Hawk undercarriage overhaul

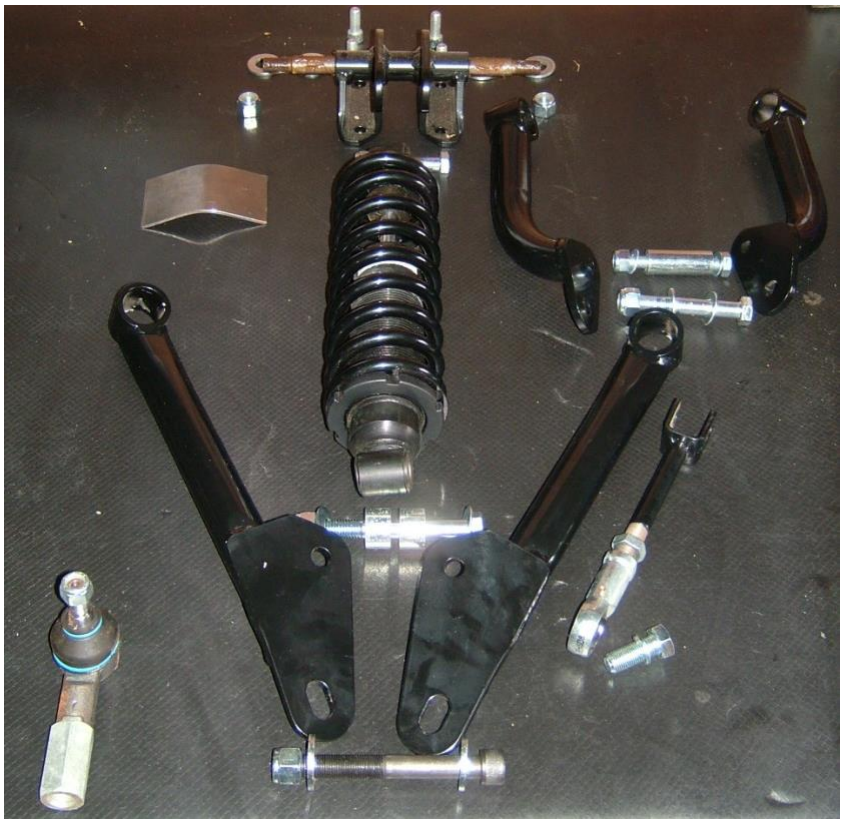
By Stuart Clarke

I decided that the time was right to overhaul my suspension owing to ground clearance issues and general performance. The MGB set up is perfectly serviceable but wasn't designed for carrying a heavy Ford lump around and the single carriageways where I live are unforgiving towards low slung cars. Unfortunately the MGB set up has pretty much zero adjustment in respect to ride height and changing spring ratios without considering damping ratios isn't best practice.

With this in mind I looked for an alternative and I decided to go with the Hawk Cars / Hoyles Engineering tubular wishbone set up. This set up offers coil over shocks with adjustable ride height, and the facility to tweak castor and camber settings.

Full instructions are available for the assembly of the kit. This guide is provided as an additional extra to give my personal perspective of the installation and offer assistance where needed.

So what do you get in the kit, pretty much twice of what is pictured below



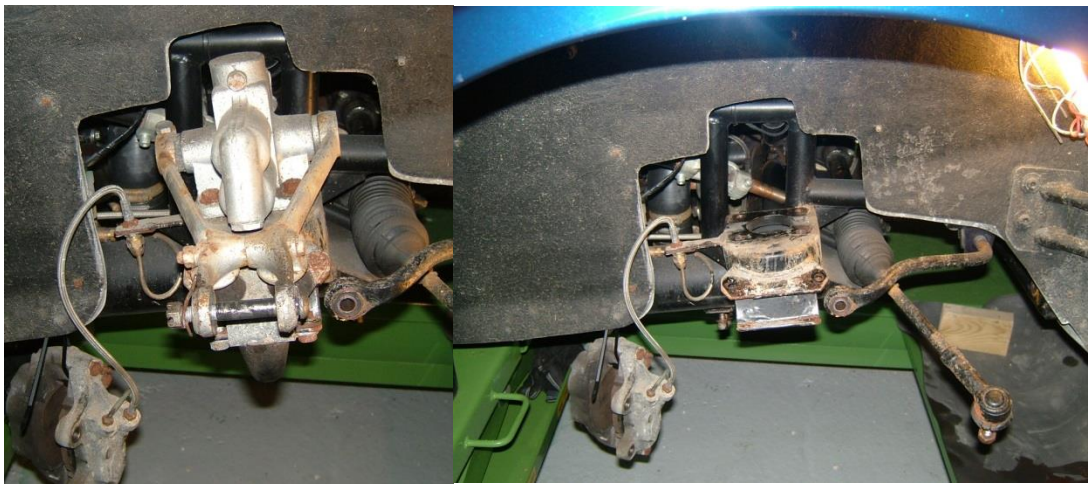
The only things needed, in addition to the parts shown above, are bushes. As two wishbone sets are used two equivalent MGB bush sets are needed. I've had good experience with poly bushes so I ordered two packs of these.

