**Rear Suspension on a 3000**

I was surprised to have my last effort, on thermostats, referred to as “bo\*\*\*\*ks” in these pages. However, here’s another offering...

My car is a MkII BT7, but I am sure that this article is relevant to both series of BJ8s and to everything else from 100-6s onwards. Possibly even the 100-4s, though we are not supposed to call them that. And, yes, I know that the later BJ8s’ ground clearance is better than the rest, but it is still pretty hopeless.

The cars’ designs gave them very little ground clearance when they were new. The passage of time will have made the springs flatter and feebler. Also, the shock absorbers will have deteriorated and, although they absolutely do not affect static height, they are supposedto help to prevent grounding as they slow the downward bump effect.

I had been meaning to replace my springs for years, a winter project that never got done. Seemingly, the car sagged more every time I looked at it and so I determined to replace the springs, check the shocks and to do it ASAP. I shall leave out most of the detail and all of the incidental blasphemies which are part of this job......awkward, tedious but easy enough. Nothing complex and no clever decisions or minute adjustments along the way. Just the usual curse of difficult access and lack of space.

I suggest that you need (1) a manual to do this job and (2) that the BMC parts book is useful for its diagrams which show you exactly what goes where and in which order.

So, with manual to hand:-

1. Put chocks in front of both front wheels. Jack the car up on the first side and support it safely with sturdy wooden blocks as near as possible to the rear spring shackle. And axle stands.
2. Remove the wheel.
3. Put a jack under the spring, a screw/bottle or a hydraulic trolley. This should be near but not on the plate secured by the two U-bolts. Raise the jack and take the load off the spring.
4. Remove the 4 nuts from the U-bolts and put them aside, maybe in a grease solvent. Shove the U-bolts up and over the axle and remove them. The bump stop can stay in situ; it’s a handy way of relocating the U-bolts later. If it falls out, never mind. It goes back in easily enough.
5. Undo the rear shackle assembly and tap or prise the shackle off. Assuming you’ve kept that area lubricated via the grease nipple, this will simply be a ghastly job with insufficient room to move a spanner! But you’ll manage. A set of ratchet spanners is helpful throughout.
6. Now the fun starts. Traditionally, the front shackle pin *on the driver’s side* will be frozen into its bushing. The nut should come off easily enough but the spring will not drop down until the pin (bolt) is out. Now, here is a pain saving retrospective tip: when I finally got my spring out, I absolutely could not drive the pin out with a club hammer. While that pin is in the car, you’ll barely be able to tap it with your finger tips let alone bash it out with brute force. Save time, pain and effort and think heat or cutting. You can burn the rubber out of the bush until the pin frees up. I did not like the proximity of the fuel tank, lines or pump, nor all the old grease, underseal etc. So, I left that for braver types. No, I’d been advised about a saw that would make light of the job and bought one when I saw it on sale. Mine calls itself a “multi-function” saw, but I’ve seen them called “Reciprocating Saws”. Anyway, it’s like a big, sturdy jig saw with accordingly big metal-cutting blades. Get one of these saws and a few spare blades and your problems will at least become manageable. Look at “multisaws” under “Power Tools” on the B&Q website. Price/quality is up to you, but it needs to be quite a stumpy unit unless you can get your car up high. On the accessibility topic, grind the triangular tip off the blades and you’ll have more depth of cut and fewer broken blades.
7. With both sides of the pin severed, the spring will come out and away. *If you are lucky, the passenger’s side pin may come out easily enough. That’s to do with its proximity to the exhaust system keeping it dry and free of corrosion.*

Putting the new springs in is simple enough:-

1. Clean out the area where the rear shackle attaches, removing all the old grease and gunge. Remove the grease nipple. Clean it out and check that it works with your grease gun. Replace it.
2. Clean all the nuts and bolts tidying up the threads so you can tighten them 99% by hand. Plenty of Copperslip or similar. You’re going back into the no access areas.
3. Leaving pins/bolts fairly loose to start with, attach the spring via the front then the rear shackle pins, jacking up the spring to line up the bolts.
4. Now raise the jack until the U-bolts show sufficient thread to attach the bottom plate and take up the strain. Raise the jack a bit more; tighten the 4 bolts making sure that the plate is centred on the pin coming down through the spring and keep tightening until they’re done. Don’t forget the so-called “polyurethane pad”.
5. Lower the jack a little and tighten the shackle pins’ nuts and bolts.
6. Remove the jack and give all the nuts a final heave.
7. Grease the rear shackle assembly.
8. Replace the wheel and remove the supports.

