TEE ONE TOPICS

Issue 52 April, 2006

ARE WE WINNING?

Some years ago I attended a self help group in Sydney where we were able to enjoy the use of garage hoists. Among the chassis' that were hoisted was a very nice looking Cloud of some series which unbidden I wandered under and by sheer chance spotted a front suspension joint that was incredibly worn. I found the owner and pointed it out very clearly. His immediate reaction was that he was due to leave on an 'Overlander' the following week! Further he almost regarded me as some sort of spoilsport when I insisted that the car was unsafe. I am of course as the Bible observes 'not my brother's keeper' so I moved on. He did the trip apparently without incident and probably ridicules me whenever my name comes up in conversation.

Meanwhile what of the car? I have absolutely no idea and I am not about to call him up and ask. Rolls-Royces seldom have catastrophic failures thank God but when they eventually expire they are often as the Army describes them BER! A car is then lost!

A CAPITAL IRONY

Despite all these writings, tech sessions, chats and dare I mention it – common sense, a recent safari into the Never Never by a group of our cars turned up a car with a flat tyre – not a problem except that the spare had no air in it! I am still under counselling!

That I should lecture is a capital irony after our recent Federal Rally. All reasonable prophylactic measures having been showered on my Spur, 12 kilometres from the Parkes the home of the huge radio telescope and inspirational source for the award winning film 'The Dish', my dear car lost the 'GO' from under the right foot. The fuel pump had failed. These cars do not have 2 SU pumps but do have a single Pierburg rotary pump operating in a closed circuit fuel line. If it stops the car stops.

For the record the NRMA was absolutely marvellous. (For international readers National Road Motorists Association equates to the AAA or the AA of the RAC) . The car eventually and very efficiently found its way back to Orange where the Rally Headquarters was set up and to simply cap the run of good luck I had Mark Herbstreit remark at dinner that he had a spare pump I could borrow. Such events are truly unavoidable, the original pump had given stirling service and even now I do not know why it stopped! As to backups I am working on a double rotary system so that we have a better chance of getting to Parkes which we will do one day!

Finally I like to think that members and owners are taking a greater interest in their cars, that the aura around them has been demolished and that mere mortals such as you and I can actually have a go at fixing them.

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RACK TALK

The history of controlling the direction your conveyance takes is of interest particularly when the motive power is totally dumb. Before that many a tale was told of the inebriated owner of a horse being loaded on board and the faithful beast would take its master home. The only other inanimate power at the time was surely the wind. Direction could be reasonably controlled by the setting of the sails with some correction from a rudder and that in turn controlled by a tiller or helm. The latter was used on the seminal motorised vehicles emerging at the start of the last century. It must have been a fairly strong chauffeur who manned that tiller since there was probably little mechanical advantage unless the tiller was very long which would not be practical. A wheel with gearing was clearly the requirement to reduce the load on the driver. This resulted in a steering gearbox at the bottom of the steering column or in the case of the 'T' model Ford at the top of the column behind the steering wheel.

Above: Richard Treacy gave up when his third exchange rack expired and decided to overhaul the thing himself. Kits are available for the do-it-yourselfers but as cavalier as I am I would avoid the task particularly as removing and replacing the things is not the most enjoyable of tasks.

Eventually very light cars were able to adapt a toothed shaft meshed with a gear, the latter being driven by the steering wheel through the steering column. The former pushed and pulled the wheels from one side to the other pivoting to achieve steering. This light, quick and very positive steering was impractical for heavier cars unless they were to be driven by Sumo Wrestlers.

At Left: The little oil cooler under the radiator of the Spirit seems to be a token effort at trying to keep the internal fluids at a reasonable temperature.

But eventually hydraulic power was applied to the system and the wrestlers were no longer required. If you doubt me put your Shadow on a gentle slope, switch off the engine, release the brake and try steering it!! In fact we had a local near accident with a late Spirit whose engine had the happy knack of cutting out for no particular reason. It did this on a roundabout while being driven by, shall I say a fairly substantial lady and she just managed to get the car to safety and stop. A mere slip of a gel would I suggest be in major trouble! For reasons we mere mortals are not privileged to know, the Factory designed their own rack and pinion steering which has been a source of trouble from the day the first Shadow II went on the road. And it is still a problem!

