

## CANCELLATION OF END OF YEAR

I am offering no excuses since nobody believes them but for future reference December and January will be deleted from my calendar. My activities vis-à-vis these pages however do not stop so let me rummage through a few things I think we have not addressed.



### Shadow Air Conditioning

Most owners will be familiar with this cylinder jammed into the left front corner of the engine compartment. This is a drier. Any moisture in the circulating gases will quickly freeze as the pressure increases and fine ice slivers will get under valves and other crucial bits and the whole system will fail.

Initially when the system is charged it is evacuated to as low a vacuum level as possible usually about •0065 psi and some operators sweep the system with nitrogen to minimize the possibility of water vapour remaining. Even then there is a risk so a drier is put in the lines and that is your cylinder in the corner that we see in the picture. It is filled with a desiccant, a compound that absorbs water, variations of which you find in small bags in new camera boxes and the like to prevent rust from water vapour.

If you change to the 'new' refrigerant it is essential you change the drier along with some 'O' ring seals in the system. This is all academic since in this country work on air conditioning systems HAS to be done by a licensed operator! But the information above is something you should be aware of so you can drop the bon mot while the work is being done. And when the operative announces that the drier fitted to your Shadow is no longer available, do not despair as a shortened version is available and works adequately albeit with a modified bottom mount to replace the one seen in the picture.





## STOVE PIPE LEAKS

The above items are the new version of an old fitting which goes back to the start of the vee eight in 1960. Their function was simply to pipe a small quantity of induction air through the choke coils to heat them up expand them and open the choke. The heating is done by passing the piped air through a 'U' shaped tube in the 'B' bank exhaust manifold. Originally the pipes were lagged with asbestos cord which looked very business-like. With age the cord frayed and the pipes looked like a dog's breakfast. Worse still the pipes rusted and burnt with the heat and eventually if they didn't snap off at the manifold they at least punctured which allowed cold air to enter and the choke would close up a bit and your wallet would open a bit to pay for the extra fuel.

The last price I had for Factory replacements gave me a week in intensive care for shock so I was delighted to find the above aftermarket items from Introcar in London [www.IntroCar.com](http://www.IntroCar.com) at a very reasonable price.

Whilst on the subject, I wonder how many owners have fiddled with the choke thermo coils. The setting of these which dictates when the choke will open and close was, according to the manuals a matter of the greatest care and to be attempted only by the anointed. In theory, once set, the coils should meet all environments and if you regularly had to start the engine in Northern Finland, there is the thermostatically switched electromagnet that will hold the choke butterfly shut until the icicles melt off the engine!

Australia never experiences such extremes of cold except maybe in a heavy Winter in Thredbo so on a balmy morning you bounce out in your board shorts and thongs and start up the car to go get the papers, there you are with a revving engine effectively over choked until it manages to warm its cockles. Sydney cars particularly suffer this fate and even 2000' nearer to God in Canberra, the revving engine syndrome can be quite irritating. So feel free to lean off the setting. If you are caught short get someone to hold the choke shut while you crank – the end justifies the means.

And if you have bought a car about which you have little knowledge, take note of the choke performance. I was consulted about a Phantom VI that was very difficult to start when cold in Winter. Having been serviced for years in Sydney it turned out that the mechanics of the

day had 'zeroed' the choke coils to overcome the revving engine problem, apparently oblivious to our colder climate!!!



## OVERHAULING REAR CALLIPERS ON SZ CARS

One of the great mysteries of our modern world is why the calipers of cars using mineral oil (LHM) in their hydraulic systems eventually leak. This is very rare in the old RR363 systems but it seems we have to live with it.

Personally I love the stuff. I have just dismantled virgin calipers that have been in service over 25 years. There was practically no sediment, no 'varnish' and certainly no rust! Citroën use mineral oil and I have been told Jaguar have dabbled with it otherwise Rolls-Royce seems the principal consumer.

Usually the front calipers leak, first evidenced by oily deposits behind the steel backs of the

brake pads. If the oil has not got onto the linings and they are fairly new, you may be lucky enough to save them since pads that have been soaked in oil are of little frictional value!

One of our members complained that his Spirit under heavy braking would frequently skid. He wasn't sure which wheels or why. Crawling underneath revealed the above which have actually been cleaned! The callipers were swimming in LHM. This effectively reduced the rear braking to nil so the whole effort to stop the car fell to the front wheels which presumably eventually gave up and skidded!

