

TEE-ONETOPICS

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GETTING SCREWED THE RIGHT WAY

So you are lying on your back looking up at the front axle of an S2 Bentley. In common with a number of cars of the era the factory used screwed joints on their suspension rather than shafts and bushes much favoured by the immediate post-war manufacturers. The screwed joint by virtue of its thread form has a much greater bearing surface and even though when assembled there is an inherent looseness in the joint this is easily taken up by the pressure of the road spring.



This is a range of nuts used on the front suspension of an S2 or S3 car. The 'S' series cars quite extraordinarily used a much lighter suspension much the same in design. The picture does not show that the inside of these nuts is threaded to ride on the threaded pivots pressed into the suspension yoke and the central mounts.

The looseness also assists in getting the grease through the system. Getting all this to pieces is fairly straight forward once you have removed the spring. This HAS to be removed completely under control. There is a special decompressor available from the Factory but it is a tool that should be available from Club resources. DO NOT take chances with the main spring they are quite lethal when compressed.

Why do all this you may wonder. Well because of the very great pressure on all components of the suspension it is very difficult to ascertain what friction points are seriously worn. As the wear process is very slow it is common for owners to not notice that they are working that much harder on the wheel to keep the car in a straight line. It can also be instructive to bang the car over a really rough road (don't go mad) and listen to the noise. Any trace of a rattle and you have a problem.

