



# THE REAR GEARBOX MOUNTING

R-R Silver Dawn, Silver Wraith Bentley MKVI, R type

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Very often I am asked what I consider to be the most important part that fails. Surprisingly to most owners I never mention brakes, engines, suspension or steering, but the rear gearbox mounting and its associate tie rod, rubbers and side torque reaction rubbers. Most owners have never contemplated the potential problems of such a mounting failure. Failure in this sense meaning either the complete parting of the mounting rubber from its normal bonded steel plate mounting or undue sagging usually caused by residue oil contamination.

Only two mountings support the total weight of the engine and gearbox, the front engine mounting under the coolant pump and the rear gearbox mounting. An imaginary line drawn between the two points passes through the centre of the rear crankshaft flange. The main mountings are assisted by the rear gearbox tie rod which arrests fore and aft motion of the engine and gearbox assembly, and the torque rubbers mounted between the cow's horn bracket at the rear of the gearbox and the chassis, which take side reaction torque. When mountings fail, it is not unknown on these cars, including Cloud I's, for the engine and gearbox to move forwards during heavy braking to such an extent that the engine fan "eats" the radiator matrix, a quite unpleasant sight! Any sagging of the rear gearbox mounting will place vertical loads on the side torque reaction rubbers and in some cases will shear the side torque mount adjusters. Anyone contemplating renewing the rear mounting should ensure beforehand that the side torque adjusters are slackened off and readjusted after the rear mounting has been replaced. The tie rod rubbers must be replaced at the same time as the main mounting.

It is vital for the owner to realise that any movement of the engine and gearbox will directly affect the brakes as the brake servo is mounted onto the rear of the gearbox. In a similar fashion the selection of the gears is affected on both the automatic and manual gearbox as is the actual gear change speed change points. In extreme cases automatics can be positively dangerous when running on the choke with the tie rod broken and the mounting actually sheared. If you have an automatic, you had better be sure the mountings are in good condition, you may believe the car is in neutral gear when the gearbox is in 4th gear. A fault once experienced by an owner I know who used his left foot to throttle the engine and demonstrate to a technician a sticking throttle linkage. The throttle linkage still stayed stuck on whilst the car went through the plate glass window of the car showroom, the gear selector showed the neutral position but the automatic gearbox knew it was in 4th! Both faults due to a failed rear mounting and tie rod.

Another problem little known is that the front joint on the main drive shafts of rear wheel drive cars exhibit a frequency vibration of 1900. This is not at all assisted by the drive shaft misalignment caused by the gearbox moving over to the right hand side when the brakes are operated with a failed mounting. The main drive shaft will vibrate due to the misalignment of the drive shaft and front Hardy Spicer joint.

Depending upon the severity of failure the following problems may occur as the gearbox moves fore and aft and side to side under the influence of braking, acceleration, gear changing or centrifugal cornering forces. Other problems will surface as the rear end of the gearbox moves in a downward direction as the mounting rubber deteriorates. This list is not exhaustive but is presented to high light some of the more common occurrences.

Excessive brake pedal travel and misalignment of the brake rods occurs. Very often the gearbox has moved so far to the right-hand side that the two servo rods connected to the balance trapeze arm have actual touched. This situation aggravates the already delayed action of the braking system when reversing the car as the engine and gearbox shunt back and forth under the influence of the brake servo. Owners should note



that the correct driving technique when operating these cars in a confined space is to apply the brake pedal lightly after starting to either reverse or move forward. This action rotates the servo to the correct direction mode and takes out some of the brake lag which is experienced.

On manual gearbox models, the internal gear selector lever within the gearbox can override the selector shafts and cause jamming of the selectors and gear lever. This usually happens when the gear lever is in reverse gear and the car is facing downhill, or the lever is set in a forward gear and the car is facing uphill. The situation is aggravated when the weight of the vehicle is taken on the gear train and drive shaft before the driver applies the hand brake. It is also possible to encounter this situation when the vehicle is moved away on inclines or at any time when drive shaft torque will revolve or move the engine and gearbox past their normal maximum positions relative to the gear change selector. Due to a failed mounting condition, the turning force (Torque) of the drive shaft partially revolves or moves the engine and gearbox more than normal against the gear selection cross shaft and end lever. The latter two items are effectively fixed to the chassis and the internal gearbox selection therefore overrides its normal position. In simple terms the selector lever jumps over the top of the selector fork actuating slot. Poor manual gear changes are experienced in operation due to misalignment of the gear lever and gearbox. Clutch shudder, due to misalignment of the gearbox to drive shaft and clutch linkage variation on clutch take up can also be experienced.

Exhaust system fractures and fouling of the system on the chassis frame can also be expected as can the breakage of the exhaust manifold at its junction with the exhaust front pipes. The latter situation is accelerated when the joint is under tension and no alloy under sheets are fitted, when water splash causes thermal shock to the manifold joint. Any fitting of the exhaust components cannot be carried out successfully when the rear mounting has deteriorated. Unexplained noises may show up during operation, particularly the fouling of the exhaust during certain vehicle movements.

Any car fitted with an automatic gearbox can exhibit fierce and unpredictable gearchanges, sudden down changes into second or first gear when braking to a stop are also particularly noticeable. These faults may vary according to acceleration, deceleration and to centrifugal forces during cornering. The drive comfort of the car can be upset on drive or over run conditions, as the gearbox and engine move position.

On R types an extreme foul condition can occur between the windscreen washer bottle or its holder and the intake primary manifold feeding the carburettors on S.U carburettor installations.

Unexplained sticking throttle situations occur as the engine moves out of position relative to the throttle linkage. This very often happens because the yoke pins and ball joints in the throttle linkage have suffered partial seizure due to lack of lubrication and cannot accommodate the extra angular movement demanded by the engine movement.

To protect the mounting from oil contamination it is possible to fit a double "Z" shaped alloy shield across the rear gearbox steel mounting bearer to deflect oil under the bearer. The total thickness across both steel bonded plates and the rubber of a new mounting is 1 inch. If the mounting sags any more than around 15 % under load or the rubber is in any way soft the mounting should be renewed for your safety!