



Bristol Austin Seven Club

Bristol Austin 7 Club - technical article

www.BA7C.org

The majority of these tips have appeared in club newsletters over the years. Please note that you use them at your own risk as neither the Bristol Austin 7 Club nor the authors can be responsible for the results of trying to follow the instructions given.

Sock absorbers - Ron Hayhurst

My recent interest stems from the way our 4 Seat Tourer seems to hop about over the humps and dips a lot more than Longbridge ever intended. It must be several years and several thousand miles since I put new friction discs in all three shock absorbers and, although appearing OK at that time, it has increasingly become clear that some investigation is needed. A start has been made on the front one; at the time of writing, work remains to be done on the other two. Years ago I abandoned the aluminium link on the near side and took the end of the two outer arms directly on to the anchor point on the axle to give a "Panhard Rod effect. This restricts the tendency of the body to ride on its shackles to one side relative to the axle when cornering hard. This time I am putting it back to standard and hope for a softer ride.

Anyway, the long and short of it is that the front shocker must have been doing next to nothing – and the same may be true at the rear! What I have discovered may well be a common fault and my method of fixing it may be useful.

I started by removing the two nuts in the centre and, in separating the arms, soon found the rubber bushes to be badly worn - as was the side of the aluminium link. The eye opener was to discover just how little of the discs was in contact with the friction face of the two outer arms, as shown in Picture1. For whatever reason, the friction face of these two arms was found to be concave. Consequently it had been in contact across a ring only 3mm wide at the outer edge of the disc. The rest of the discs had never been in contact. Problems were also seen on the faces of the centre bracket, which bolts to the chassis, and on the associated discs and offside arms.

Picture 2. shows how rust and glazing had also lead to a reduced damping effect, although in general terms all faces were parallel. The flat face of the centre bracket was restored using a Rexon belt sander and the reverse side and the

faces of the centre arm, which have raised bosses, were cleaned up with emery cloth. Making checks with a feeler gauge as seen in Picture 3 gave some idea of the need to take metal off the arms until a parallel face was produced. The belt sander was again employed and, after an initial attempt, the outer unworn part was removed as seen in Picture 4. To remove the remainder took some time, including interruptions to cool it down, until fully "flattened" as in the final picture [overleaf].





check with feeler gauge



arm after initial sanding



arm after initial sanding

The links were cleaned up and new bushes fitted prior to a trial assembly of the shock absorber to the chassis. It was then that I noticed witness marks on the axle where the rearmost part of the centre bolt had rubbed (banged??) against the axle when in, or near, maximum deflection! Stripping everything down I checked the centre bracket, thinking it must have been bent back in some front end crash years ago. When checked, the bracket had an exact 90° bend which seemed to suggest it was still in "as made" shape. Alternatively, perhaps a similar incident had bent down the lip on the chassis to which the bracket is bolted. I decided to search through my spares and found two brackets. One had an included angle of 85° and the other was 80°! Were they made like that (perhaps for different models ... correspondents please reach for your keyboard) or had somebody been into some bespoke application? Who knows! There's a possibility that the 85° one had been fitted to the car when first acquired and I had soon after replaced everything on the front axle. Anyway, this one is now back on the car. All parts were now assembled on the bench and the centre bracket mounted in the vice with the arms pointing up and down. Using a spring balance I checked the stiffness of the arms as I tightened the adjusting nut. It needed to be run up a good way before I could pull 10 lb on each arm. I could find no quoted figures in any A7 literature so started a thread on www.austinsevenfriends.com. Here there was a suggestion that 20 lbs was nearer the mark; this was followed by contact from Terry Griffin who has put a lot of thought into A7 suspension. Terry has had many successes racing in the Bert Hadley Memorial Championships and he forwarded me copies of the articles he has written. His main advice was to fit new star washers which are stronger and can be more heavily loaded when adjusting. He also suggested a very light greasing to allow progressive movement rather than the initial "snatch" at the start of movement of the shocker. New star washers and centre bolt were duly purchased and everything bench assembled; this time with a big brass washer (as found on the rear suspension) fitted to the

boss on the centre bracket.

My plan was to carefully measure the distance the adjusting nut is run up the centre bolt for a given pull on the spring balance. By taking the nut up to the same position when fitted to the car I hoped to get a known stiffness in situ. It would also act as a basis if and when I decide to make later adjustments to the ride of the car. Another suggestion was to use a torque wrench along-side these measurements so that having established in situ the torque for a good setting, it could be checked later if there appeared to be a lack of stiffness in the suspension. However, the required torque was too low to be measured by my wrench.