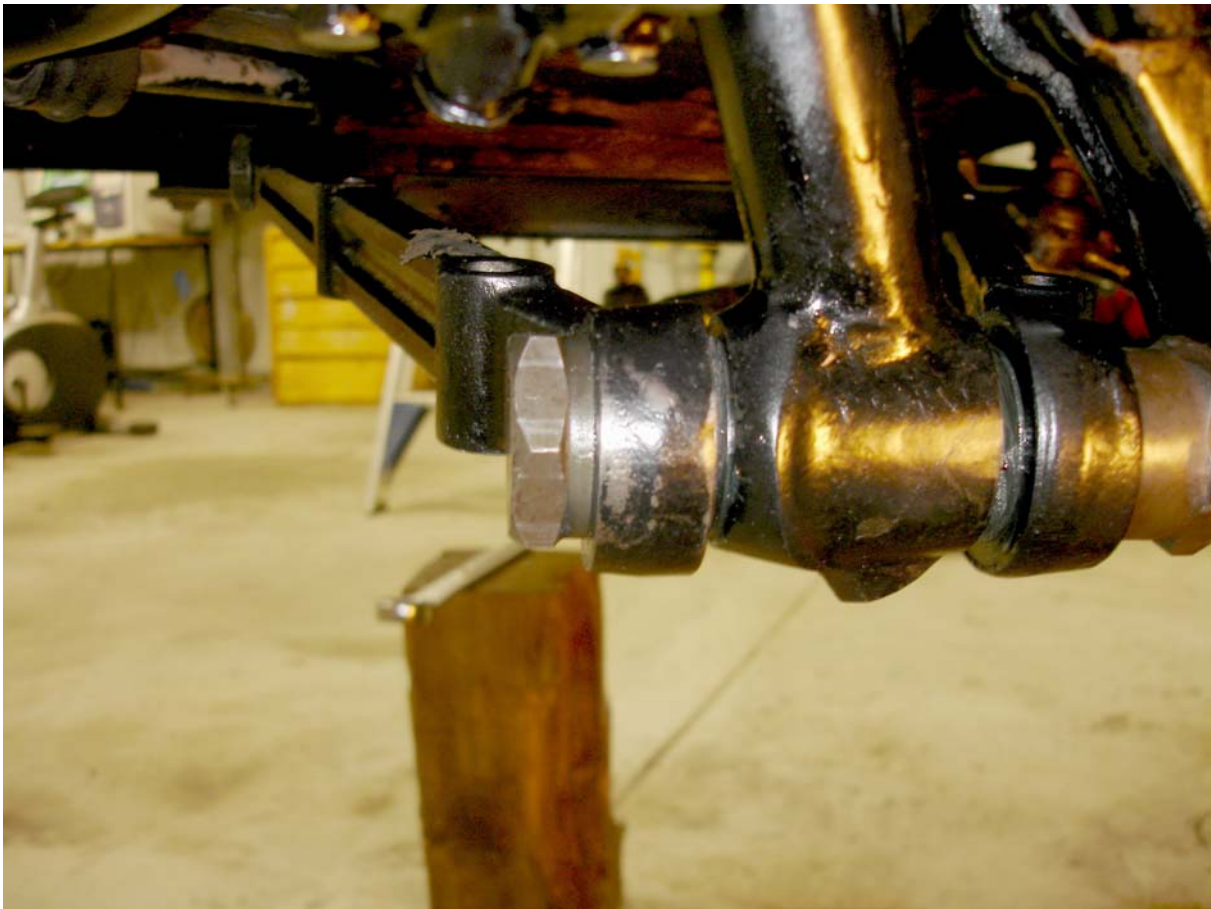


At left is the end result of spring removal. Seen also are the remaining suspension joints, the outer lower and the upper one on the end of the shock absorber arm. The outer lower seems to be the worst wearing of the three. This consists of two nuts plus a threaded pin pressed through the lower end of the suspension yoke. Usually both the pin and the nut wear. Having removed the spring the nuts are unscrewed (they are very tight about 500 ft lbs) at either end of the suspension arms and the whole thing comes to pieces.

Having cleaned it all up and assessed the damage, organise the repairs. If as you probably will, need to press out the lower suspension pivot from the yoke you will need an awfully mean press. This one took 45 tons to shift after 40 years! The fitting instructions are all in the workshop manual. If the pin is severely worn the nut will be also. Below is one of the inner joints.. In putting the whole thing back together you have to remember that there are two threads on the nuts, inner and outer.

The outer screws in to the arm while the inner screws onto the threaded pin.





Here is the lower joint showing the two arms which have been screwed by their nuts onto the lower pin. Note the gap between the end of the arm and the yoke. These are protected by neoprene seals to let the grease out and the keep the dirt out.. It is very easy to screw the nuts seen here in such a way that there is no gap between the arm and the yoke – a condition ready made to destroy the suspension.

The end result should be the nut screwed up tight in the rod with the arm still about 3/16” away from the bottom of the pin. In this situation the arm should be able to swing right down and right up in the normal field of travel.



This is the spring removal tool or actually a copy of one I had made the threaded rod is poked up the spring from below and hooked over a plate bolted under the front cross member. The spherical joint is to allow the bottom spring plate, once it is unbolted to swivel around the tool to avoid any undue stress.

A recent story involved the arms screwed up hard against the base of the pins. As soon as the suspension lifted, the nut tried to screw in even further wrenching the inner suspension mount to the point where it tore the lower mounting surface (1/4" thick) away from the axle carcass!



