TEE ONE TOPICS

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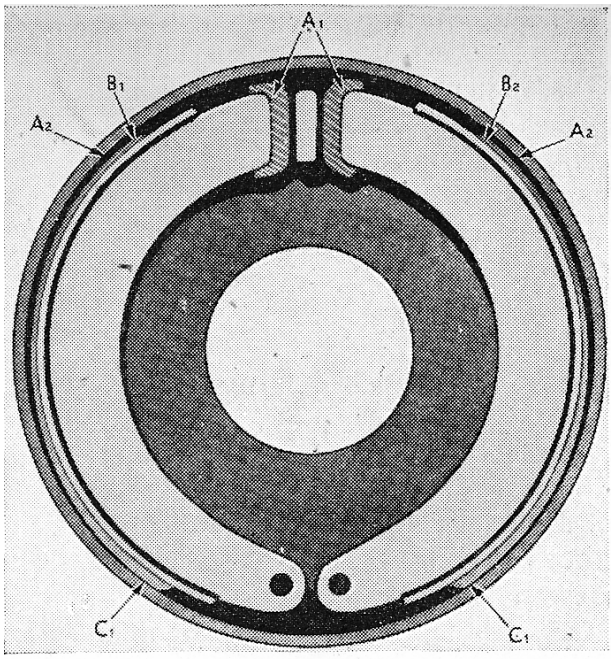
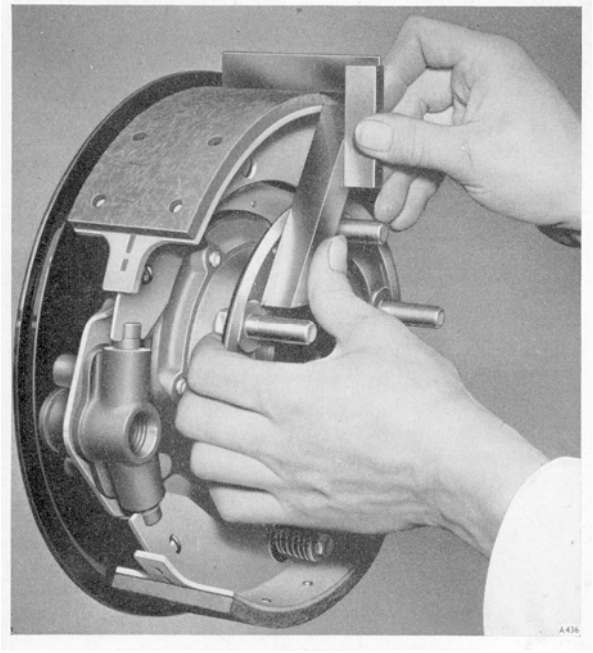
WHEN THE USE BY DATE OF THE USE BY DATE EXPIRES FOR A SET OF BRAKE DRUMS!

I love doing 'I told you so' scenes. Not that they come up very often but in immediate post-war language this was a 'bottler'. Six years ago I told the owner of a Cloud III that the drums on his car had been ground to their limit and beyond. At the time only Factory replacements were available which currently are running at about $1400 each. The drums on all 'S' series cars are the same front and rear which is one blessing. He not surprisingly stalled considering you could buy a nice small car for the same amount of money. One big difference between rotors and drums is lining area employed which is much less on rotors. To compensate, the pressures applied to the 'lined' pads are much greater than that employed with brake shoes. Even so in the latter case the object is to get as much lining to contact the brake drum.



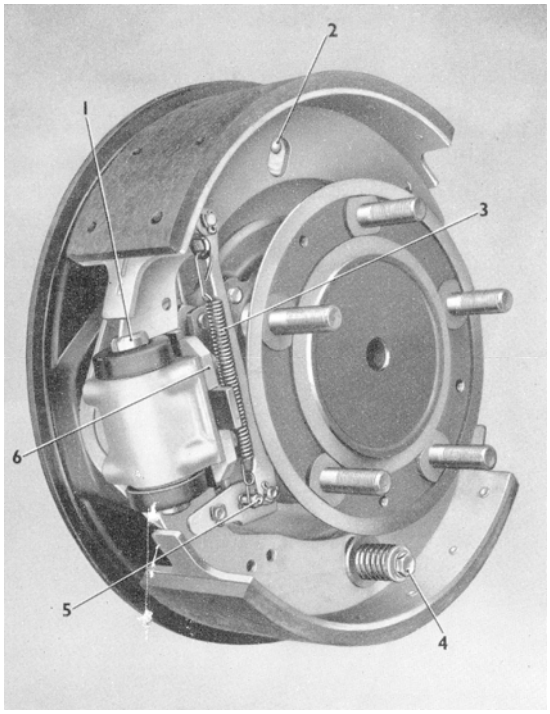
At left is a diagram showing the diagrammatic layout of brake shoes and drums. The shoes are mounted on pivots at the bottom of the system and are expanded at the top. The difference with the brakes fitted to 'S' series cars is that the expanders in the front wheel brakes are hydraulic and at the rear they are hydraulic and mechanical. From the diagram you will see that the shoes pivot around mounts at the bottom. In practice the pivots are actually the adjusters as can be seen at the right. Even though the 'pivots' for the shoes here can be moved in and out by the adjusters, they still act as pivots since there is no way that normal braking action will move this end of the shoes towards the drum! So the adjusters when screwed out bring the end of the shoes as close as possible to the drum without binding (note point 'C' in the picture above. When the



hydraulic expanders push the rest of the shoe to the drum only about three quarters of the shoe is actually effective.