Next step was to strip out the old MGB set up.

First ensure that the car is mounted on sturdy axle stands. These need to be as high as possible as access under the vehicle will be needed! (Owing to the fact that I have a four post lift and a jacking beam this was fairly simple) I found the easiest way to strip the front suspension was to undo the nut securing the lower kingpin trunnion at the front end of the lower wishbone, position a trolley jack under this trunnion pivot point, jack up to take the take the load of the spring then to remove the bolt. The jack can then be lowered and the lower wishbone will pivot down under control, leaving the kingpin / hub assembly hanging from the top mount, until the spring tension is released. When the spring tension is fully released the jack can be removed and the lower wishbone and be pulled down to release the spring. The advantage of using a trolley jack is that they have long handles and you can operate them from a reasonable distance. This should not be attempted with a scissor jack or bottle jack.

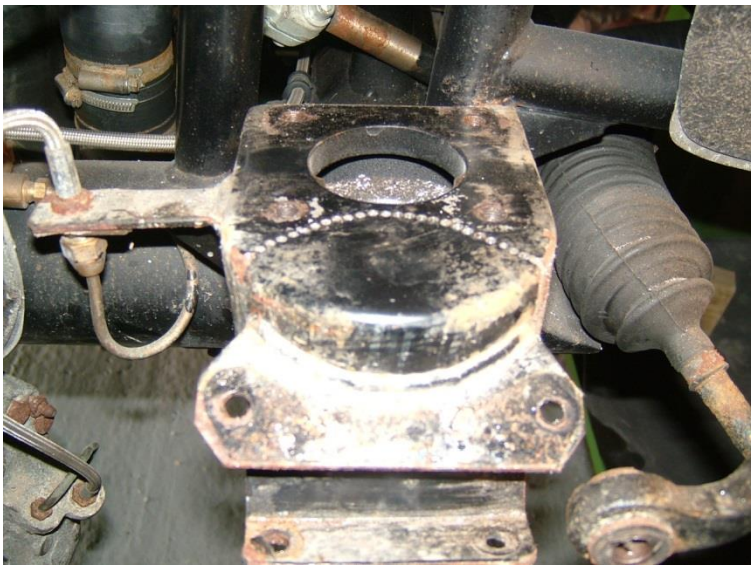
Be very careful as there is a massive amount of energy stored in these springs. Ensure that the vehicle is secure and ensure the jack is not going to slip. The screw compressors I have would not fit on the springs and therefore this is the only option I had. If you are unsure, in anyway, do not proceed and please seek advice from a garage mechanic!! I have carried out this operation on at least 3 cars without incident

The lower wishbone arms can be then removed from the lower pivot, leaving the pivot in situ as this is used with the new set up. It is a good idea to check at this stage that the pivot is straight and in good condition. I unbolted the brake calliper and cable tied this to the chassis. The track rod end can then be disconnected from the kingpin / hub steering pivot / brake disk and this can then be unbolted from the lever arm shock absorber. I removed this assembly in one piece. Then the lever arm shock can be unbolted from the chassis followed by the bump stop carrier.



The lower wish bone pivot is retained as is the kingpin trunnion / hub assembly.