INGENUITY APPLAUDED

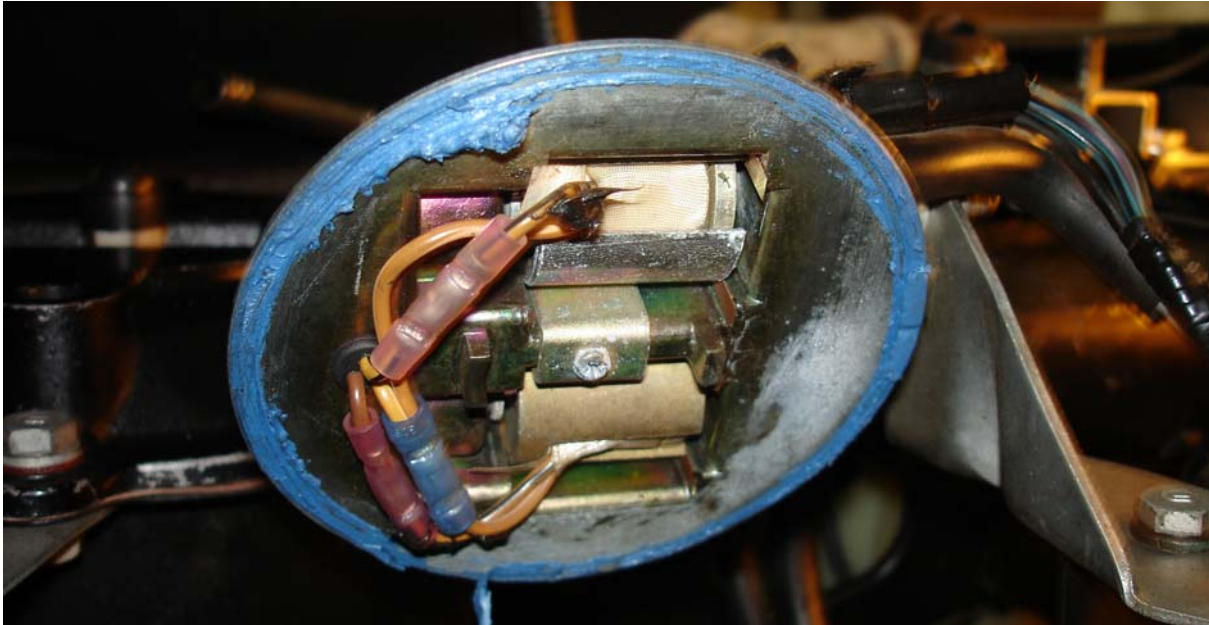


One of our members was somewhat embarrassed when a member of the public came up to him on a rally and asked him why the rear of the car was so high in the air. Alighting he inspected the side elevation to find that truly it was high. The reason it turned out was that some enterprising mechanic had loosened the ball joints at the bottom of the suspension control arm links presumably for adjustment. Unfortunately he did not retighten the lock nuts and the whole assembly eventually fell off. The control arms are sprung upward so the rear struts were fully pressurised and up went the car. Our resourceful member noted the connection needed and recalled a similar fitting to what was needed, on a golf cart. He was right. The bits were found and fitted albeit in plastic and the car travelled some hundreds of kilometres without further problems.



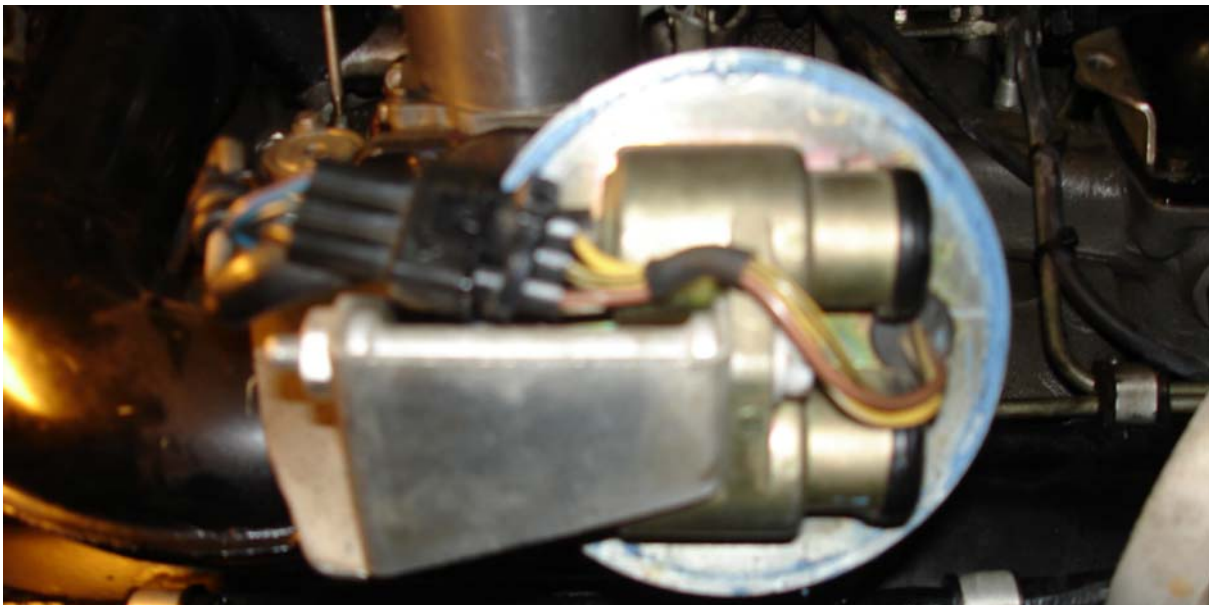
CRUISING

I believe most drivers are conscious of keeping an eye on the Speedo to see they don't exceed the limit – well not by much anyway. I do the same but often if my mind wanders I find myself slowing down and only realise there is a problem when the noise of passing cars brings me back to earth! Then there was the friend I had in the States driving a Buick Electra (when better cars are built – Buick will build them!) up through the hills of Montana at night listening to a broadcast of the Wagnerian chant The Ride of the Valkyrie. There are few people that are not stirred by this



If you take the bellows of your cruise control this is what you will see. The two solenoids which control sucking the air out and the let air back in can be seen. The blue muck is an attempt to seal the rubber bellows which take about a year of use to relax sufficiently to lose their air tightness. A run of silicon usually fixes the problem

wonderful piece of orchestral music. My friend was certainly stirred, he grasped the reins of the Buick put his foot to the floor and charged up that wonderful sweeping highway. Fortunately the music petered out and to his horror he found himself emulating a bullet train! He never would tell me what actual speed he achieved but I did notice he had a noticeable streak of grey in his hair from then on! Cruise control if used hopefully will stop such excesses but it is also handy for creeping past schools and the odd procession you have to join!