Drums like brake rotors wear but unfortunately not evenly. Noting the limitations brake drums already have it is important particularly when relining brakes to lightly grind the drums so that their braking surfaces are concentric with the wheels and at right angles with the axis of the axle!

The new diameter of an 'S' series drum is 11.250" from which the Factory allows you to grind out no more than .050". The drums of my problem car were .323" oversize! To date I had used thicker linings to compensate for the greater drum size and that seemed to work for a while.



At left:- This is the pushing end of the brake mechanism on the back wheels. The combined expander which is always operated by the footbrake and the handbrake when the latter is applied and the hydraulic double acting piston arrangement was common to a number of English cars. The equal wear linkages seen just ahead of the expander can be a swine to fit because most people only have two hands! One trick is to carefully apply the handbrake until the expander draw link seen poking out of the middle of the assembly, is level with its surrounds. You then have a clear gap to thread everything through. Don't forget to check the shake back stops where fitted and certainly don't lubricate them. If there is not enough friction the shoes will work their way away from the drum and the next application of brakes – there won't be any!!!

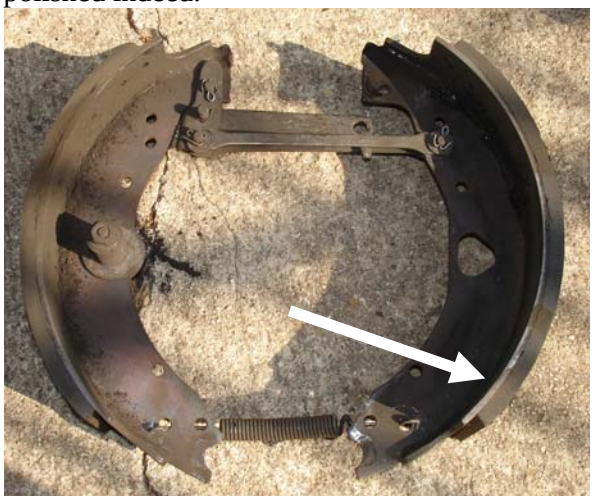
One obvious feature was the 'softness' of the brake pedal even though it was operating through a non-crushable solid metal linkage.
The internal friction area of the drums were very blotchy with odd blued heat spots. The 'spots' I would guess are some sort of pinning used to hold the drum together. It is not generally known that these drums whilst cast iron in common with most manufacturers products, actually have a steel liner inserted to minimise wear. On this car I think we have worn that liner to a point where the 'fixing devices' probably a form of rivet is now showing on the surface. All this has produced a friction surface that is variable in frictional properties and worn in God knows what direction.

The first indication of trouble was the car refused to proceed – backwards. Horror, delusions of transmission lock ups flashed before our eyes. But when driven a few feet forward then gently reversed no problem. The next event was noise. It was if the shoes had divested their linings and we had metal on metal.

At right:- The bright rubbing ring on the side of one of the rear drums.

Front drums off – plenty of lining, no leaks or broken springs. Rear drums off likewise but God intervened at this point and a stray ray of sunlight highlighted the edges of the brake shoes. They were highly polished. A quick

look inside the drums – there were bright rings around the sides of them. Even more interesting the bearing faces of the shoes – where they sit on the adjusters and the expanders were very brightly polished indeed.

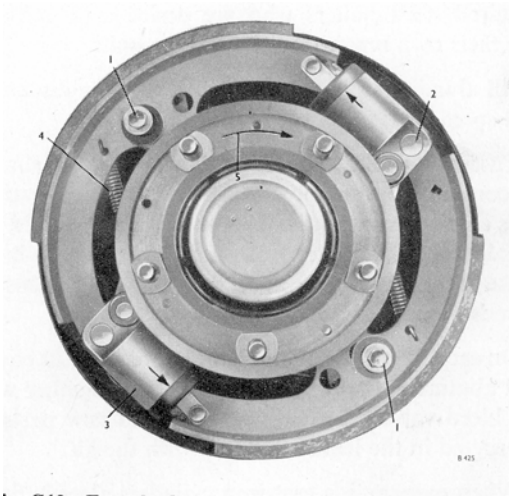


We were able to get one pair of new drums from R A Chapman in Melbourne who manufacture them for a third of the original price. They are apparently solid cast iron and do not have the steel liner peculiar it seems to Rolls-Royce. In short they are eminently suitable for the task.

