picture

Simple prophylaxis is to run water onto the windscreen and down into the air intakes on each side and check that water is coming out of the valves. If they do block they can usually be squeezed open and if necessary get your pinkie in there and clear out any accumulation of muck. If all that fails open up the plenum and remove the valves for a good cleanout. Not doing this is a great recipe for rust and a rebuild of the bulkhead!

WIPER BLUES IN SPIRITS

While you are cleaning out your plenum chambers, have a look at the myriad of levers and joints that jointly operate the windscreen wipers. The rod in the centre of the picture is driven back of forth by the wiper motor and gearbox. The rod is connected to the flat lever seen poking out of the bulkhead, that lever in turn operates more levers to operate the wipers. The swivel joint seen at the end of the first rod, collapses and although the wipers move more or less normally they produce a very audible clunk. It is usually this joint that has failed although there are a number of similar joints in the wiper drive train.

The joint is not replaceable. Apparently the Factory decided the whole setup was scrapped and the repair is to pull the whole mechanism out and replace it with a newly designed assembly. These are readily available, apparently for a few thousand dollars! If you don't want to spend that kind of money you might like to replace the original joint that has collapsed with a rose joint as it is known readily available from engineering suppliers or more easily from RA Chapman in Melbourne.

The repair involves removing the arm, grinding off the stub of the old joint, drilling a hole in the arm and welding the adjusting end of the rose joint to the shaft having cut off the old end. As I remember about $25!!

A GROWING PROBLEM

If there was an Achilles' Heel in the Shadow it would surely be the rear leveling. The system is powered from the number 2 accumulator and controlled by a two way valve mounted on the body adjacent to the rear wheel arch. The valve has an operating arm which is linked to the rear suspension arm. As the body is pushed down by loading the valve is opened admitting high pressure brake fluid to the rams one of which is seen in the above picture.

The picture shows the ram cylinder unbolted from the body mount and pushed up to the limit its travel. Within that cylinder is a very powerful lip seal and 'wiper' that prevents oil at up to 2500 psi escaping down the ram and onto the floor.

And there is the Achilles Heel!

The ram seal wears and eventually leaks evidenced by a loss of fluid level in the rear section of the reservoir in the engine compartment and the extraordinary sight of oil dribbling down one or both of the rear springs. The immediate solution is to block off the oil supply to the ram with a small ball bearing at an appropriate joint. If this is not done not only will you empty the reservoir but if you are driving at any speed the 'cloud' of drops of RR363 will be sucked into the vortex following the boot lid and next day you will find the lovely paint work ain't lovely anymore!

Have you ever noticed that people who really have no idea how to fix a problem will exhort your help prefaced by the words 'all you have to do is….'. Well all you have to do in the above case is to undo the cylinder as in the picture having disconnected the interchangeable

Here our efforts were rewarded. This is later car with the coarse threads. The 'lugs' on the spring carrier provide some assurance that the unit will stay in the hole. The friction between that carrier and the underside of the body mount is all that is available to stop the latter turning. The stud and nuts are the top rear shock absorber mount, which to get at to change the units, the rams have to be removed! Cars that have been used on bullock tracks often tear these spring towers out of the floor of crack the bracing panel across the front of the boot., All this can be repaired by an adept welder and a wallet!

feed and exhaust pipes, then using a strong 'C' spanner, unscrew the ram piston from the top of the spring mount. It will be very tight. In fact it is usually so tight that the spanner actually rotates the spring mount, which doesn't help at all. You can try jacking the subject wheel up until the suspension arm squashes the bump rubber which will entail lashing the body of the cat with chains to the jack. This will jam the spring mount up hard against the body mount. Try making a dam around the damn thing and keep filling it with your favorite release mixture. Try freezing spray on the piston. Use a small flame to heat the spring mount and freeze the ram. That usually gets it undone. If you have a very early car, prayer helps since the threads are fine rather than the coarse ones used later. These have defied God and man and in the end and angle grinder is used to cut the piston.

In summary it is usually a difficult job but like most things on these cars they are a challenge to be met with determination, common sense ingenuity, patience and sheer bloody strength.

Some views of the ram piston. Above: usually the most welcome sight, the thing unscrewed without damage. At left: Just to show you the spring pot with centering lugs and the piston. And below: The 'C' spanner in operation. The 'notches' obviously get mangled but having got the thing out, with a little dexterity and a good file, these can be cleaned up and be as good as new.

Top left: A worm's eyeview of the tunnel in which the rear spring operates. Note the absence of any 'fangs' on the underside of the top of the cavity. These would be a great help by stopping the spring seat from revolving while you are trying to unscrew the ram! Bottom: The spring and its seat in position. Bottom right: As springs go these are exceptionally long. R A Chapman have replacements at a very attractive price that have an extra coil. These seem to improve cornering and certainly lift the 'saggy bum' look these cars adopt in old age.