It was time for some “Man work” as the next step gets a little more serious with grinders and welders! The tubular wishbone configuration incorporates an adjustable Gaz damper. This requires the necessity for some chassis modifications in that the bump stop mounts need to be removed and clearance for the damper needs to be made in the lever arm damper mount. There is a chain drill jig available from Gerry which can be mounted using the lever arm damper bolts and bolt holes. The first time I did this I drilled all the way through and used an angle grinder to grind between the drilled holes. It’s just as easy (if not easier and much quicker) to use the jig as a guide, mark the area to be removed and cut the section out just using an angle grinder.



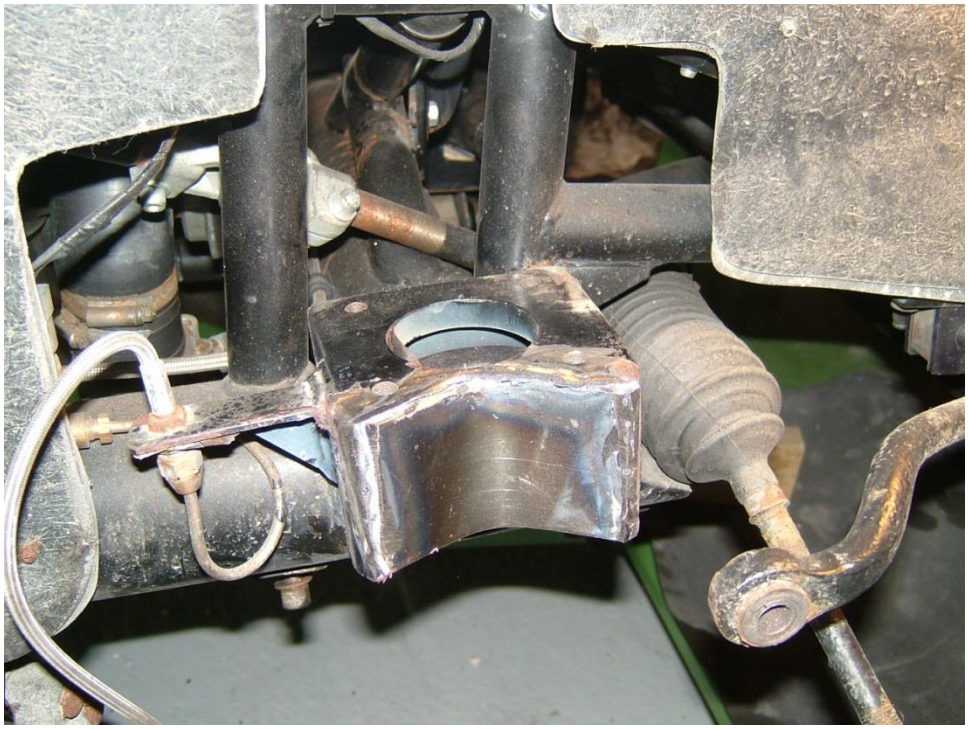
This shows the area to be removed before……..

and 20 minutes later! (I do a fair amount of metal bashing)

This is no way to leave the beautiful Hawk chassis, which is the reason why the bent piece of steel plate is in the kit.

This needs to be welded in. It's not a structural weld and therefore can be tackled by most hobby welders. A good quality Arc or Mig set is perfect for mild steel. Before you commence, ensure the battery is disconnected from both terminals (positive and negative), make sure all combustible materials are removed from the vicinity and a bucket of water or fire extinguisher is available…….. Just in case!

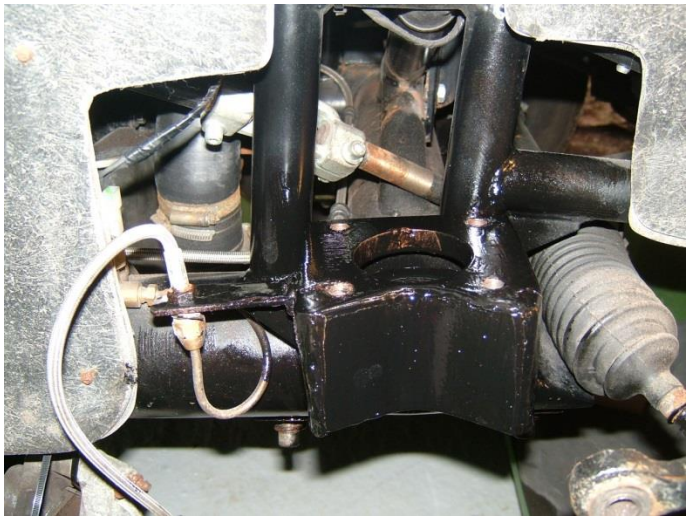
Using the grinder, clean up the mounting surface to ensure the profile matches the plate (or bend the plate accordingly). Then weld the plate into place.