At left: One reason I do not remove and replace racks for recreation is the small task of trying to hold the unit which must weigh some 40 lbs while you are trying to thread the pinion shaft onto the end of the steering column and then start at least two of the 4 large bolts that secure it to the sub frame. The plastic tie strap seen poking out on the right of the picture is my method of loosely supporting the thing while you swear and grunt. The large straps are adjustable and are more than adequate to take the weight.

As I mentioned, a contingent from the Australian Club is wending its way to Darwin following the very successful Federal Rally in Orange. Included are no less than two SZ cars both of which are leaving a trail of oil from their leaking racks! There have been three iterations of these assemblies, the last in the early nineties. They never fail as such, they simply leak Repairers are apparently limited in the range of seals they can use and most of them will tell you that the seal technology is in the historical category. Then there is the general design in that the whole structure is bolted rigidly to the front sub frame on which is mounted the entire front suspension. Obviously this frame flexes with the various loads placed on it and if it flexes so must the steering rack. Surely it is asking a lot of a seal to keep high pressure oil in its rightful place when the shaft on which it is trying to seal is writhing around like a demented rattlesnake!

If all that were not enough consider an exhaust pipe running alongside of it which in the case of a roaring turbo would be a glowing cherry red. Despite attempts at shielding, the oil in the steering system would have to be, at times, the hottest in the whole car despite the pathetic little oil cooler strapped to the front of the sub frame.

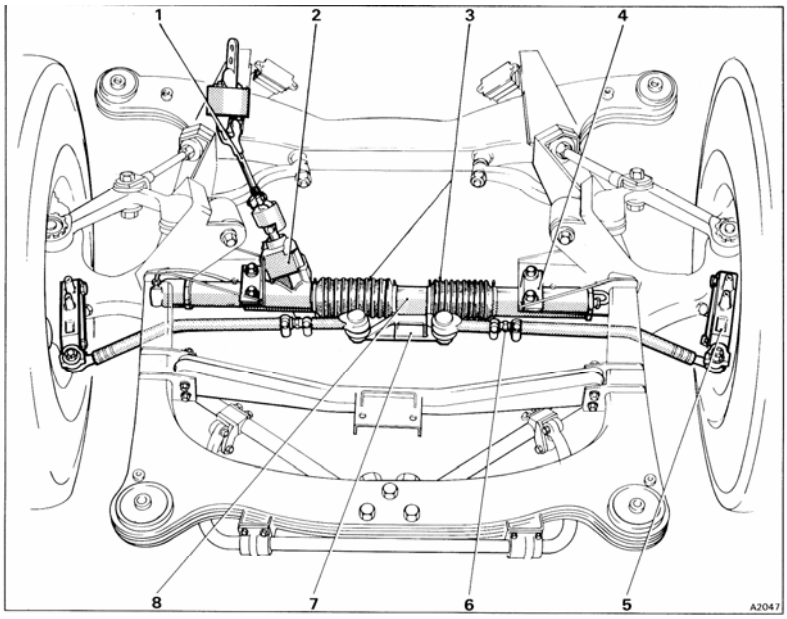
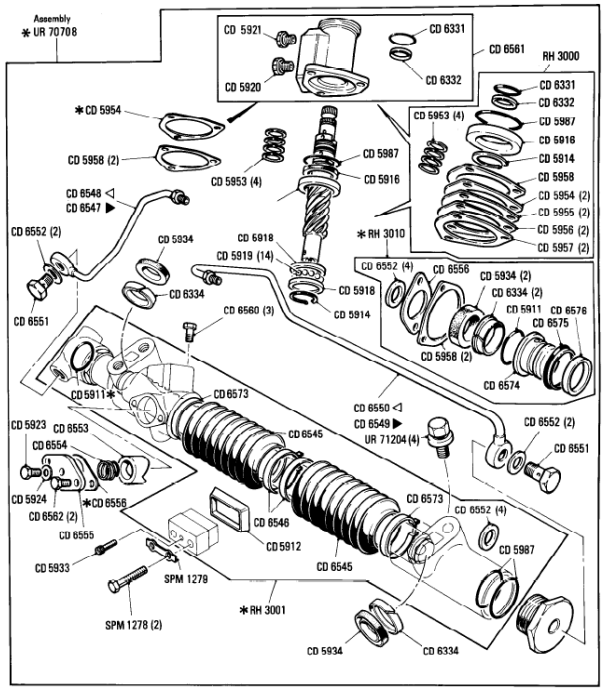


Fig. N2-1 Steering unit mounted in sub-frame

1 Intermediate link
2 Spool valve and pinion
3 Convoluted seals
4 Steering to sub-frame attachment
5 Side steering lever
6 Track rod adjuster
7 Inner ball joint bracket
8 Centre tube and seal

I understand that the largest rack supplier in the United Kingdom last year sold over 200 replacement racks!! So where does that leave us?