At left:- Note the shiny abrasion on the lower edge of the right hand shoe.

The shoes were removed together with the equal wear linkage and shake back stops and taken to our local friendly brake man who mounted them in his shoe grinder. The task here is to swing the shoe in an arc across a spinning abrasive wheel so that the finished surface is uniform, at right angles to the shoe web and at a radius exactly matching the new drum.

Well this was an eye opener. One side of the lining was noticeably higher than the other and there were odd high spots all over the linings. This was all ground off (the linings were almost new) and the whole assembly assembled.. The rear brakes were then nigh perfect, the pedal had firmed up, there was no noise and stopping was very much more positive.



But the noise was still there albeit to a lesser extent and predictably it was now coming from only the front brakes! We are now waiting on another set of drums.

At left:- The front brakes are far more robust than the rear having much more work to do. The two single acting wheel cylinders are actually mounted on a separate carrier plate firmly bolted to the stub axle. Both shoes are self centring and both have shake back stops. It should be mentioned that the reverse problem can occur with shake back stops with cars that are seldom used. Here the stop glues itself to the web of the shoe and after the brakes are released the shoe remains firmly pressed to the drum. This usually doesn't stop the car but the smell of burning brakes is not pleasant.

The owner during all this was convinced that the noise was coming from the servo on the side of the gearbox and was the cause of the reverse jamming! We managed to disprove this by stopping the car with the handbrake and there was no noise. This proved that the grinding was no longer at the rear. We then jacked up the rear, ran the thing in gear and used the foot brake. Again no noise and stopping was perfect. This cleared the servo!

What we believe was/is happening is that the drums are so worn and worn so unevenly that the shoes are wobbling around during application. Eventually they are so worn they get a bias away from the car and slide over and rub on the side of the brake drum! And the reverse lock up? Well this is the result of shoes' toes being picked up by the drum and applying a self servo effect!

ARE YOU PUSHING OR PULLING?

I wonder how many of you would recognise the above. Up until the Shadow appeared, windscreen washer bottles were of glass, neatly clipped to the valance with neat Bakelite caps and rubber plugs and nicely coated wiring.

Unfortunately the output from the built in pumps and jets was only slightly better than a micturating grasshopper which was not a great deal of help at 100 mph with a windscreen that has just had the results of a passing Condor's incontinence. So the pumps were improved which meant more water and hence the need for larger reservoirs.

At Left:- And here is the little darling nestled in behind the left hand mudguard. The function of the top filler orifice is unknown and is normally closed by a cap!!! Note the gooseneck coming through the valance on the left of the reservoir!

Glass bottles are great but they break and are heavy so the then emerging plastic industry produced a suitable reservoir. Unfortunately when the vee eight squeezed itself into the Shadow, engineers were confronted with a fairly new problem – heat. Most plastics don't like heat and the new wash bottles were no exception. New Shadow owners fresh from a long high speed run down the highway, were horrified to open their bonnets to admiring service station customers while refuelling, to see stalactites hanging from the metal frame that used to house their windscreen washing equipment. I think there were three iterations before they got it right. But some radical engineer eyeing the Shadow's commodious body spotted the space behind the front wheels and seemingly

found a cool spot for a reservoir. Not only cool but there was space for one so large one could almost wash the car as well as the windscreen.

At left:-This is the filler plug end of the reservoir seen on most Australian delivered cars. The little black cylinder is the irreplaceable motor bit.

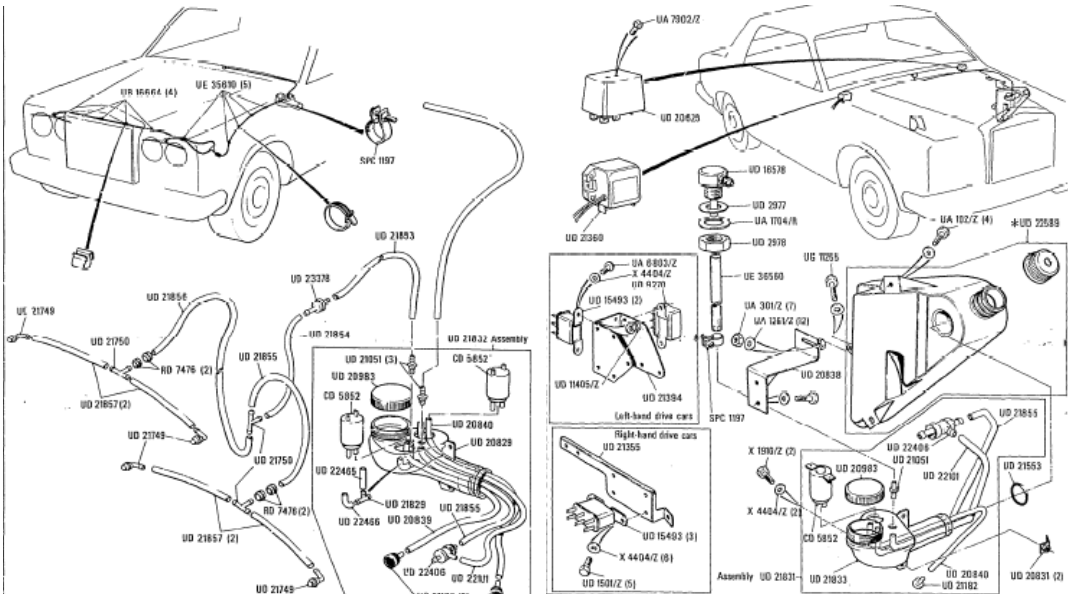
And that is what you are looking at on the previous page! To get the water in, a goose neck is inserted through a hole in the valance and one or more pumps were inserted beside the filler cap. The pumps were capable of sucking as well as pushing! Depending on the application they were connected to a veinous-like network of plastic pipes which dangled through the goose neck into the reservoir. The options coped with were obviously windscreen washing and as an extra, headlight washing which required a separate pump, lines, motors wipers and arms! Nobody has ever told me which country insisted on this standard but clearly we paid for it. Anyway the pumps apparently could for reasons we are never told, be no longer produced and no alternatives were offered. Some owners tried to fit after market units into the filler orifice but the resulting squirt was back to grasshopper standard!