The earliest cruise control would have been the hand throttle which was used on most cars until the advent of the automatic choke. The catch was that it didn't increase the throttle setting going up a hill nor did it decrease it on the other side. And if you had to stop you found yourself fighting the engine! The Factory first fitted cruise control on their cars in the early Silver Shadow. This was a mechanical device which was not particularly effective but finally an electronic unit was adopted which was used up until fuel injection was installed.

Basically the system has a central processor which counts the pulses coming up from the gearbox which are principally generated for the benefit of the speedometer. Having worked out how fast the car is going it then checks that it is top gear and whether a cruise setting has actually been set. Then if necessary it sends a signal to a vacuum unit on top of the engine which simply pulls or releases the carburettor linkage.

The systems give little trouble and with a little bit of common sense and patience, most problems can be sorted out. Beware of one operator though who spent time checking over a non-working Shadow II system and finally returned it to the owner telling him that it didn't work! For that professional opinion he was charged some \$300! I had 'my man' look at it, in 20 minutes he identified a crook relay, replaced it and the system hasn't faltered since!

Graham Pheasant who lives in the Mountains had trouble with his cruise control and told the following story,

"I had a problem with my speed control and after bugging the hell out of Bill for circuits I finally tracked the problem to the switch in the gear box that tells the system that the car is in top gear. The switch was stuck in the closed state which locked out the system. Removing the wire from the switch solved the problem but then allowed the cruise control to operate in any gear. This I could live with. I then suffered a rear end collision on the M5 in Sydney and the RR was in sick bay for 4 months awaiting a rear bumper from dear old Mother England. When I retrieved my gem the speed control once again had taken time off.

I had long forgotten that I had developed a test to prove that the throttle servo was working. The problem was both solenoids in the servo unit were slightly corroded preventing the vacuum from operating the throttle. The test involved using an external 12 V battery. I removed the 3 pin connector to the servo, placed the 12 v negative supply to the right hand pin and 12 v positive to the other two with the engine at idle. The motor should immediately increase its RPM. If it did not then the unit is faulty but the repair is simple. Remove the diaphragm and use a good quality penetrant to free the solenoids or undo the retaining screw, pull both solenoids out and physically clean and replace them. You can then power them up and visually check that they operate.



GETTING STARTED

One of the more positive changes made in the latter days of the SZ cars was the introduction of the Nippondenso starters in 1987. As can be seen in the following photos the new units simply drop in after the old Lucas unit is removed. The smaller unit is much more powerful, very reliable and gives much more positive starting without that grunting sensation that the older units exhibit. The conversion is quite simple other than having to drop the exhaust pipe to get the old one out!



R A Chapman has gone one better and commissioned a more robust model for a fraction of the price of the Factory original.



Maintenance and Spare Parts Costs.

