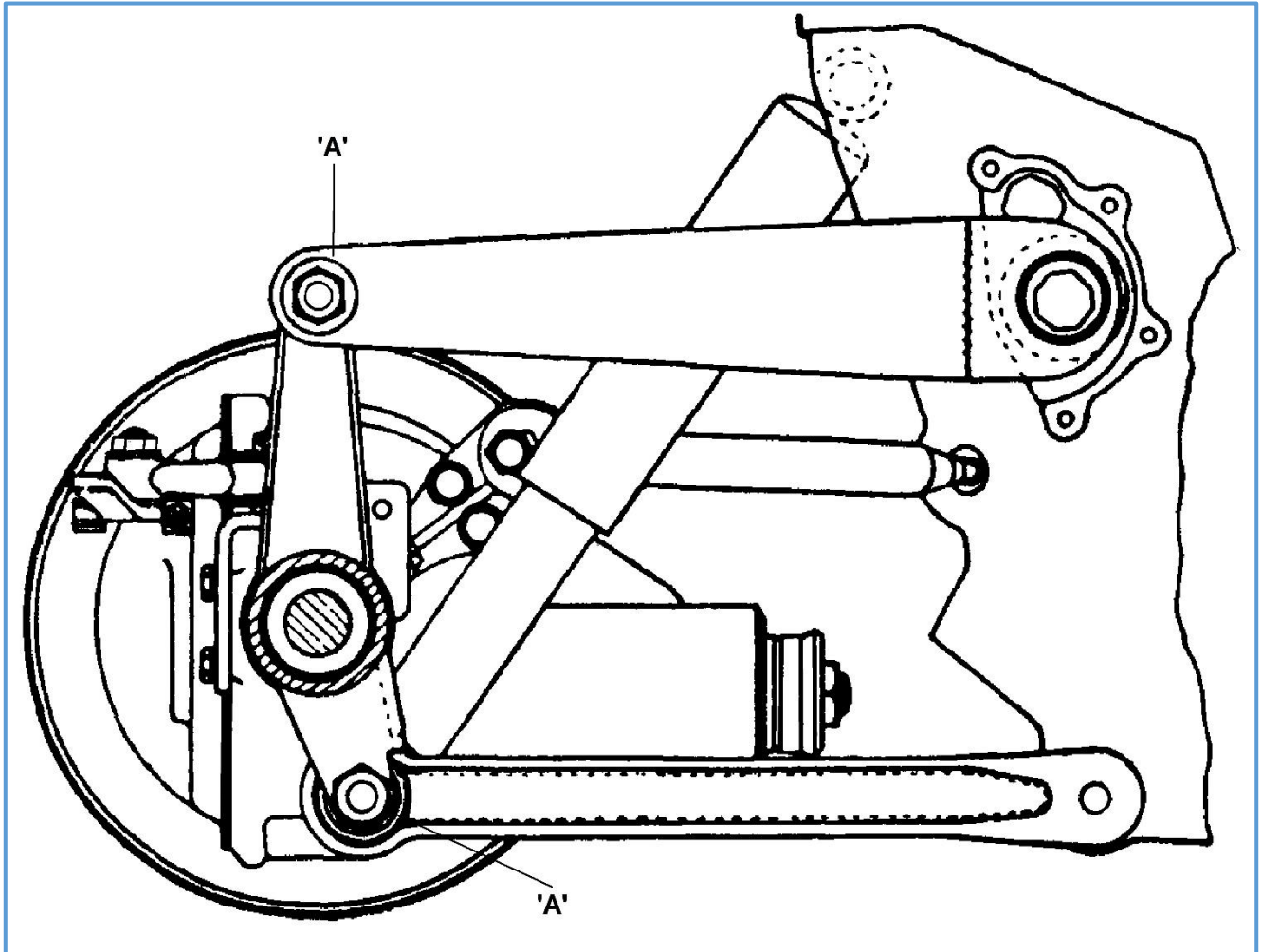


TECHNICAL NOTES SERIES

JOWETT JAVELIN – PA, PB, PC, PD & PE
JOWETT JUPITER – SA & SC



'A' Represents typical Silentbloc bush locationd.

– PART XXXI –

SILENTBLOC BUSH REPLACEMENT (ALSO METALASTIK BUSHINGS)

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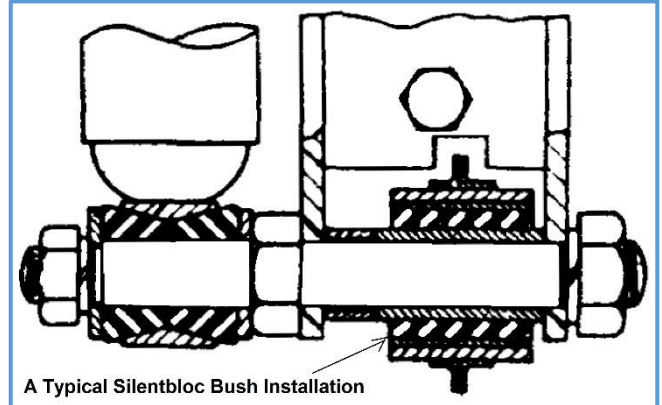
*Compiled by Mike Allfrey – 12th November, 2015.
Revised – April, 2017.*

SILENTBLOC BUSH REPLACEMENT

'Silentbloc' is a trade name for rubber bushes that are 'bonded' to inner and outer steel sleeves. Another trade name for such bushes can be Metalastik – with both names being commonly used in the motor trade.