At Left:- The system from Hell! The two rubber grommets hide holes where the two motors were originally fitted to handle squirt requirements for the windscreen and separately for the headlights. Neither are required now in the picture as the pump motor is now under the mudguard! The filler cap is yet to come, having been dispensed with by a previous modifier.

The reason is that most if not all pumps for this application are pusher pumps. If they have a continuous mouthful of water they can spit it out like a champion. One of our Canberra genius' therefore fitted a very ordinary pump to the reservoir direct which can be seen in the first picture.

The result is such that I had to replace a shattered windscreen twice before I realised that the jet was too strong!! Joke of course but the result is impressive. The price of a replacement reservoir by the way is approaching a big one!!!!

Our resident genius is mulling over the problem of the headlights. Seems there is a solenoid operated two-way tap on some car (yet to be recalled) which could be made to direct the appropriate squirt to the headlights. We will wait until he remembers!



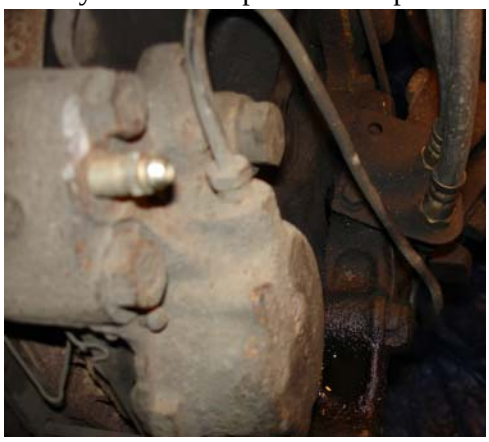
Above:- In case you thought I was exaggerating, the spares diagrams on the left is for the two washer system the one on the right is for the single washer.