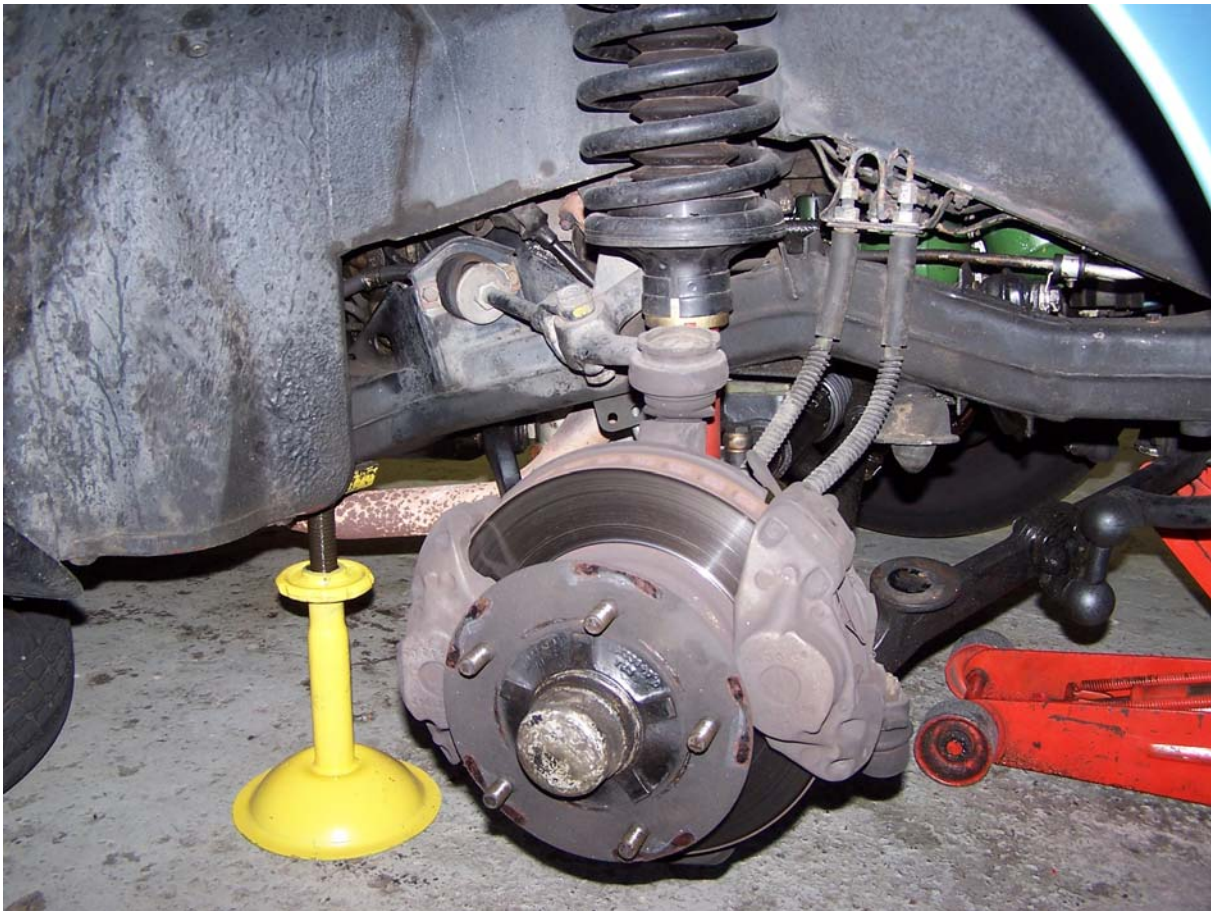
David Gore, the Registrar of the Shadow group forwarded a long paper to me on the question of maintenance and the future supply of spares. I took the liberty of editing it and would commend the result to you.

The importance of regular, comprehensive servicing and maintenance of the Silver Shadow, cannot be over-emphasised. Following the factory-recommended service and maintenance schedules almost invariably results in lower average operating costs and greater vehicle reliability. We all are tempted to defer maintenance to a later time but this may also result in increased costs through further deterioration.

Many owners have not thought of the differences between servicing and maintenance:

- Servicing involves preparing the vehicle for use with fuel and other necessary fluids, tyre pressures, cleaning windscreens etc.
- Maintenance includes repairs, overhaul, modifications, replacement of parts, defect rectification, inspection and testing to keep the vehicle in a sound condition.

Servicing is the responsibility of the driver or owner or chauffer if you have one. Most of us these days leap into our vehicles start up and tear away oblivious to whether the water pump dropped its guts during the night or a large quantity of brake fluid leaked because of a failed seal. When disaster strikes we express amazement yet the responsibility is ours. Every three months or so go into any battery supplier and get them to check the unit in your car and the charging rate. Much easier than cranking!!



Even the simple task of taking off a wheel is well worthwhile. Here is a good opportunity to hose the muck out of the callipers check the front wheel bearings, check for brake fluid leakage and have a good look at the various soft suspension bushes that you can see looking for bits hanging off or squeezing out!

David has dissected maintenance somewhat formally but this shows the thought and planning that should go into looking after your car.

Maintenance can be categorised.