I used an arc welder and it can be seen from the blue marks on the plate that there's plenty of penetration meaning a good weld.

When it has completely cooled down, it can be painted.

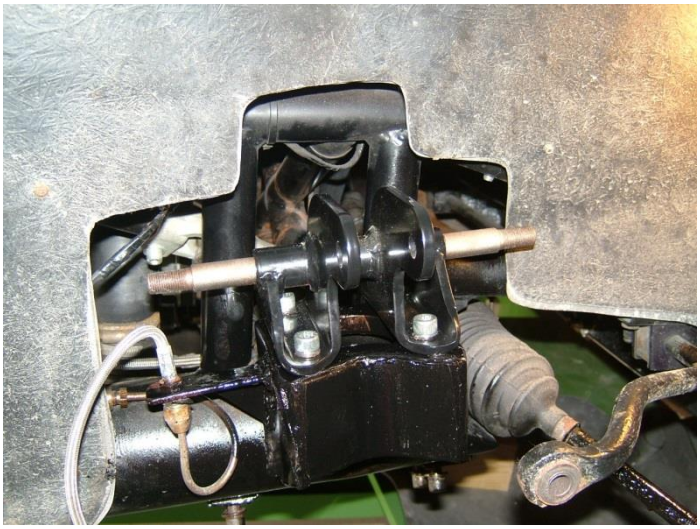
I used plenty of coats of smooth Hammerite allowing the recommended time for drying between coats.



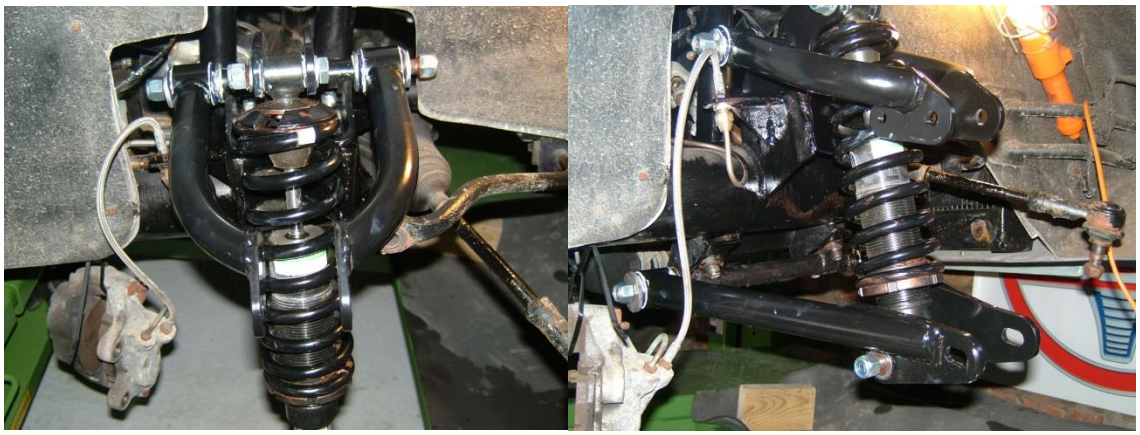
I left the chassis for a couple of days to fully dry and then commenced with the assembly.

The first step is to fit the bushes into the wishbones. I fitted these in the same way as I fitted them originally on the build which is using a vice to squeeze the bushes in.

This procedure is repeated on the top and bottom wishbones. The next step was to bolt on the top pivot using the same torque recommendations as for the MGB lever arm shocks.