Apparently there are a number of people working on the problem particularly in the seal area where most if not all the problems occur. For the moment all the hapless owner can do is keep an eye on the consumption of power steering fluid which should be virtually nil. He can also keep an eye on the convoluted seals on the rack which tend to bake hard and split. When this happens the rack needs to be removed and sent to a specialist for repair. If power steering fluid leaks from the seals the rack is in clear need of an overhaul.



A closing piece of advice is don't use additives in the hope of sealing off the leaking seals. The seals that are leaking are plastic and won't be affected but other seals will and have been known to expand so much they have damaged components.

At left: The spares schedule lists the consumables , the alternative is buy the whole rack . The Shadow II was the first car to use this equipment and well I remember the hapless Factory Supervisor telling me how there were strikes at the rack manufacturers and the petrol tank manufacturers, just when the model was to be presented to the World! Apparently the Factory yards were strewn with cars sans tanks and racks as they cannibalised them to get sufficient for the presentation. The late Don Appleby of the former York Motors tells of opening the container with the very first Shadow II for Australia packed therein, to be greeted by this lovely new car standing astride a huge pool of power

steering fluid. Not an auspicious start! If you have succumbed to the additive treatment you would be well advised to overhaul the whole power steering system. Replace all hoses high and low pressure, have the pump overhauled as well as the rack and thoroughly flush the system to remove all traces of the contaminant.

Richard Treacy our Switzerland expatriate now advises he has had it, being on his third exchange rack so has dismantled the latest leaking one himself.

At left: The dreaded spool valve which controls the amount of hydraulic assistance to be supplied to the rack. The splined shaft connects to the steering column. This bit of the assembly seems to require more precision in setting up than a Swiss watch!

He is now consulting with various authorities and hopefully we will benefit from his observations. The opening pictures are of his rack dismantled. My experience? apart from removing and replacing the units, none. But only yesterday I had a call from a friend down the coast who has a leaking rack. I had it professionally overhauled not four years or 90K kilometres ago!!!

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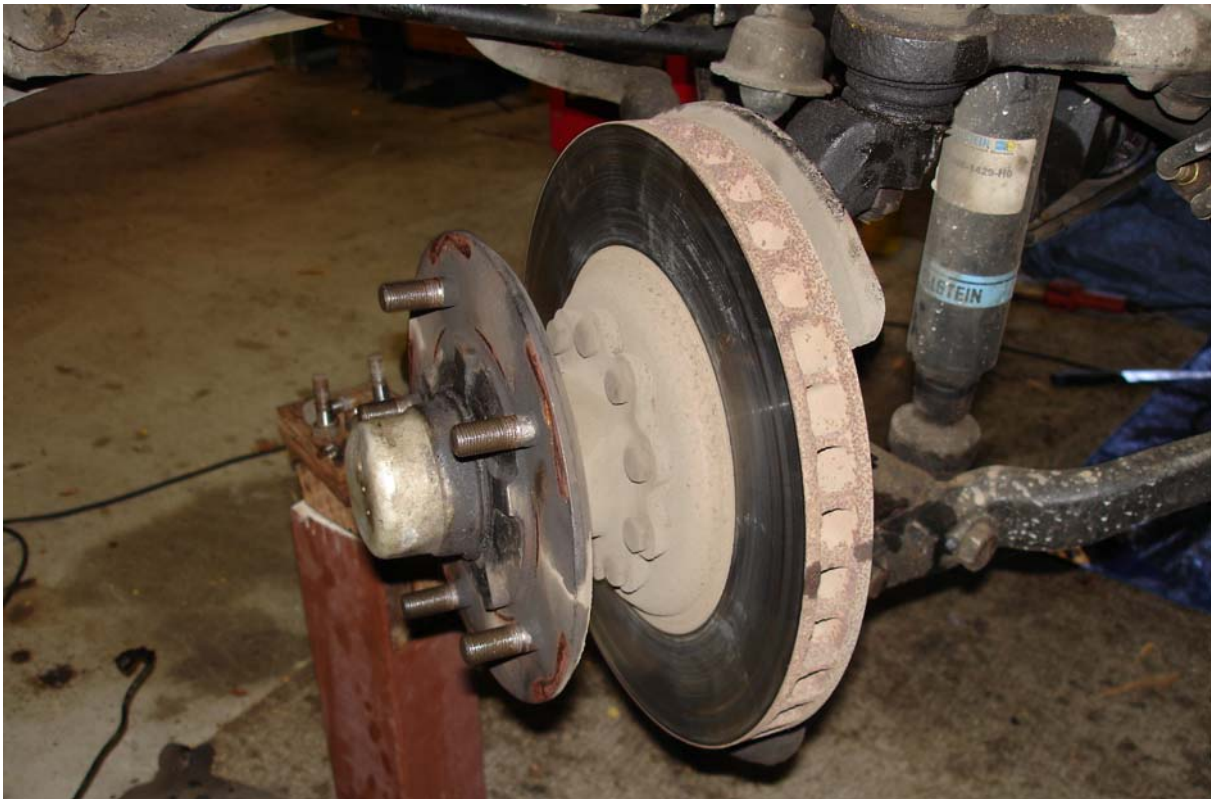
A LITTLE DISK THERAPY