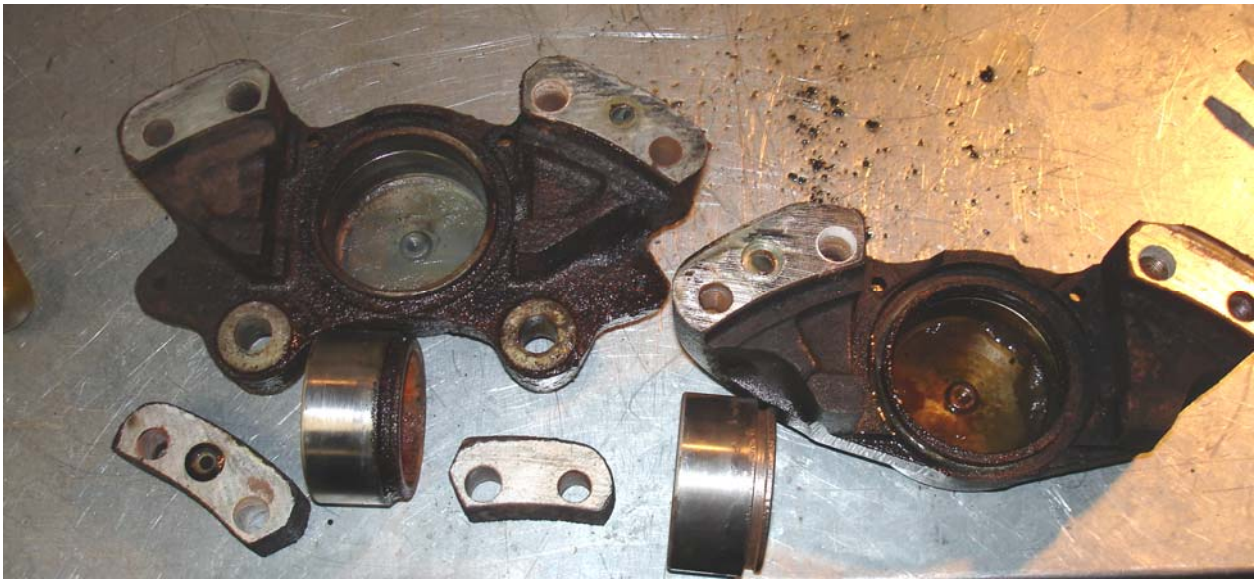
FILTHY HUB CAPS

The above has to be a great before and after picture. Taken of a T2 Bentley the cleaning was done simply with a scrubbing brush laundry detergent and hot water. The filthy deposit which occurs with all cars is brake pad dust which fouls up the suspension hubs callipers tyres and hubcaps. If only to prepare for the day when you have to change a wheel, once a month if you can find the time, whip the caps and wheels off, hose out the callipers hubs and stub axles and give the wheels a scrub front and back as well as the hub caps.

CALIPER MAINTENANCE

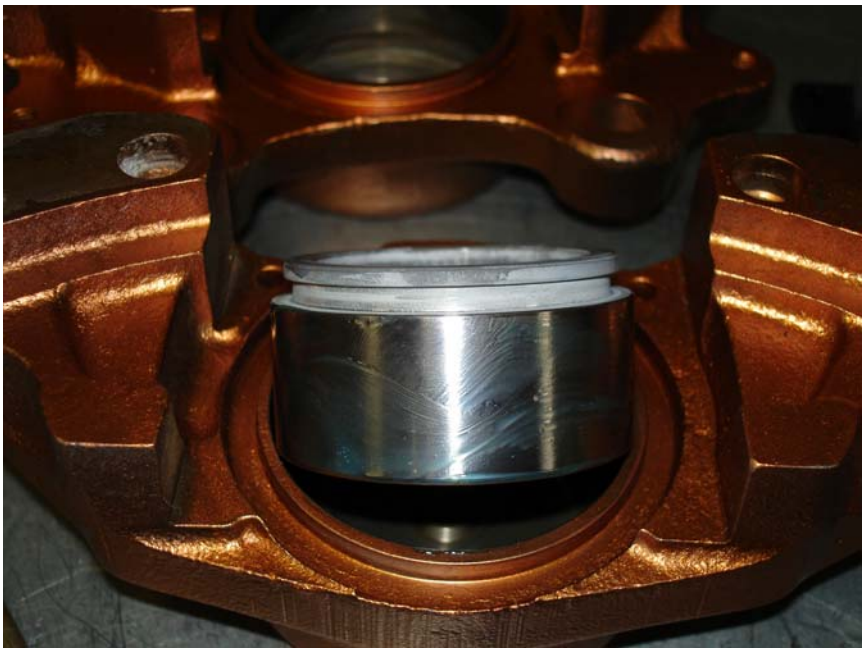
Aren't these pretty? Actually they are tarted up with a bit of good metal suitable spray paint to slow down the rust mites. Certainly not essential but then if you take a friend under the car you can gesture vaguely at your units and infer that only the most specialized operators do this work on your car. As to colour there has been a bit of traffic lately on the subject of green callipers. Sure an'all Patrick would be proud of the instigator or selector of that practice to be sure! I have not seen them on Rolls-Royces but apparently for illustrative reasons some callipers have been painted green to designate their intended employment with mineral oil. In my experience and humble opinion the move to this fluid must have been the best step ever taken with hydraulics. Some of the most neglected mineral oil systems have been dismantled and there they lay as good as the day they were installed!





But put good old RR363 into a mineral oil system and you will have one of the really big-time automotive disasters! Fortunately I have never seen an example but it has happened in this country. Extraordinarily there are still cars getting around with early filling devices which make addition of brake fluid to mineral oil cars quite simple. The parts for the modification are readily available and must rate as the best insurance against contaminating the systems of one of these cars!

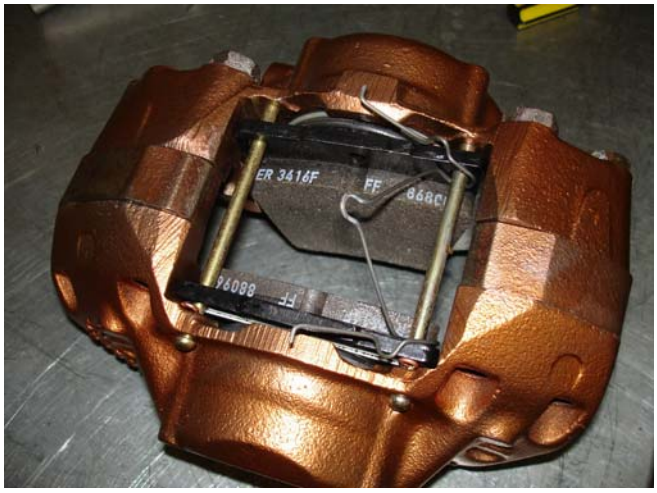
Callipers as we have seen in previous issues seldom need attention. Keeping them reasonably clean of accumulations of brake dust by a good hosing, keeping an eye on the rubber boots that they haven't become unclipped or punctured and of course checking that the brake pads still have adequate 'meat' on them to do their job. We have also mentioned that mineral oil callipers for some reason leak! If this occurs or the boots are torn or punctured then they should be overhauled, cleaned out and new seals fitted.