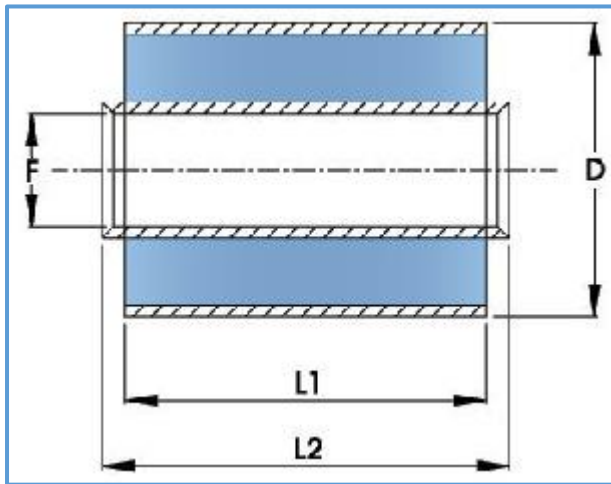
As a part of the preparation of my Javelin for the National Rally, the rear axle assembly has been removed so that new rubber bushes can be installed. It was when it came to removing the four Silentbloc bushes that are used at the rear axle ends of the rear spring arms and the lower links that a problem arose. The question was – how to remove the old bushes, that have been in place for fifty-four years, without the use of a hydraulic press and, more importantly, without damaging the bush housings?

Right: Figure 1. Showing, at right, a cross section of a rear suspension lower link. The rubber bushes at left are loose cone shock absorber bushes.



It was decided not to use a hammer of suitable weight and a drift of suitable diameter, because, in the case of the rear spring arm bush, Part Number 50259, the support bracket could so easily have been bent. With more than 120,000 miles of use and because of the age of the bushes, replacement was of great necessity. After due consideration and lengthy pondering, a decision was reached.

A Silentbloc bush consists of three components to make up the bush assembly – first, there is the outer steel tube, second there is a compressed rubber sleeve and, third, there is the central bushing. The outer sleeve is of thin wall section and its main function is to make the bush an item that can be conveniently installed by the average car mechanic.



Left: Figure 2. Showing the components that make up a Silentbloc bush assembly, where 'D' is the outer steel sleeve, 'F' is the inner steel bushing and the rubber section is shown in blue.

The inner steel bushing is of thicker wall section because it has to be capable of resisting the clamping force of the securing hardware. Also its smaller diameter has to cope with the twisting action of the rubber, as the body of the car moves up and down on its suspension. The outer steel tube, being supported by the component the bush is pressed into, uses the housing interference fit to resist the twisting action of the rubber – hence its tightness in the housing. The rubber provides a small amount of torsion springing action as well as isolating the axle assembly from the car's bodywork. The Silentbloc bush is also a method of attaching suspension components that pivot, but do not require lubrication. In production the rubber component is frozen in liquid nitrogen prior to pressing into place. As the rubber warms to

ambient temperature, it tries to swell, but is restrained by the outer tube and the inner bushing and, its length is carefully determined so that the rubber does not ooze out at the ends. This type of construction makes the bush assembly a very tight unit. There are also such bush assemblies that are constructed by a hot casting of the rubber component, these are known as bonded bushings. In Figure 2, 'L2' is the length of the inner steel sleeve, which, in the majority of cases is longer than the length of the outer sleeve 'L1'. This design provides working clearance when a Silentbloc bush is pressed home in a suspension component such as a Javelin's rear axle upright, which would be a snug fit inside the fork of the spring arm.

Right: Figure 3. A close-up of a badly worn and damaged bush assembly that is old and has been abnormally overstressed.

Figure 3, shows a graphic example of wear and tear suffered by a Silentbloc bush assembly. The rubber has obviously aged, and the inner sleeve has endured the trauma of loose mounting hardware. Because of its age, the rubber bushing would have hardened and transmitted shock loads to the loosely mounted inner sleeve. These sleeves are hardened to withstand the tight clamping force of the bolt and nut, to hold the sleeve tightly and prevent its rotation while the rubber is working as the isolating medium it is supposed to be.