These little discs as you know are one of the man made things between you and God! We seem to forget their task and the loads we place on them so let us hark back to our days studying physics, at least at high school level, since beyond that in my case is lost.

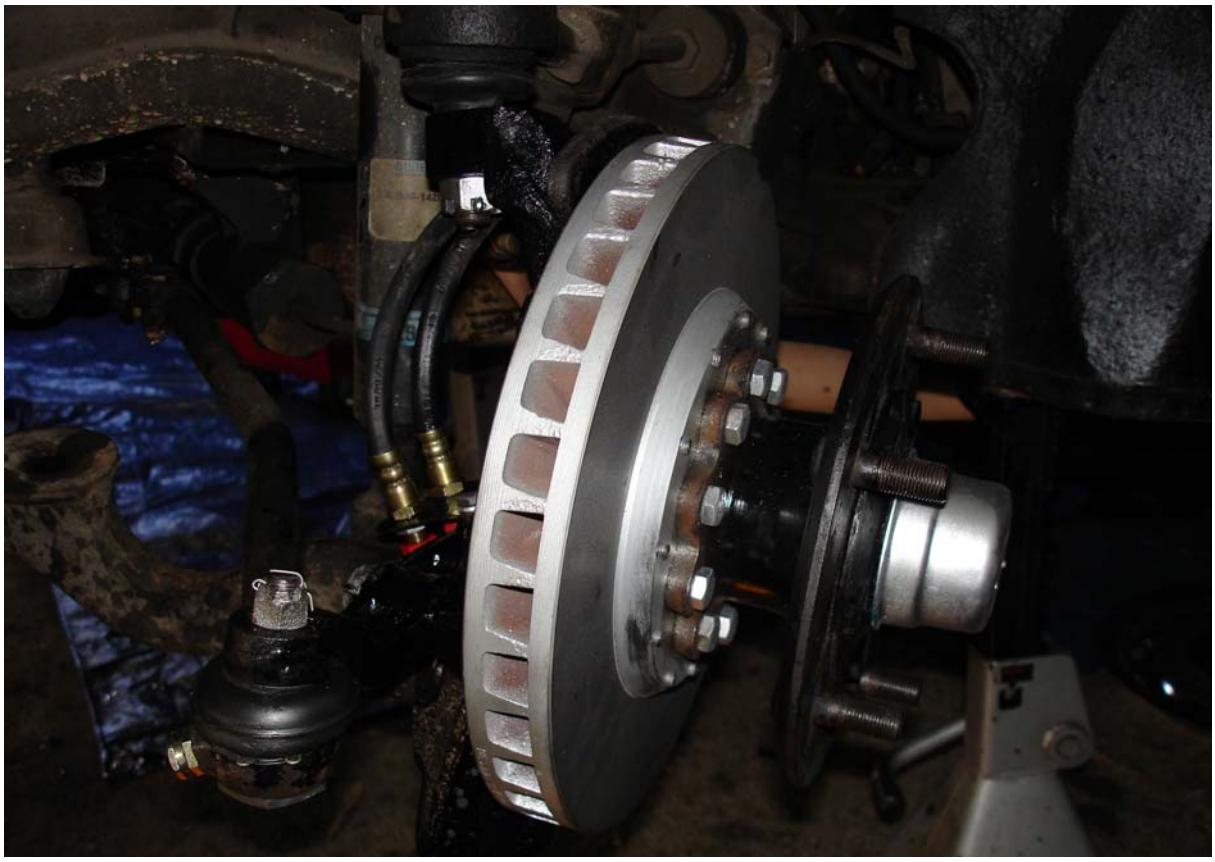
'Energy cannot be created or destroyed' roared some savant (I think it was Mr Newton). Kinetic energy, the result of a mass (say 2 ½ tons of Bentley) screaming along at 150 mph is a good example. To get the Bentley to that speed involved burning a heap of fuel giving thermal energy which in turn through an explosion, created kinetic energy which pushed the pistons to make the car move.