A graph of load to initiate movement versus applied movement to compress the star washers showed a reasonably straight correlation from 5 lb upwards. A further 4mm of travel of the adjusting nut took the load up to 25 lb; at which point there was little remaining thread available on the centre bolt. I have decided to try a 16 lb load initially, assisted by whatever resistance comes from the rubber bushes, to help to decide a final setting. On stripping down it was pleasing to note that the star washers kept their original shape – they are very resilient! At the time of writing I have yet to refit the front shocker to the car and the rear ones will be tackled later. Terry had some further advice which is relevant to most pre August 1934 Sevens. He advocates replacing the springs on the rear shockers with the same star washer system found on the front, to get a higher load on the discs. He points out that the long arms at the rear produce a very small amount of movement (friction effect) at the discs; an error that was corrected with the Ruby and improved further with the Big Seven - details of the latter can be seen on page 485 of Bryan Purves's Source book. Terry has a fairly straight forward modification to these long arms to improve matters. Finally, if you are building a special and/or intend to do some circuit stuff, he has two or three specific articles that he has published that are well worth a read.

Following on from the above article I have refitted the front shock absorber with the front face of the first nut on the centre bolt taken 16mm up from the end of the bolt. This seems to be about right, but more later. I then had a look at the rear shock absorbers, where I again found there was a need for action !

The rubber bushes in the offside shocker were a rattle fit and those on the near side were not much better – can't explain how this had not been noticed when greasing the spring pins, so don't ask why! On removing the O/S shock absorber it was apparent that its trailing end was out of alignment causing the bushes to wear on one side and also wear away one side of the aluminium link. The wooden discs seemed to offer little friction resistance and have been replaced with new composite material from one of our A7 Suppliers – fitted with a very thin smear of grease.

A quick check through my spares failed to produce any aluminium links so four or five were bought at the next spares day. Having brought them home, these looked OK at first glance but when the old rubber bushes were taken out I was saddened to see how much "rust" (aluminium dross) was revealed. Although this was soon cleaned up, the new rubber bushes were a sliding fit rather than the in-

tended tight fit! Some even had the same wear on one side as the one I had just removed. Caveat emptor for all who would buy such second hand items ! ! !

A bigger and better search amongst my spares revealed four or five old links where just two of these were OK ... moral of this bit of the story is to seriously consider buying new ones ! !

The next job was to assemble the link on to the shock absorber arm. This was pressed though using the vice with appropriate spacer. It was then that I noticed that the bolt carrying the bush was not at right angles to the body of the arm and that the ends of the arms were not parallel to each other at the point when they would be nipped up by the inboard nuts. The same was also seen at the front end, meaning that the "jaws" at each end of the shock absorber "gaped" so that some of the load on assembly went into closing the gape rather than loading the disc or rubber bush. This was remedied with a bit of tin bashing with the arm held in the vice. Finally, the assembly was tightened until the small exposed section at the end of each bush was slightly distorted (squashed!!). This had also been the approach with the links on the front shock absorber.

Some time ago, to improve the damping action at the rear end I added an engine valve spring to fit inside the standard spring to increase the load on the rear friction discs. I remember having to check that it did not go coil bound before the standard spring was well tightened and I shortened it to $1\frac{3}{8}$ " by removing one turn. I omitted to make any resistance measurements with the spring balance, before fitting to the spring pin – probably because I had had enough of it by then – so there's no techy stuff to finish off ! !

The good news is that a road test or two showed a noticeable improvement when traversing all those humps and bumps that now seem to proliferate ! !

As indicated in the May Newsletter, I was unable to find much useful written information on the shock absorbers fitted to our cars, apart from those relating to the modifications by Terry Griffin on his special. Consequently, the two articles are on my way of fixing things and others may do it differently and have further comments to add, especially when it comes to squashing the rubber bushes. I think of them as adding to the dampening of the suspension, not turning relative to their housing and gripping tightly on their through bolt. However, should they be squashed, and if so, by how much? The rear shocker not only rocks up and down but is twisted slightly by misalignment of the axle to the chassis when one wheel rises over a bump or drops into a pot hole. The arms appear to be resilient enough to accommodate the twist but should they rely on a certain amount of looseness in the bushes as well, by not nipping them as I suggest ?

It would be good to get some feedback in the newsletter from others who would do things differently and/or add further tips on this topic.