The rear calipers on the Spirits and Spurs are virtually identical to those on the Shadow but the ends of the suspension arms have been redesigned to accommodate the new suspension system involving struts. It is the attachment of these later bits that causes chagrin!

Pulling the front calipers off is fairly straightforward, a couple of feed pipes, two mounting bolts and they are in your lap. But the SZ rears offer a slightly greater challenge to the



unwary. So as one of our Northern friends said 'One picture is worth a thousand words', here we go.



Above we have the worm's eye view. The large washer at the top is the lower end of the suspension strut. At lower left of the strut is one of the bleed nipples complete with ribbed dust cap for the caliper, remembering that there are two systems operating in the one unit! Next down is one of the parking brake operating rods with the actuating mechanism to the left. To note here is that the rod passes through the left hand strengthening plate, one of the two supporting the lower end of the strut!



It is not necessary to remove the strut from the suspension arm which has been done here. But the platform for the strut mount with its vertical supporting plates can be clearly seen.

Bottom left shows that one of the four caliper bolts that hold the two halves together has been removed. This was done to allow access to the supply nipple seen withdrawn from the caliper. The heads of the two large bolts allow only an open 7/16" AF spanner to be used on the nipple so if it is very very tight there is a good chance it will burr and you may have to repair to your garage shrine for prayer and whisky!



See what I mean????

The Factory in its manuals counsels against splitting the calipers on its cars. They are quite simply clamped together with four large high tensile bolts, their joining ducts sealed with readily available special washers. Trying to properly clean calipers while bolted together is a feat I have yet to witness but only with somebody else doing the job! When you order the caliper kits you will have to specifically ask for LHM compatible intra caliper seals which as

far as I know are not a listed spare for these cars!



Here most of the pipes have been removed. The jungle consists of the two supply pipes (one for each system) the transfer pipe that runs from one side of the caliper over the top to the other to feed the piston on the other side and lastly the bleed nipple pipe for the lower cylinder.

### MONEY SAVER!!

If you use a fair bit of LHM for whatever reason, consider buying the stuff from your nearest Citroën agents and refilling the

dinky little bottles supplied by Castrol and installed in your boot (trunk)! You just need to be clean and tidy since worries of hydroscopy are nil with this stuff!



Next task is to unbolt the caliper. The attachment is the same as the front except that given the space restrictions and the very high poundage the attaching bolts are torqued to, special headed bolts are used. Here the lower caliper bolt can be seen, the other larger bolts are half of the four that hold the whole axle assembly onto the suspension arm.

The view to the left is inside the end of the rear end of the swinging suspension arm. The nearest and brightest bit is the end of the Lobro joint where it bolts onto the rear wheel stub axle.

You should not take fright at the sight of these bolts. They are known as double hexagon head bolts or dodecagon heads, given that they have 12 'sides'. A standard multi point socket fits them very nicely!! Above is a picture of a standard multi point socket and a simple hexagon socket. The latter can't be used on these bolts!







If you take this job on, one tool you will need is a decent break bar as these bolts are very very tight!

Now comes the interesting bit. You are looking at the rear of the right hand rear brake rotor.

The mounting lugs for the caliper can now be seen.

The calliper has been removed but because a few bits of it slightly protrude into the holes on the rear strut mounting plate beside it, the whole axle and calliper assembly need to be loosened and the assembly moved outward allowing the caliper to be withdrawn to the rear.

This simply involves loosening the four hub retaining bolts a few turns and pushing the axle outward. It can't be pulled too far lest you split the Lobro joint on the end of the axle.

While in the region you should have a careful look at, the rubber boots on the joints. If they have started to crack or split,

whip the axle out and send it off to a specialist to re-kit it.



There is nothing special about the callipers if you have done them before. Here we are unbolting the two halves to clean them. Note the break bar because once again these bolts are very very tight

### **ANTI-SEIZE GREASE**

Altruism hopefully is not dead. Think of the next poor bugger who has to undo these bolts including the ones above the calliper mounts and the rear axle bolts. I spent an hour screwing these virginal bolts out dipping them in the good stuff and replacing them!