At left: The basic hub on which you rely to stay alive. Nestling down inside you will see the outer cone of the inner wheel bearing. When brake rotors are replaced it is not a bad practice to replace both the inner and outer bearings. They are not expensive and although they wear well it is a nice bit of prophylaxis to replace them. It is also a good time to carefully inspect the wheel studs lest some zealous tyre monkey has laid into them with a rattle gun and screwed the life out of them.

So a gallon or so of chemical energy (petrol) was converted into kinetic energy. To stop the car we apply the brakes. This involves extracting the kinetic energy from the car by gripping the brake discs with some considerable ferocity and what happens to the kinetic energy? – it is converted into heat energy. The brake discs you see above after performing this stopping task would be so hot they would they would glow, hence the elaborate venting holes. The heat is dissipated through the suspension, the hubs the wheels and even some to the tyres.

At left: Old and new replacement rotors. Notice the difference in thickness due to grinding. The old rotor in this case was well below the minimum required thickness. The new rotor in this case was manufactured for R A Chapman Automotive in Melbourne, the only after market supplier of brake drums and rotors for our cars.

Meanwhile the brake pads are desperately gripping a red hot spinning disc, trying to dissipate the heat through the body of the callipers back to the stub axle without boiling the brake fluid. As you know this takes a toll, not only of the brake pads, but also the brake rotors themselves. Modern day pads being devoid of asbestos (a mineral quite impossible to burn) contain some abrasives that one wonders why they do not reduce a brake rotor to iron filings in the next 10 miles. It is indeed a wonder.



Above: The rotor and hub have been bolted together the wheel bearings packed with grease fitted and adjusted and the callipers are now to be fitted. Before the assemblies were mounted on the stub axle they were delivered to a brake specialist who is equipped to very lightly skim the new rotor so that it is exactly true and at right angles to the stub axle. R A Chapman actually provide a small extra amount of metal on the rotor to allow for this 'truing'.

Brake rotors are bolted very firmly to the hub of your car which in turn runs on very precise taper roller bearings on the front stub axles. All this construction must finish up with a maximum 'run out' of .002" across the face of the rotor. If there is any more, you will feel it in the pedal or in the body of the car. The callipers are trying to push the pads firmly onto the rotors but lo they move away and then move back . The pads following this dance transmit this movement back through the brake fluid. In a Rolls-Royce you will not feel it in the pedal because of the peculiar brake setup but you will feel the car jerking as it slows down. Then you will know you have warped rotors.