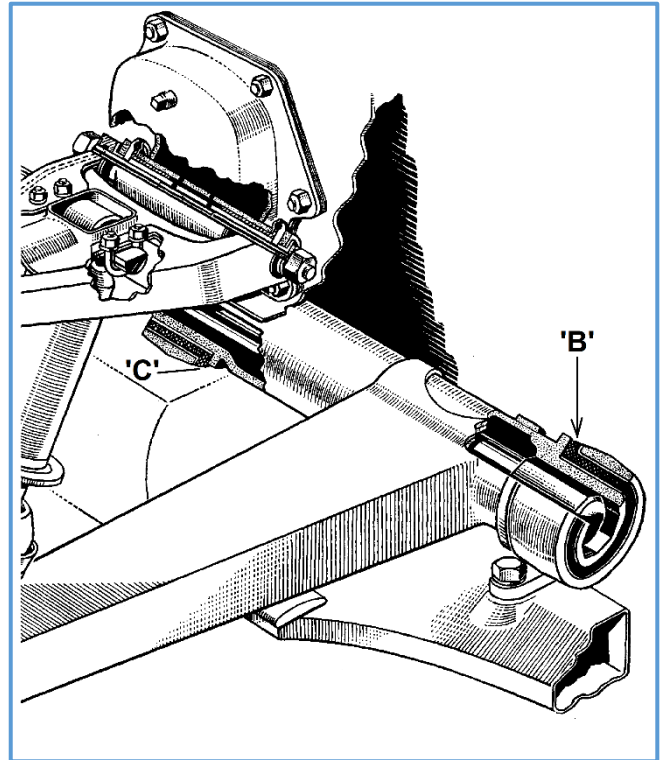
The approach to dismantling was to use a $\frac{3}{16}$ " diameter drill and drill out the rubber component by axial drilling. It was soon discovered that the rubber, due to its age, was very easy to drill out. Due to its age, it was quite crumbly and the drill on slow speed, passed through easily. It was also noticed that, as material was drilled out around the rubber bush diameter, there were weak spots. This suggested that the bush had deteriorated considerably under load. Once several drillings had been completed, it was a simple matter to grip the inner



bushing with a pair of vise grips and pull the bushing out. Once that was done, it was easy to extract the remainder of the rubber with a pair of pliers.

This activity had left the outer bush tube intact within the housing. A new coarse cut hacksaw blade was installed into the hacksaw, through the tube, and three longitudinal hacksaw cuts were carefully cut through the tube wall. Care has to be taken here, to ensure that the housing is not cut into. After making the three cuts, it was easy to, with a sharp cold chisel, to 'peel' out the cut portions of the tube. Once the tube had relaxed, it was easy to drive out. After cleaning up the bush bore in the housing, and filing away any burrs that the cold chisel may have inflicted, the housing is ready for the installation of the new Silentbloc bush assembly.

Right: Figure 4. Items 'B' and 'C' are the front and rear set of Metalastic bushings mounted on a front spring arm.



Fortunately, in some ways, the original spring arm Silentbloc bush is no longer manufactured. Our affiliated club in New Zealand have come up with a very effective solution to this problem. They were fortunate enough to have a quantity of the similar rear lower link Silentbloc bushes in stock. These bushes are slightly shorter in the major diameter and have a shorter inner bushing that accepts a $\frac{5}{8}$ " diameter bolt. The club supplies a pair of adaptor sleeves per bush, so that it will suit the $\frac{1}{2}$ " spring arm bolt. These adaptors come loose with the Silentbloc bush. The beauty about this is that a $\frac{5}{8}$ " draw bolt and sleeves can be used to pull the bush into place. A suitable $\frac{3}{4}$ " drive socket with an outside diameter just smaller

than that of the Silentbloc bush was placed on a bolt after first installing a thick flat washer. The bush outside diameter and the housing inside diameter were coated with Loctite Anti-Seize, this is an anti-galling compound which, hopefully, makes the bush easier to install. The assembly is then inserted into the housing and a suitable larger diameter socket placed against the housing, with more flat washers and Anti-Seize compound applied to the nut and thick washer. The bush was then wound into place, and it became immediately apparent just how tight the Silentbloc bush within its housing. This was really hard work, but once on the move it was best to keep the assembly moving. The bolt used was a Grade '8' $\frac{5}{8}$ " with UNC thread, the job would probably have been easier with a UNF thread form – provided a good quality nut was used. The bush was pulled into the housing until it was centrally located within the bore.

The use of sockets as puller adaptors is not really good workshop practice, but my lathe has moved to Queensland, so use was made of what was available in the workshop. Maybe someone can machine a set of adaptors for club membership use? What about one set in each State?

It should be noted that the fit of the Silentbloc spring arm bushes, in conjunction with the Panhard rod, is all that locates the rear axle laterally. It is for this reason that the temptation to 'open out' the housing bores to facilitate an easier Silentbloc bush fit, must be resisted.

The next step was to install the two adaptor sleeves, which were pulled in using a $\frac{1}{2}$ " diameter bolt, the sleeves must be pulled into the inner bushing until their shoulders rest firmly against the ends of the bushing. It is important to remember that, before tightening the Silentbloc bush hardware, the weight of the car should be on the rear axle. The hardware should then be tightened 'dead tight'.

All that remains now is for the rear suspension components and rear axle to be painted prior to installation. Where is that tin of grey paint?

Mike Allfrey.