And finally here are the new pads going in with their anti-rattle springs. The latter can be like trying to get a live tarantula into a small pepper pot but the judicious use of a suitable centre punch makes life a lot easier! Overall if you have the time and facilities to do this job you will need at least 20 hours spare. Multiply that by your man hour rate and it may be worth your while and you should achieve a great level of satisfaction!



## SEAT BELTS

These contraptions which the Americans had to almost change their Constitution to force people to wear them are, today, taken for granted. So good is our conditioning that I for one feel somewhat naked when driving unbelted!

A certain Head of State was adamant that he would not ride in the Vice Regal Phantom

VI until belts were fitted!

As far as I can remember the Silver Shadow was the first of our cars to fit belts as a matter of course. The Silver Cloud high priests deigned to issue instructions in their printed manual on how and where to fit them and by the seventies at least, the Factory would supply instructions on fitting belts to the Mark VI body!



The dinky little cover for the upper belt mount is pure Roycery. The top is held by two little prongs and at the bottom by a clamp held by two small self tapping screws. You start from beneath with a torch and a Phillips Head screwdriver. To get the cover off having removed the two hidden small screws, drawn the bottom of the cover away from the 'B' pillar then push it up firmly to release it from the prongs. Practicing on the driver's side pillar, I was startled to find wires and things that did not look very seatbeltish. Then I remembered my curiosity as to why this cover had side slots in it and the other did not! One of these can be seen in the picture. It appears that the wires and bits were the upper temperature sensor for the automatic air conditioning system and the slots let the fuggy air in to talk to them.



The first belts (originally invented by Volvo in 1859) to appear were fiddly things bolted to the floor and in the front and guaranteed to get lost in the upholstery when you were in a hurry.

The long 'B' pillar cover is held to the floor by a couple of bolts and the screws securing the Stainless scuff plates on each door sill. With the little top cover removed, the log cover simply slides up an inch or so and then lifts off!

Only lap belts were available so that when they eased your screaming torso out of the wreck, while you may have cranial and thoracic injuries that would keep a small platoon of surgeons in nice motor cars for the rest of their driving life, the orthopedic people specializing in the pelvic area missed out. Lap and sash eventually appeared, again requiring skills normally attributed to Houdini to put them on but once buckled your chances of survival were greatly increased!

And so some clever soul devised the retractable belt. This overcame the worry of jamming the thing in the door and damaging it but introduced a new wear factor through the web



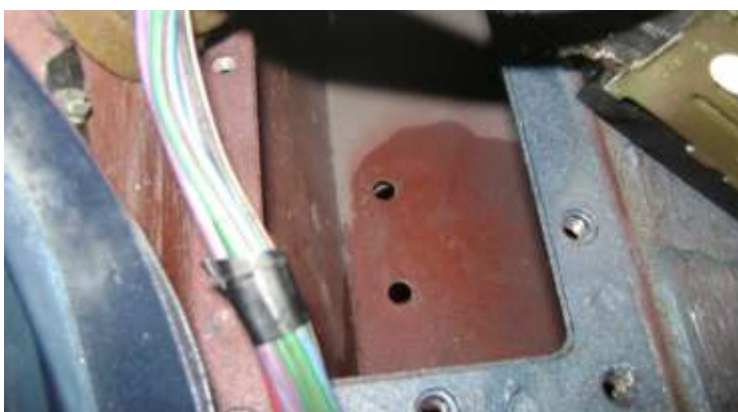
belt having to run through a track every time it was fitted and whenever the wearer moved around in his or her seat!

The bottom line is that they wear out and fray. You have the option of repairing or rewadding the old belt or identifying a modern belt that will fit. The only licensed seat belt repairer in Australia is a firm called 'Seat Belt Solutions' in Western Australia. Their web site is [www.seatbeltsolutions.com.au](http://www.seatbeltsolutions.com.au) so go have a look.

Fitting them however is your task and again some pictures to show what is involved, in this case in my dear old Spur!



So that's where it is? Yes the front belts are secured in a hole in the floor just behind the driver's seat and



covered by a massive steel plate fastened to the floor by no less than 10 bolts. This is not to prevent the seat belt escaping but provides an anchor for the fixed end of the belt seen here. The belt underneath feeds through a slot which has a right angled insertion slot to thread the thing.

At left is a picture of the box opened and belt removed. Bolts are screwed from underneath and the retractor actually sits in a plastic bag to protect it from serious water invasion into the sill



Here is the plate showing the insertion slot and the simple remedy to prevent chaffing of the webbing.