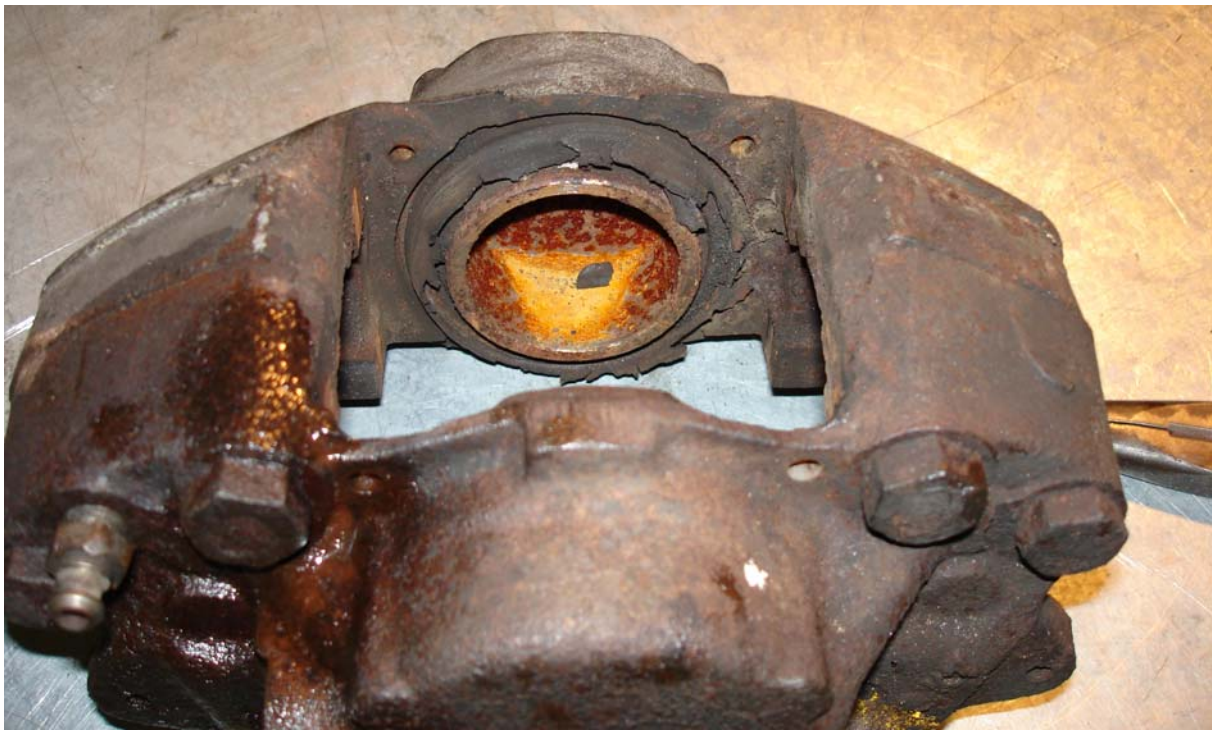
At left: An internal view of the Chapman Rotor. Note that it is comprised of two pieces, a small hub and the brake 'disc' itself, the two being bolted together. This is considered a more substantial method of connecting the two pieces and in addition when the 'disc' is worn out it can be unbolted and a new one fitted to the hub. This is a considerable saving as the central hub is the more expensive item to manufacture.

Below: For comparison, the genuine item which uses a method of crimping the 'disc' to the hub. Unfortunately the crimping is subject to rust particularly on cars imported from the UK to the extent that the 'disc can shear off the hub!

How can this happen you say! Well the common cause is cold water. You have just come screaming down a series of hills applying your brakes with gay abandon (no sexual connotations intended).

The rotors are verging on a temperature on which you could fry eggs and then your wheel hits a puddle of ice cold water which deluges the rotor. Sometimes you will actually see steam coming out from under the mudguards!!! Steel castings at high temperatures do not like that sort of treatment and tend to get a bit confused molecularly and lo you have a wobbly disc. It can usually be corrected by grinding so that the finished surface is exactly at right angles to the stub axle and then you can enjoy a smooth stop!!!

There is virtually no maintenance for a brake rotor other than a light papering of the surface when you replace the pads and keeping the whole assembly reasonably clean. The latter is done by simply hosing out the callipers and discs thoroughly when you wash the car. This removes the brake dust and makes the whole system function more efficiently.



Above: While you are at it, have you had a good look at your callipers lately? Unlike disc brakes they really give very little trouble. Giving them a good clean with a strong hose and keeping an eye on the rubber boots is about all that is required apart from ensuring that there is plenty of meat on the pads.

Here it seems nobody bothered to look at the boots on a 1978 Shadow II. I suspect they are the originals. Note the burred bleed nipple. Please don't do that!

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A SCREWED UP SUSPENSION

David Hughes kindly sent me some photos of bits of the front suspension from his early Cloud I which sports a one shot lubrication system. I went through this seven years ago when I dismantled the S2 so I had to air my knowledge in this area.

Designing a suspension must be an engineering art. Not only does it have to withstand the torture of the roads, but it has to operate within fairly close dimensions to keep the car roadworthy and there is the small problem of comfort and handling.

