

Dealing with parabolic springs winding up under torque



Upper spring as it should be –lower spring is bent due to torque

Michael Beswick contacted the V8 Register in 2011 for advice with parabolic springs winding up under torque. Here he provides useful feedback on how he has got on.

You highlighted information on your web site and Brost Forge in Kings Cross. I was a bit cheeky in seeking help from the V8 Register as I do not have an MGV8, but a supercharged 4 pot MGB Roadster. Still quite torquey though!

After a couple of discussions, I took my bent springs to Brost for them to repair, re-temper and add a third half leaf (from centre mount forward) to reduce the stress on the "main" leaf. Time will be the judge but so far, so good: the ride is the same as before and so far no sign of winding up. The replacement parabolics that I had to fit last summer, as we were off on holiday, showed very slight bending after about three months – less than 900 miles.

I gently tried to find if there was anything like a "specification" that Brost could supply but I think they just did it by experience! They do everything from rocking horse springs to springs for steam engines.

I also looked at anti tramp bars, but as my pair of extra leaves cost £60 it seemed worth a go! The anti -tramp bars also seem to rely on bolts through the floor around the front hanger whereas this method still allows for some movement but has the extra "meat" of the third leaf to help. If you have a fire-breathing monster of a V8, you may need an alternative arrangement, but I would think this would be suitable for the more modest powered versions with a power output similar to a Factory MGBGV8. If in doubt Brost are worth a call!

Hopefully all will be well-if not I will update you! If any of your members want my opinion on my experiences with Brost and spring repairs, by all means give them my email or phone number!

By the way, Brost were helpful and friendly- they took two weeks. They had an informal approach, but I arrived at 10.30am on both occasions which is their tea time!



General view of repaired springs with extra "half leaf" on the "front" part (LHS above) of the spring



Closer view –note a single spacer has been removed to allow for the extra leaf

If you would like to discuss springs with Michael Beswick he has indicated he would be pleased to help. You can call him on **01920 466391** or **07774 801983** or email him at genesismb@aol.com

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Shows half leaf (centre mount forwards to front spring eye) - one "spacer" removed to allow for the third leaf

Experience with springs given the "Brost treatment"

Gordon Hesketh-Jones, who has used his MGBGT V8 as a "daily runner" and for regular, long continental touring holidays (typically 5,000 miles) clocking up well over 400,000 miles, contributed his views his experience with rear springs.

"The standard V8 specification for the rear springs is 550lb, compared to 400lb for the earlier MGBs then 450lb for the later versions. Once loaded with four weeks' worth of luggage, the rear suspension becomes extremely harsh and the springs flatten regularly. We tried various types of shock-absorber and finished up with SPAX - they rattle at low speed, but otherwise work well. One of the experiments we tried was to fit MGB rubber-bumper rear springs with the anti-tramp bars, as in theory this would give a softer ride but avoid torque-steer under hard acceleration. Sadly wrong on both points. In addition, the MGB springs "flattened" in less than a month so yet more time spent lying on the garage floor.

Nirvana arrived when I sent a spare set of my V8 springs off to Brost for treatment to adjust/raise the ride height and to slightly softening the ride. This was the perfect answer and the ride was transformed, both with and without luggage. The only downside is that with heavy use for around 55,000 miles, the springs have again flattened so I have to repeat the process but it will be worth the effort.

What are parabolic springs?

The MGB and derivatives like the MGBGT V8 have multi-leaf rear springs with the rear axle attached. The rear spring has to resist the "wind up" effect and with the higher output with the V8 engine, stiffer rear springs were necessary to deal with that although the consequence was the ride comfort was reduced by the firmer response with that rear suspension set up.

Multi-leaf springs were very common on cars up to the 1970s in Europe and Japan and to the late 1970s in America when the move to front-wheel drive and more sophisticated suspension designs saw automobile manufacturers use coil springs instead. Unlike coil springs, leaf springs also locate the rear axle, eliminating the need for trailing arms and a Panhard rod, thereby saving cost and weight in a simple live axle rear suspension.

Parabolic leaf springs are a more modern application that consists of two or more leaves. The leaves touch only in the centre where they are fixed to the axle and at the outer ends where they are fixed to the vehicle. This design usually has fewer leaves and each leaf represents a complete spring in itself and will act as such. To do this the leaf is tapered, from the centre (thick) to the outer ends (thin). This tapering follows a parabolic curve - it means that every centimetre (or inch) the thickness of the leaf decreases in an amount that relates to the square function of its length. In this design inter-leaf friction is unwanted so there is only contact between the springs at the ends and at the centre where the axle is connected. Spacers prevent contact at other points. Aside from a weight saving, the main advantage of parabolic springs is their greater flexibility, which translates into vehicle ride quality that approaches that of coil springs. There is a trade-off in the form of reduced load carrying capability, however. The characteristic of parabolic springs is better riding comfort but not as "stiff" as conventional "multi-leaf springs".

Typically when used for automobile suspension, the leaf both supports the axle and locates or partially locates the axle. This can lead to handling issues such as 'axle tramp', as the flexible nature of the spring makes precise control of the unsprung mass of the axle difficult.

<http://www.parabolicspring.com/parabolic.htm>

V8 website resources

Parabolic springs on an MGBGT V8

www.v8register.net/subpages/technicaltopicsparabolicsprings1.htm

V8BB thread on parabolic springs on an MGBGT V8

www.v8register.net/FilesV8WN/V8BB%20thread%20on%20parabolic%20rear%20spings%20correct%20spacers%20190308.pdf