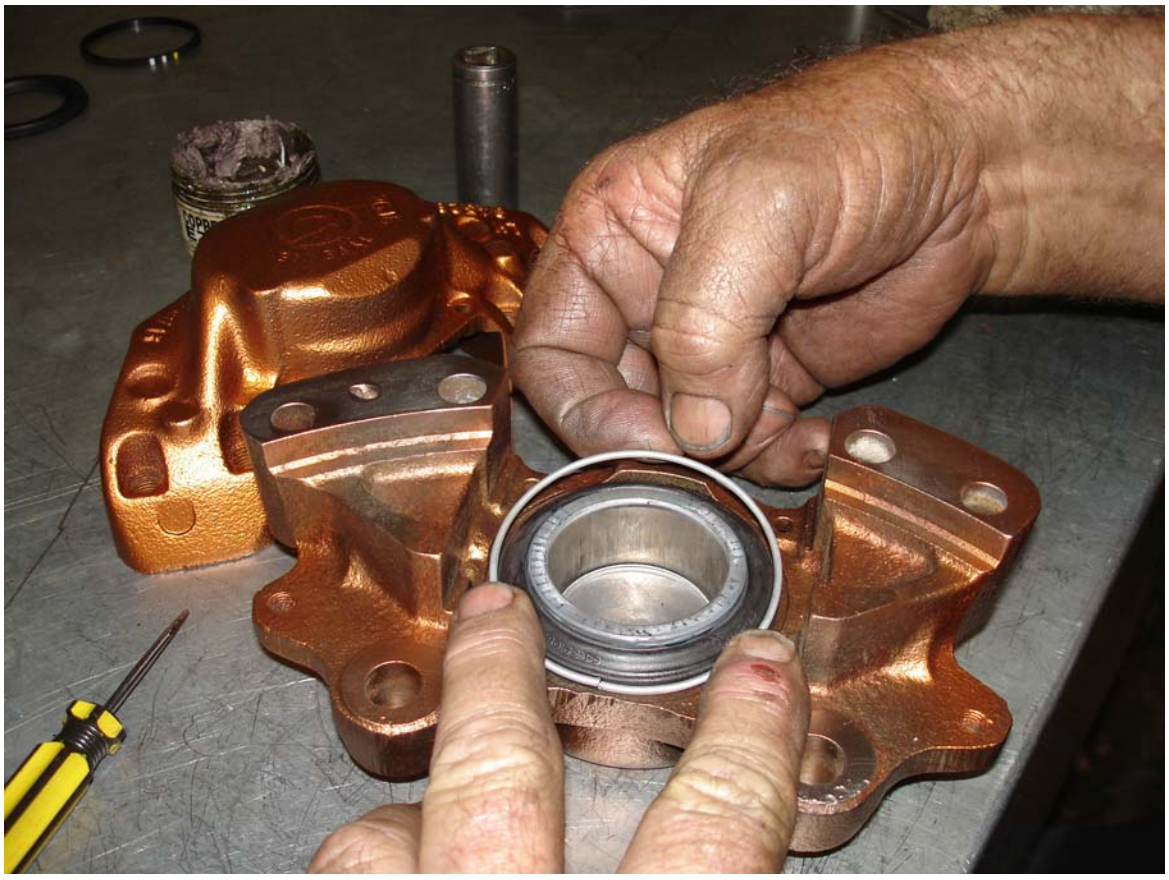


The callipers are simple to remove. Obviously, exhaust the accumulators then detach the supply pipes to the callipers. There only remains undoing two fitted bolts that hold the units to the stub axle and the calliper in your hands. If the brake rotor is worn and has a peripheral lip simply lever the pads back into the calliper body giving you more room to slide the callipers off the car.

If you are going to reuse the brake pads, mark them so that they go back where they came from. Probably not essential – just good practice. You will notice the callipers are in two halves held together by four bolts. The halves in turn are separated by substantial shaped spacers which allow the manufacturers to use the castings on different cars if required simply by changing the thickness of the spacers. For reasons I have never been able to ascertain, instruction manuals will always instruct repairers to NOT separate the two halves of a calliper. To not do so however makes them very hard to dismantle, clean and fit new seals. It is for that reason the repair kits do not include the special 'O' rings needed to seal the passage between the two halves. Fortunately these are available but unless your spares man is on the ball you will have to ask for them!