At left:- Part of the rather ingenious supporting system for the front springs. Note that the top of the spring is ground flat but the bottom is simply cut off. The later fits into a dinky little hole in the support plate shown here. Being picky, the Factory were very fussy about not having paint between mating surfaces particularly around bolt holes. The easiest way to fix this is after painting wack a suitable size rotary brush in the power drill and polish off the offending paint.

There is an environment for rapid wear given the loads and environment in which the system has to operate and lastly there is a need to, as far as possible, insulate the occupants of the car from the racket drummed up underneath.

At right:- The lower control arms with the threaded piece seen in the previous picture removed. Note the relatively light structures of the suspension. This was beefed up considerably in the S2 and S3 chassis.

Development of materials and metallurgy have greatly broadened the art but it is interesting to see the development in our cars. The good old Mark VI used silentbloc bushings on the innermost mounts on the lower control arms, a rubber tennis ball on the end of the torque tube where it clung to the underside of the chassis and another silentbloc bush at the top of the stub axle where it met the shock absorber arm.

The remaining bearing at the bottom of the stub axle used those intricate rollers in a specially made housing hopefully swimming in a bath of oil from the central chassis lubrication system. When the Cloud finally emerged the designers decided to use screwed bearings on all the front suspension joints. They were not new to Rolls-Royce as again Mark VI lovers who have pulled the rear shackles to pieces will know. The threads are not close fitting since they have to rotate as a normal function. The total wearing surface however is much greater that a plain shaft and bush. There is a need however to have the two pieces always under tension otherwise they would rattle!

If these screwed bushes are kept well lubricated they should last forever. Unfortunately unless you do your own greasing you cannot be sure that the grease is getting to where it should.

At left:- a typical threaded bearing used on all the S series. The piece to the left screws onto the central mounting plate at the right of the picture.

Some 4 years ago I wrote in these pages the following:- “An oft-neglected accessory to the whole machine, grease nipples are not projections to force a grease gun against and grunt. Some months ago I pulled the whole front suspension out of the S2 mainly to clean it but also to renew the rubber dust seals that had to be perished after 40 odd years.

In fact most of them weren’t. Having removed the coil springs, always a task to raise the blood pressure and tension levels, I loosened the very large threaded bushes that screw into the lower control arms; no small task given that they are tightened to 250 foot pounds tension. When I came to loosen the lower, outer rear bush, the whole assembly came away in my hand. The thread on the main suspension pins had almost completely worn away obviously through lack of lubricant.

I had for the past I5 years pumped grease more or less blindly into the appropriate nipple but it had obviously gone everywhere but where it should be. An expensive result I can confirm.

NOTE: - To be read only by those involved with Silver Cloud and S series Cars

Assuming you do your own greasing, the procedure we followed to clear 'the plug' was a follows. We removed the tie rod from the steering arm, which allowed a socket, and break bar to be put on the rear screwed bush. It was very tight as expected put with the aid of a length of water pipe it came unscrewed. This was wound out about ¼ of an inch. The same procedure was followed with the front bush, which was easily accessible. These bushes screw simultaneously into the control arms (wishbones?) and onto the suspension lower bearing pin pressed into the yoke connecting the upper control arms with the lower ones.

The grease nipple on the underside of the yoke feeds through a drilling in this pin and into its centre, which has quite a large hole right through it. The grease oozes out of the ends of the pins and forces its way past the threads of the bush screwed onto it and emerges into daylight where the bush ends. There is only a small clearance between the end of the pivot pin and the end of the bush and it is here that we suspect the dried plug formed and prevented grease getting through to the threads in the bush. By screwing the bushes out say ¼ inch the plug could be pushed out and the newly available space filled with grease. Hopefully oozing out at the end of the bush. Screwing the bush back into the control arm and onto the suspension pin also forces the reservoir of grease out through the threads.

Notes for the unwary

There would be few owners that would have the size sockets, tension wrench etc needed for this task but we will list them below. If there is the slightest doubt that the grease is getting through liaise with your friendly garage man who will have a hoist and he can follow the above procedure.