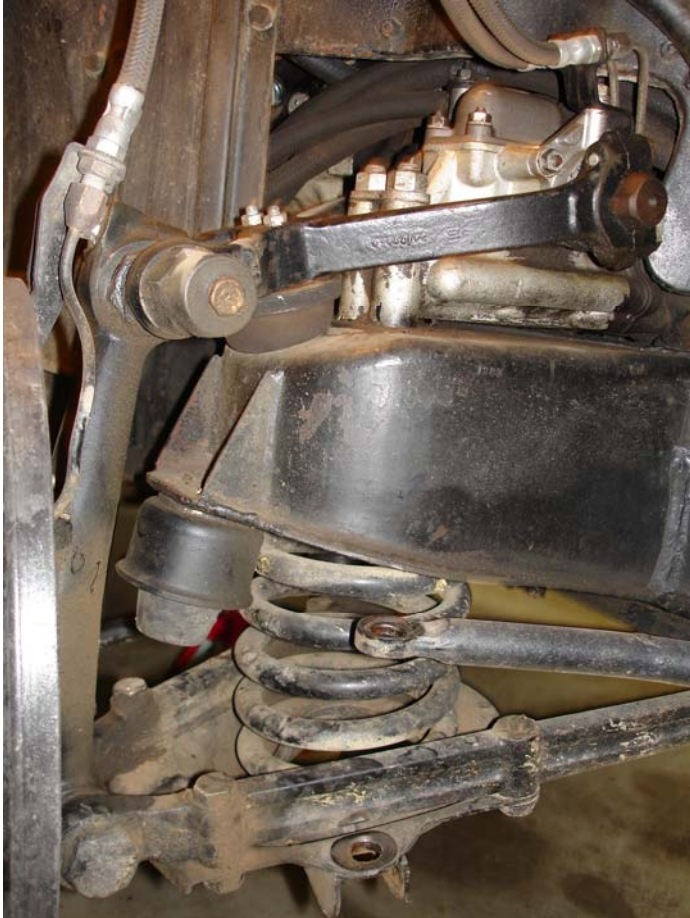
Condition-based [Preventive] Preventive maintenance is intended to prevent an item failing or wearing out by systematic inspection, essential where a failure would have expensive or unacceptable consequences particularly with suspension or steering components. This is usually dictated by the manufacturer using past experience and knowledge gained from long-term durability testing of components.

Fixed-time Experience and knowledge gained from long-term testing of components is used to predict when components are likely to fail in the vehicle's life-cycle. Statistical analysis is used to calculate the best time for replacement. This is incorporated in the maintenance schedule. It is important to note that many items have time-dependent and not usage-dependent service lives for example hydraulic hoses, Replacement cannot be deferred because the vehicle has not been used or has only covered a small distance since the last replacement.

Corrective This is required when an item has failed or worn out, to bring it back to working order. It usually applies to items where the consequences of failure or wearing out are not significant and the cost of corrective maintenance is less than preventive maintenance.

“Consequential” Collateral failures where repair and maintenance procedures affect other components which would otherwise have remained serviceable. Deferring preventive and fixed-time maintenance or adopting “run to failure” maintenance practices are the usual causes.

Run to Failure [“Bust & Fix”] This is a ‘strategy’ which allows items to function until they fail.. It can be argued that this form of maintenance is cost-effective. The relative high cost of purchasing spare parts compared with their intrinsic value has always been a discussion point with car owners and enthusiasts.



The price of spare parts is based on the cost of making the part but also includes the cost of storage, handling and financing the stock and making it available when it is needed.. In the case of Rolls-Royce and Bentley parts; the time period involved may be in the order of decades.

Another wheel off job. Always have a good look at shock absorbers whether they are piston type like here in a Bentley or telescopic like in the previous edition. There should be no leaks! Also keep an eye on rebound and bump rubbers they can get pretty mangled in their old age!

There also has to be a reasonable profit margin for both the dealer and the manufacturer.

There is a reasonable argument that manufacturers lose sales of spare parts due to inappropriate pricing, when equivalent or alternative parts are available from other sources. This is a marketing problem for the manufacturer. Generic parts such as fasteners, seals, light bulbs/fuses, filters etc are usually

readily available ex-stock from their manufacturers and should not incur long-term stockholding costs for the car manufacturer if recognised stock management procedures are in place. Hence generic parts could be priced at or close to prices charged by alternative suppliers; the customer will purchase their entire needs from the dealer instead of shopping around and the manufacturer will benefit from sales that would otherwise have been lost. Unique parts which can be replaced by alternative substitutes can justify higher prices but these must be relative to the cost of the alternative.