The unit is known as a vertical mount, which fits to the Factory angled mount the latter catering for the slope of the body sill.



At left is a worm's eye view of the mounting holes

The retractor is designed to release the belt when it is vertical but will tolerate a 3° lean in any direction. This obviously dictates that when the mounting bracket is bolted to the sill and the sill is horizontal, then the belt must be vertical. This was my way of ensuring this – and it worked!



And this is the plastic bag in which the reel sits. The bag has two holes in it to accommodate the mounting bolts when they come through the bottom of the sill. Since the reel doesn't simply drop in, it has to be put in at an angle and swiveled; the chances of the plastic bag holes remaining lined up on the mounting bracket are somewhat slim!

My solution was to whip the heads off a couple of bolts and use the shanks as studs screwed into the bottom of the mounting bracket. These will hold the bag in place and give you some hope of lining up the mounting holes with the sill holes. Having got the studs through, careful holding of the reel while you unscrew the studs, one at a time and replace them with the correct bolts should see the most difficult part of the job completed satisfactorily.

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## CONTROLLING THE FAN

I seem to remember a figure of something like 2 horsepower that is drained from the engine just to run the cooling fan behind the radiator. The French being the master innovators (did you know they used ignition and steering locks on the 1947 Renault 750!!!) They somewhere used electric motors to drive powerful fans to cool radiators, when they needed to be cooled! English cars generally had a reputation for poor cooling for as long as I can remember (which is long!). Even the iconic Mk VI and Silver Dawn owners were advised to not labour the engine too much and keep an eye on the temperature gauge. Prewar cars had enough coolant in their systems to float the car but still had problems.

Apart from capacity and pump output the only variant available has been the fan which traditionally was driven by the front end of the crankshaft via a belt. But if you look at fans on the early cars, they would not pass for a reasonable personal fan in the office. The solution there was to have a colossal radiator. Apparently if you make a radiator core thicker than about four inches you get virtually no additional cooling. If this is so the last tool in the box has to be the fan.

Fan design I imagine is almost a profession in its own right. They have to drag as much air as possible with the minimum of revolutions, be as quiet as possible and draw as little power to turn them yet still do their job. Electric fans are now very reliable and used extensively but it seems if possible the old crank and pulley system is preferable. The ideal was a fan



that would effectively idle when cooling was not required such as at high speed but cut in when the car is laboring up a hill, boiling up the transmission and the driving heat out of the air conditioning condenser in front of the radiator core. The fluid coupling seems to be the answer. They were not introduced on our cars until the early Shadows. The 1970 Phantom VI I can confirm is fitted with a fluid fan coupling.

There have been various iterations used by the Factory. The early Shadows used a unit that apart from bolt mounting holes were identical to the ones used on the early Holdens. Whatever the unit used however they are very expensive to replace. It seems that there are only two scenarios of failure. First there is the failure of the internal bearings. This can be monitored by gently wobbling the fan blades forward and backwards. If there is any movement, replacement is indicated. The other fault is a lack of drive and you can see this very quickly when you switch off the engine. A good unit will stop the fan spinning in a few turns; a poor one will spin for quite a while. The problem is a lack of fluid in the coupling.



The fluid must leak very slowly but eventually there is not enough to provide drive. Richard Treacy put me onto the fact that Toyota, who has made more cars than there are grains of sand on the beach, has been fitting fluid couplings to their fans for yonks. When they lose their drive, you can unscrew a little plug and squirt in a tube (available as a Toyota spare) of silicon oil and order is restored.

Since we do not have the luxury of a little plug, Richard tried drilling a hole in the body, inserting the oil and sealing the hole. I had a spare coupling which had

good bearings and decided to give the idea a run. Problem was that nobody could tell me how much fluid this rather large unit held! I asked the Toyota spares man who advised filling it up. I stopped after three tubes and there was still room for more. Now the fan stops with the engine in less than a quarter of a turn and the fan noise is reminiscent of an AA380 on takeoff. So the next experiment is to put one tube full in the other unit and see how that performs!

Finally if you are West of North Bandiwallop and the fan starts an horrendous noise and is very loose on its spindle, take it off. If your car has electric auxiliary fans out front you should get home without any problem just drive judiciously with a light throttle.

Watch this space.