The wishbones can be fitted with the damper and spring. Copper slip was smeared on the top and bottom coils of the spring to prevent squeaking and also on threads as salt spray loves rotting unpainted mild steel and I may want to undo the nuts one day. Two of the lower wishbones have threaded bosses, these are fitted towards the front as the adjustable antiroll bar drop links attach to these. The galvanised spaces fit between the lower wishbones and the lower damper mount

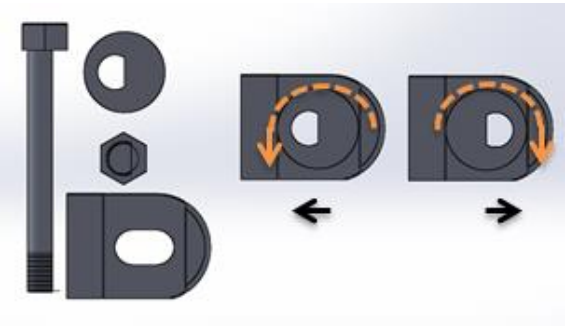


No bolts were tightened at this stage and the adjustable lower spring mount collar (which is used to adjust ride height) is at its lowest level. The king pin trunnion / hub / brake disk assembly can now be attached with the bolts and washers provided. I connected the bottom of the trunnion to the lower wishbones first and then the top to the top wishbones. There is a spacer tube that fits between the top wishbones.

As already mentioned, the ride height, castor and camber can be adjusted on this suspension set up. Settings will be discussed later but the mounting of the king pin trunnion is critical to the settings.

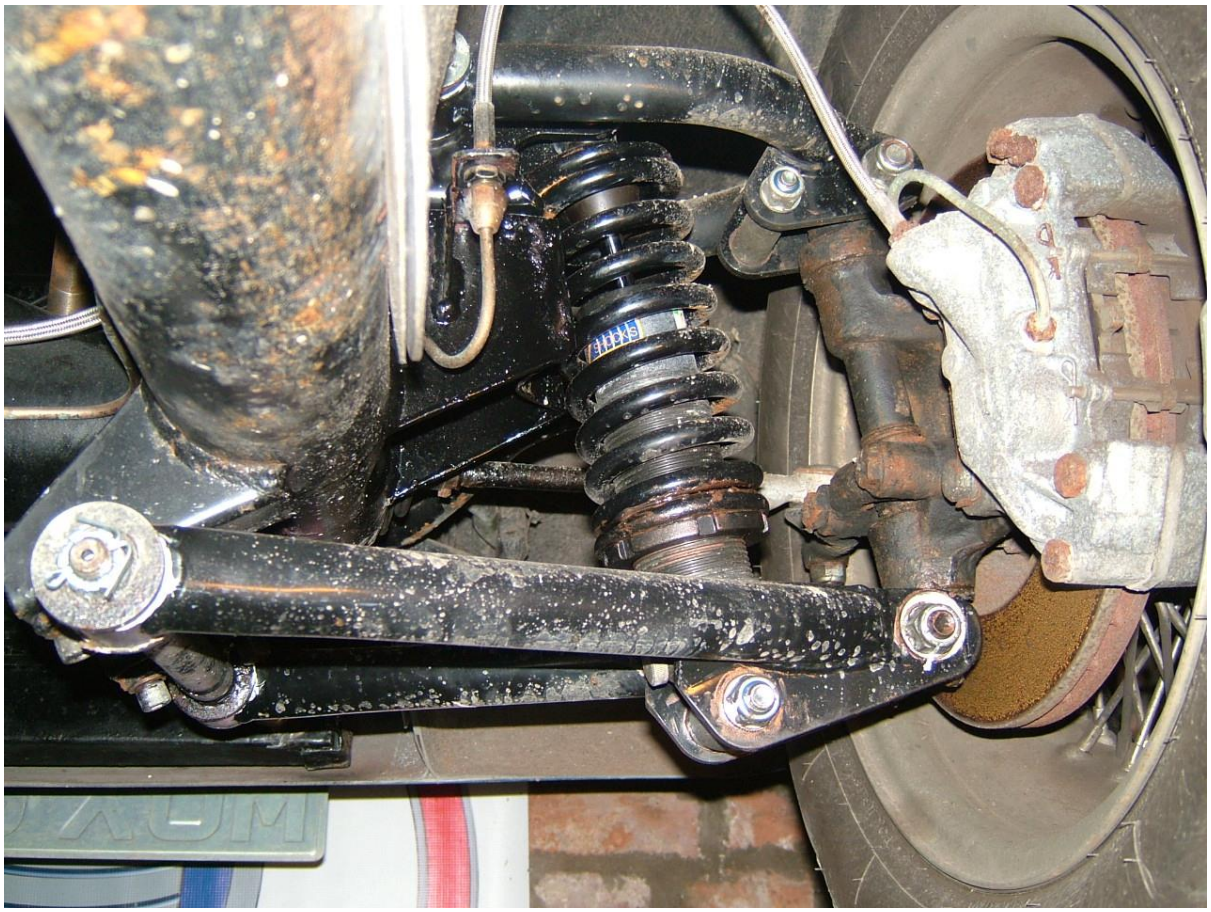
There are spacer washers to fit between the top trunnion and the top wishbones. An equal number of washers on both sides give a neutral castor setting and I'd suggest this as a starting point.