To undo the bolts securing the two halves you will need stout sockets and a long break bar since they are usually very tight. Having a substantial vice to hold them goes without saying. Having separated the halves the pistons can easily be withdrawn either with compressed air if you have it or judicious use of a couple of wide bladed screw drivers levering under the piston lip. Carefully undo the bleed nipple as these are often significantly corroded and can easily snap off.





To clean the bits I wash them in kerosene first to get most of the gunk off then thoroughly scrub them in hot soapy water which gets the kerosene and more muck off! Do a final rinse in very hot clean water and dry them well with towelling and preferably finish them off with compressed air. Now to contemplate the damage.

The pistons are your first concern. They are very substantial and plated on the outside to give a very smooth surface against which the seal runs. If the dust seal clipped around the top of the cylinder has not been broken and the wire clip holding it has not slipped off and the brake fluid has been changed regularly the outer surface of the piston may still be intact or at worst there may be some corrosion around the very top lip where the seal never reaches. Any corrosion below that point and it is a new piston you will be wanting.

The cylinders are usually recoverable by cleaning them out with a suitable rotary brush. If they are badly scored they can be re-sleeved. Pay particular attention to the seal groove. Any muck in there will cant the seal and you will get a leak. A dentist's pick is the best tool here!

Clean out all the passageways and run a tap down the threaded holes to clean them out. Finally, if you have a mounted wire brush polish the whole lot and give them a good coat of a suitable metal paint masking off the bits to remain uncoated!

The seal in the cylinders should fit perfectly with a little brake rubber grease (only if you are doing a brake fluid system) and the pistons should slide in under firm thumb pressure. Any more, pull the piston and make sure you haven't somehow picked up the lip of the seal. Push the piston almost right home and fit the dust seal. The inner lip sits in the piston and the outer one over the mouth of the cylinder. The latter is secured by a new circlip.

Make sure the machined faces of the calliper halves are clean, fit the special 'O'' rings and bolt the two halves together. Torque up the bolts as specified in the manual. You can then fit the brake

pads, anti-rattle springs, pins and clips on the bench which is much easier than doing it with your head jammed under the mudguard! It remains to rebolt the calliper to the stub axle connect up the brake line and bleed the system.

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SOME MORE RACKING NEWS

The following advice came in response to an emailed enquiry by our expat member Richard Treacy who is heartily sick of replacing steering racks in his car. Richard has written a detailed article on the subject for Praeclarvm which hopefully we can publish in the August edition.

Unfortunately, there is an issue with distortion of the rack tube due to the fact that the steering rack forms a structural part of the front sub frame on cars since the beginning of SSII in 1977. When a rack equipped SY or SZ is driven hard over rough roads or becomes involved with curbs or unintentional off-road use, the rack tube and housing are subject to bending and/or twisting moments which mean they not only may begin to leak but become poor candidates for reliable rebuilding as well. The progression of updated rack designs from the factory since SSII has been toward heavier and more rigid racks in an attempt to deal with this design flaw, although only with limited success. Until quite recently, the factory was mandatorily collecting cores for destruction upon delivery of new rack units to dealers. This apparently to discourage rebuilders.

I have personally spoken to Atlantic Enterprises and other rebuilders and they do check for trueness of the tube in determining rebuilding suitability, having learned the hard way. At the Rolls/Bentley dealership where I have been a technician for 28 years, we have never rebuilt a rack because we have no way to assess the precise straightness of the rack housing. A steering rack is an extremely safety critical item and a failure which caused a sudden bind up of the rack's steering ability at speed could be fatal.

As for observed durability of "rebuilt" Rolls/Bentley racks over the years, we have never installed one but have observed many. Usually, the bellows (boots) tear open within the first year or two because they use generic boots of weak rubber which lack the needed deep convolutions like the factory boots made of nitrile. Some rebuilders even use plastic wire ties to retain the boots instead of narrow metal clamps! Torn boots mean road dirt and grit bring a quick end to the internal seals and soon the rack is leaking again. Three to four years is the longest we have seen rebuilds last.
While we have never seen it, conceivably the right sized pebble could enter past a torn boot and bind the steering on the road. If an owner could supply the factory boots and persuade a rebuilder to use them, he might have a chance at some longevity.