While you were in the area you would hopefully have taken the opportunity to grease the handbrake cable, check fuel lines, brake lines and the EP90 in the diff etcetc. And then do the other spring which will take half the time.

Results? My car sits about 8cm higher, which will diminish a little over the first few months and the suspension is a lot less soggy over bumps. See below for the work on the shock absorbers which further contributed on the sogginess(?) issue.

**Shock Absorber maintenance &/or modification.**

One can buy so-called “heavy duty” valves for our 100-6 and 3000 shocks. (Probably for the 4 cylinder cars as well). All the usual suspects sell them. They are easy to fit and should do a good job. However, I’d bet that most of our shock absorber problems arise from lack of maintenance. My car is +/- 50 years old and I wonder if the shocks had ever been checked over properly.

To cut a long story short, there are two chambers in the shocks. The big lever travels up and down, moving fluid from one chamber to another, the rate of flow determining the speed at which the lever may move. Thus, when, for example, the car goes over a series of bumps it wants to bounce but the fluid’s controlled flow from cylinder to cylinder reduces and dampens the movement. Of course, the details are more intricate but, as we would be ill advised to attempt a home rebuild, we do not need to go there.

**Removal** is awkward but simple enough:-

1. Remove the two nuts, washers and bolts that attach the shock’s body to the car’s frame.
2. Remove the nut and washer that attaches the arm.
3. Move the, now dangling, shock until it is below the chassis.
4. Tap the pin through whilst wiggling the shock around. It should come out easily enough.

All the above is self explanatory when confronted with the real thing in situ.

1. Clean the unit with your preferred goo. It will be filthy and you don’t want grit getting inside.

You will probably find that the arm moves up and down OK, but that it’s rate of movement is not uniform through its complete arc ie it sticks or snags periodically. So, the fluid level is probably low and the fluid itself is probably pretty beastly.

**Maintenance.** If you are only interested in topping up the fluid, not replacing it, this can be done in situ. Just about. Once you have the clean unit on the bench, it is all quite simple. The filler plug is the small nut on the front top face. The valve is in/under the big nut at the bottom. \* On mine, it’s the 14W nut on the front.

I removed the filler and valve nuts and tipped the fluid into a jar, keeping it to one side so I could compare the volume with what came out of the other unit and so I could also compare its viscosity with the new stuff. Since the fluid was black and nasty, I flushed the unit out with white spirit. I did this quickly as I wasn’t sure what effect – almost certainly none – white spirit would have on the internal seals. Then I rinsed out with new fluid which I threw away. So, the internals were now clean and the arm moved smoothly and without snagging along the way. (As it should with no fluid within and no valve in place). I put most of the “snagging” effect down to air bubbles ie insufficient fluid. I also cleaned the valve with white spirit.

**Modification** is possible from this point. There are two routes, usually employed in conjunction. The most obvious and easiest is also the simplest:- put in heavier oil. Motor bike “fork oil” is ideal. People *say* that one can use synthetic. I don’t know. Since it is readily available, I bought old fashioned “real” oil. Why “fork” oil? It contains an additive that prevents foaming. As to its SAE or ISO, nothing higher than SAE 30 (ISO 100) is sensible and a usual choice is SAE 20 (ISO 68). I used SAE 15 (ISO 46) but I added 10ml of EP90 per side which stiffened it up nicely.

The second route is to uprate the valves. If one stiffens the valve’s springs, one increases its resistance and therefore its shock absorbing capacity. So, tighten the central screw which compresses the inner spring. Opinions vary but two complete turns is a safe average. At the same time and to be sure that one is working on both springs (bump and rebound), place about 1.5mm worth of shims (small washers) under or over the existing shim. Make sure that these are no bigger overall than the original and that their central hole is big enough and they should fit right in.



Taken altogether, ie heavier oil, shims and tighter springs, one should achieve an easily discernible difference. I gather that anything exceeding 30% change can only be done by fitting stiffer springs ie by buying the uprated valves. I had 4 spare washers of the right size so I suppose that I saved myself +/- £40:00 and I know that I made my shock absorbers appreciably stiffer. Of course, I’ve never driven a brand new BT7 so I can’t make comparisons. What I do know is that I hope to take the car through the Alps next August and that some of the roads involved will need better suspension than I had. A manageable challenge? Have a look at:-

<http://www.grande-traversee-alpes.com/fr/je-voyage/par-la-route/la-route-des-grandes-alpes.html>

or:-

<http://en.wikipedia.org/wiki/Route_des_Grandes_Alpes>

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