Restorative Maintenance. (“My God you wouldn’t believe”) This is my little addition. There is an old saying ‘hoisted on one’s own petard’ which referred to the original sappers who would undermine a castle’s walls to gain entrance. One of the aids they used were petards a type of bombard using gun powder as a propellant. Some hapless serf would be detailed to get under the teetering wall and light the wick and then extract himself at high speed. If the wick was a little short it was not unknown for the petard to explode before he even turned around. And in those days the current dividends of 100 virgins and a life of eternal bliss weren’t written into the

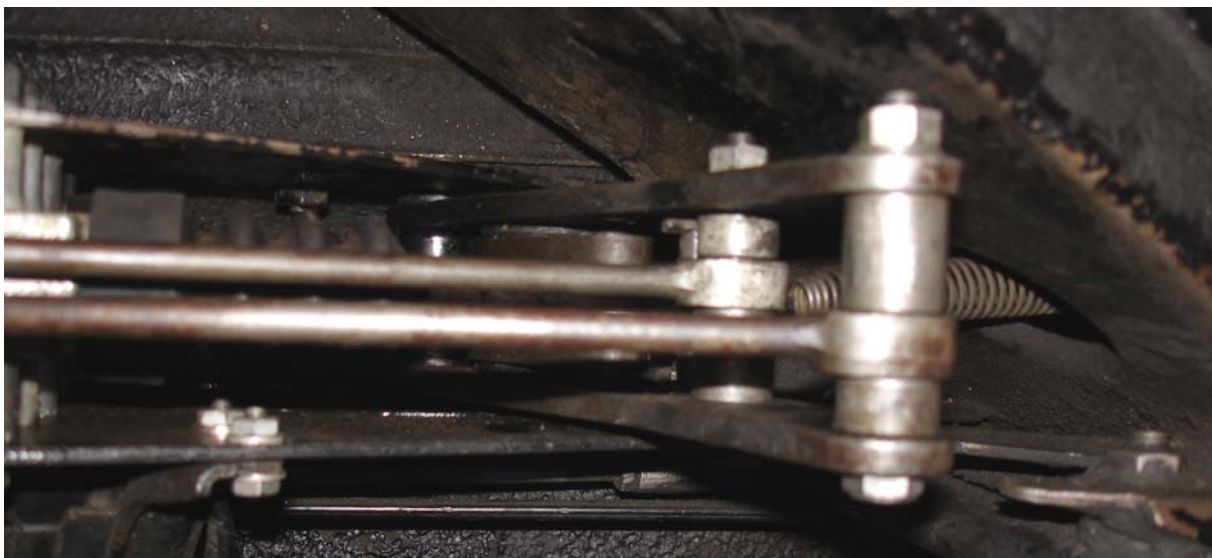
Work Place Agreement. The latter event culminated in the operator being 'hoisted' on his own petard.

Translating this to modern situations, past owners and a dwindling supply of present owners regard Rolls-Royce and Bentley motorcars as indestructible and of unlimited endurance. Why they even used to lock the bonnets so nobody could touch them between services! (Heard that one again last week as well as the Lady in Spain with the broken axle!). This attitude of 'perpetual perfection' crosses all our minds at some time so that nowadays when we indignantly find some obscure parts absolutely clapped out through nothing else but age and use, that is when we have been hoisted etc!

Let me give you an example. Below left, for those not familiar with the 'S' series cars is the detachable mounting plate for the two brake master cylinders. The latter are operated by the stout lever seen joining the two piston rods that pass through the concertina dust covers. The lever hangs on a very stout hardened pin seen poked into the mounting plate in the right hand picture. When the servo is applied it yanks the bottom of the lever to depress the pistons in the callipers and hopefully the hydraulic brakes are applied!