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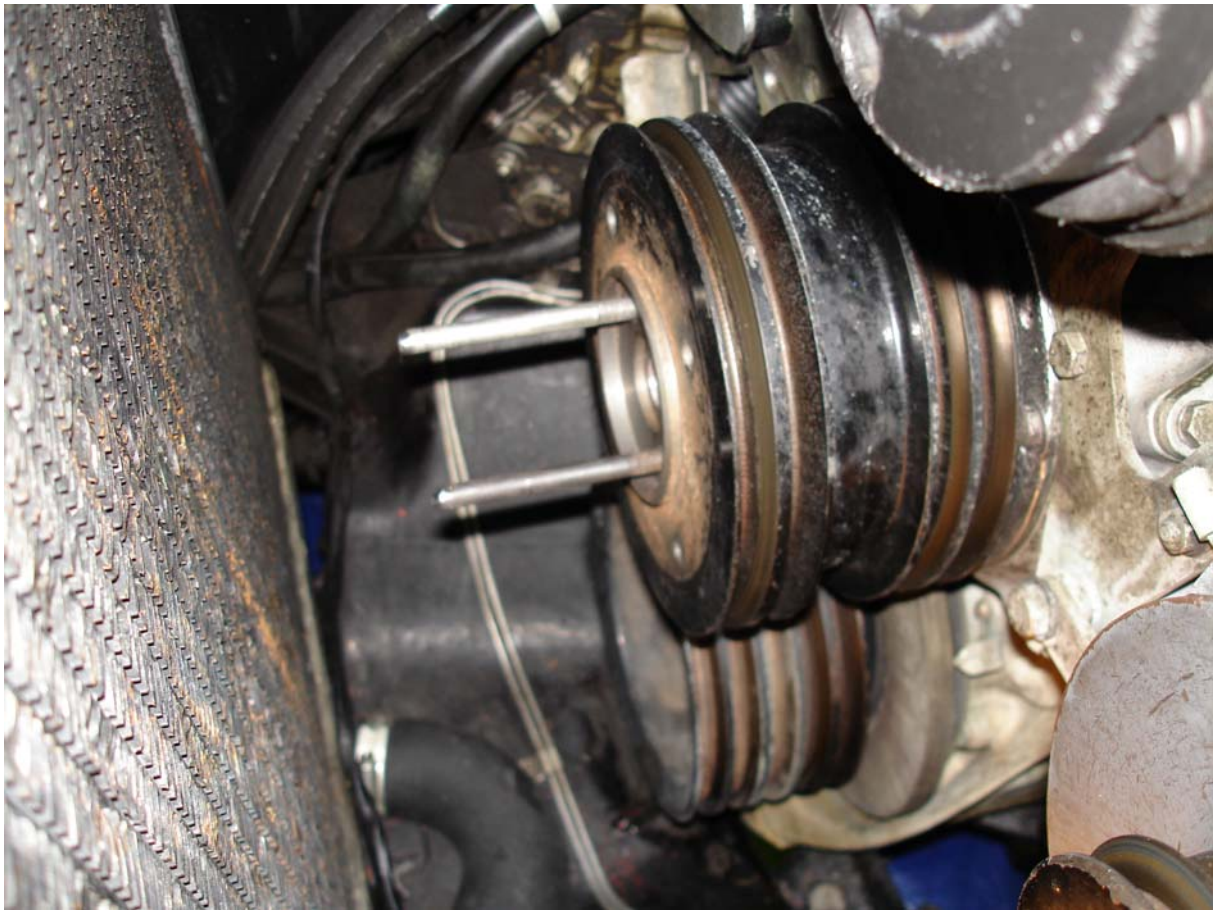
GETTING IT RIGHT AT THE FRONT END

When the Shadow emerged with its vulgar American mouth opening bonnet the purists were somewhat affronted. But those who have done it will know, all you need is a wife, two ½" A/F spanners and you can have the bonnet off and stored on the roof in under ten minutes. THEN you can really get at the engine and its entrails. Not so with its predecessor the Cloud /S series and its big Phantom brother. Three bolts two strong men and the two piece writhing bonnet with dangling air cleaner, has to be managed to a quiet area to compose itself; and then you still have to climb over that grille to get at its vitals. In this respect I refer to accessing the water pump and associated drive belt buddies! If you are vertically challenged (pelvis too close to the ground) you are in

danger of falling head first into the engine compartment. If of average height you will finish up with a very sore belly leaning over the beast. Best you make a platform that meets your needs.

Just getting a new set of drive belts in place is a challenge and no amount of accounts will assist in making the job easier. In the picture at left the water pump had a re-repair having been fitted initially with a seal, the carbon face of which was microscopically cracked. Here the pump has been re-installed and the drive pulley about to be fitted. There are various arrangements of pulleys and spiders (the thing they bolt to) but this one uses two bolts to hold the pulley to the spider then the four bolts holding the distance piece and fan viscous mount, in turn to the spider hold the whole thing together. Trying to reach in and hold a heavy pulley in exactly the right position required skills seen only with Houdini. Knocking the heads off a couple of appropriate bolts and screwing them into the spider at least simplifies the initial bolt up.



Clear evidence that there is a coolant leak. This is the deposit left behind from the genuine RR coolant available from your friendly dealer!

And while you are about it remember that little steam valve nestling in the top of your header tank or radiator top tank. It is difficult to test these for performance but an easy test is simply to re-route the overflow tube seen disappearing out the bottom of the picture, into a well secured container. Without overfilling the radiator and normal running there should be very little found in your catch can. If there is a lot suspect this valve. It blows at 15 psi!