Tools needed

Tie rod end splitter
I ¼" AF socket
6" ¾" drive socket extension
Tension wrench of at least 250 ft lbs capacity
Grease gun
Button Nipple adapter
Grease!
II/I6" set spanner
Side cutters to remove the split pins
Split pins

Data

Greasing a Cloud III recently I paid very careful attention to what and how much oozed out of the various joints as I pumped. I noticed the apparent lack of ooze from the lower outer joints. Removal of the grease nipple showed no fresh grease inside so a blockage was right there. But a new nipple produced no better result. The problem turned out to be a plug of grease that had gone quite hard with age. This was cleared and grease flowed as it was intended. Hopefully little damage had been done.

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COLLECTIVE NOUNS

My coining of the collective noun and using it as a 'Storm of Clouds' inspired some interesting samples. We all know about pods of whales a murder of crows and flock of sheep but Richard O'Dwyer passed the following on for your attention:-

Three Oxford dons were having a quiet ale in a pub. When in walked three young ladies of questionable virtue. The first don on seeing them said " Ah ha . There 's a fanfare of strumpets" The second said " I think not . It's an anthology of pros. " The third don said " No . You are both wrong. It's a essay of Trollops"

REASONS WHY ETHANOL BLENDED PETROL IS NOT RECOMMENDED FOR USE IN SOME OLDER VEHICLES

Nick Lang kindly sent in the following interesting snippet extracted from the March Newsletter of the Honda Club of Victoria. He mentioned a case he had last year of a carbureted Turbo Bentley that had seriously suffered from ingesting ethanol. The cost of repairs amounted to some$4000 which co-incidentally was the cost of conversion to gas. The owner opted for the latter and the result was reportedly excellent.

Introduction

The following information outlines the key reasons why vehicle manufacturers do not recommend the use of any ethanol/petrol blended fuels in vehicles made before 1986. This information is also applicable to post-1986 vehicles listed as unsuitable to use ethanol blended petrol.

Ethanol has a number of important chemical and physical properties that need to be considered in a vehicle's design. Vehicles made before -1986 did not anticipate that ethanol would be blended with petrol and therefore were not designed for its use. These same vehicles are nearly twenty years old and the technology used has limitations when it comes to being able to compensate for the effects of ethanol. The materials in these vehicles have also been subjected to at least twenty years of wear and tear and are consequently more sensitive to the effects of using ethanol/petrol blended fuels.

Carburetor Equipped Engines

Vehicles made before 1986 were predominantly equipped with carburetors and steel fuel tanks. The use of ethanol blended petrol in engines impacts the air/fuel ratio because of the additional oxygen molecules within the ethanol's chemical structure. The oxygen content of ethanol is 34.7% which causes the engine to run lean. Being a mechanical device for supplying fuel to an engine, carburetors have a limited ability to compensate for this additional air. The consequences of which are the potential for pre-ignition, which will not only impact drivability but may also lead to engine damage.

Vehicles with carburetor fuel systems may experience hot fuel handling concerns. This is because the vapour pressure of fuel with ethanol will be greater (if the base fuel is not chemically adjusted) and probability of vapour lock or hot restart ability problems will be increased. As a solvent, ethanol attacks both the metallic and rubber based fuels lines, and other fuel system components. Materials compatibility is a critical concern and unless the fuel system components have been selected on the basis of compatibility with ethanol, there is the serious risk of loss of function, resulting in the failure of plastic components in a fuel system.

Ethanol also has an affinity to water that can result in corrosion of fuel tanks and fuel lines. Rust resulting from this corrosion can ultimately block the fuel supply rendering the engine inoperable. Water in the fuel system can also result in the engine hesitating and running roughly.

Fuel Injected Engines

In addition to the issues mentioned above for carburetor equipped engines, the use of ethanol blended petrol in fuel injection systems will result in early deterioration of components such as injector seats, delivery pipes, and fuel pump and regulator.
Mechanically fuel injection systems and earlier electronic systems may not be able to fully compensate for the lean-out effect of ethanol blended petrol, resulting in hesitation or flat-spots during acceleration. Difficulty in starting and engine hesitation after cold start can also result.

Exhaust And Evaporative Emission Levels

Lean-out resulting from the oxygenating effect of ethanol in the fuel may affect exhaust emissions. Of more concern is that fuel containing ethanol can increase permeation emissions from fuel system, components, particularly those that have aged for nearly 20 years.. Therefore the increased vapour pressure of fuel with ethanol (if the base fuel is not chemically adjusted at the refining stage) will lead to increased evaporative emissions.