The lever is lubricated only during overhaul where it swings on the hardened pin and the pin which can move very slightly simply sits there. The other end of the pin by the way pokes into a very similar plate that is welded to the chassis frame. So after about 40 years of being wrenched and released the pin actually wears the mounting holes which makes setting the adjustments of the master cylinder up quite difficult. Building up the worn hole in the removable plate and reboring it should be no trouble but getting access to the fixed plate on the chassis for that repair is something I



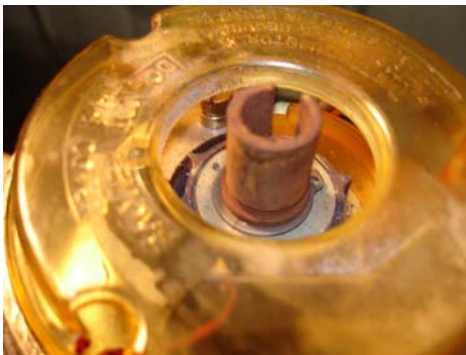
would like to take advice on. In the last picture the actuating lever can be seen depending from the hardened pin. The whole setup is sandwiched between the two mounting plates, the inner one at the top is the one that is welded in position.

I should mention that this furphy of longevity was not generated by the Factory but by the media and of course it was not discounted by any of the owners!

Of primary concern is that the long term availability of parts is entirely dependent on the manufacturer and dealer being able to recover all costs involved in making, storing, transporting and selling them. If we do not buy parts, there is no justification for the manufacturer to continue to supply parts. In the case of the SY and SZ cars increasing difficulties with obtaining parts when existing stocks are sold and the cost of manufacturing replacements is often too high. Fortunately as with earlier R-R/Bentley models, alternative suppliers are entering the market to fill the gaps.



DESTROYING THE DISTRIBUTOR



Electronic ignition in various forms was first introduced to the Marque in the Shadow II. Unfortunately the equipment supplied to the Factory for installation as well as spares was not always reliable. Fortunately in the ensuing 20 years other manufacturers greatly improved the ignition systems and readily adapted their products to the Rolls-Royce and Bentley. For some reason the factory made no reference to these distributors in their maintenance schedules and as can be seen in the photo at left the designers clamped the plastic cover over the works with a

clear warning not to go any further. The centrifugal advance mechanism under all the gubbins seen in the picture below however does need some lubrication. Obviously this distributor has not only had no lubrication but the drive shaft on which sits the rotor had started to corrode which neatly glued the latter to the former!

The rotor should pull off with a fair amount of resistance but if you really have to tug – STOP. The top part of the drive shaft is held onto the lower shaft by a patented plastic clip which apparently has not been produced for the last 20 years. If you really yank on the rotor you destroy this clip and



have the problem of how to replace it. The safest approach is to remove the distributor and cut the rotor off the shaft. You can then work on cleaning the shaft, freeing up the mechanism and fitting a new rotor. Hang the expense fit a new cap at the same time. The lubrication is down the centre of the shaft – sparingly and repeated say each time you change the oil. Always check that the centrifugal advance is free by twisting the rotor anticlockwise and letting it go. It should spring back. You might also like to put a little button of felt in the shaft to hold the oil.



TIMING THE ENGINE

Many owners blanch when you suggest they remove the distributor because they do not feel confident at getting the thing back to where it was. Most cars and Rolls-Royce in particular time their engines on Number one cylinder. For an in line engine that's the one at the front. For a vee eight engine it is the one at the front on the right hand bank as you sit in the car also known as A1!

If you are simply pulling the distributor to have a clean up etc simply remove the cap make a drawing or take a pic of where the rotor is. Providing the motor is not moved the distributor will only go back in that position or with the rotor 180° out! But what if the motor is turned how do you time it then.

The requirement is to get the piston in the number one or A1 cylinder almost to the top of the compression stroke. At this point both inlet and exhaust valves on that cylinder will be closed and the easiest way to check this is whip off the rocker cover and check that they are closed. That can be quite a job in itself. A much easier method is to get a bit of heater pipe and holding it tightly to the spark plug hole blow through it. No blow? Then the valves are shut. As to the position of the piston, you can actually see it through the spark plug hole but better you use the timing marks on the crankshaft balancer at the front of the engine.



And here it is after careful cleaning – set at about 7° before top dead centre (BTDC). It is at this point that you unclamp the distributor and turn it until the rotor points at the number one or A1 terminal in the distributor cap.



If you have a distributor fitted with points you can turn it with the ignition on until the points just flash which will be the firing point. This is static timing and on our cars the timing mark for in-line sixes is on the flywheel accessed from under the car. Setting the timing on later cars with electronic ignition requires a stroboscope which you can buy for a few dollars and follow the instructions.

Rotating the engine can be difficult if you do not have a crank handle. The picture at left is one method. All the belts are very tight a very large spanner is used on the water pump fan pulley to inch the engine to the position you want it.

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