The camber is influenced by the asymmetric spiral shaped washers or "snail" washers. These are used for moving the base of the kingpin trunnion in and out influencing positive or negative camber.



When assembled, using the bolt with the milled flat and by turning the head of the bolt, the washers twist in the grooved slot moving the centre of the hole either forwards or backwards. The position can be locked in place by tightening the nut.

Here is a photo of the completed assembly



As already stated, I'd recommend that the bolts are not fully tightened until the suspension is loaded. This prevents the poly bushes from been strained which may result in premature failure. The torque settings to be used are a combination of those advised in the Hawk build manual and those advised in an MGB owner's manual.

The only other things to connect were the anti-roll bar drop links and the track rod ends.

I would advise that the anti-roll bar is set to a fairly horizontal position and the fixings are all tightened when the ride height is set. Gerry supplies a pair of extended track rod ends with the kit. I tried fitting these but I couldn't wind them on far enough to the steering rack ends. I refitted the standard track rod ends and noted that there was ¾" of thread that screwed into them, which was more than sufficient. It is advisable to get the tracking readjusted by a garage prior to road use to verify the settings. I set my wheels as parallel as I could to enable me to drive to a local garage adjusted the settings to a slight toe in. When the tracking is set, ensure sufficient thread is screwed into the track rod ends. Now repeat the exercise for the other side!

Settings

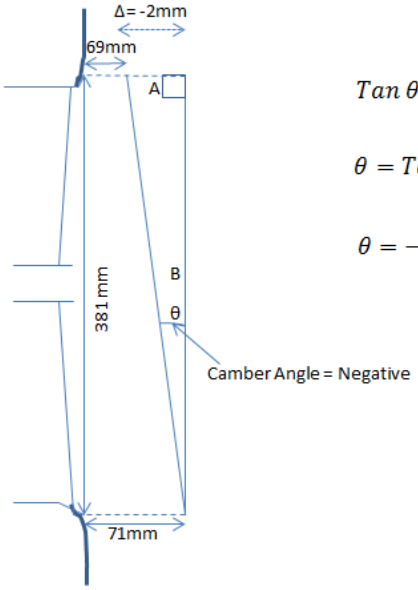
This is entirely the drivers own choice and depends upon how the car is to be used.

Me, I live in a rural area, the roads are uneven and are frequently single track with quite a prominent crown. Owing to this, I prefer a slightly higher ride height and I prefer a lower spring rating, (less firm springs) that are damped slightly firmer. I also have set my car with a neutral castor and slight negative camber.

To obtain the neutral castor I fitted equal numbers of the spacer washers between the top trunnion mounting and the inside of the upper wishbones.

To obtain the camber angle, I used a relatively cheap laser level that projected a vertical laser line. I then measured the distance from the top of the wheel rim to the laser line and the bottom of the wheel rim to the laser line. The camber angle could be determined. Through vigorous trials I found that a mild negative camber angle of -0.3 degrees was suitable for my requirements.

For those who are interested a simple bit of trigonometry



$$Tan\,\theta = \frac{A}{B}$$

$$\theta = Tan^{-1}\frac{-2mm}{381mm}$$

$$\theta = -0.3\,^{\circ}$$

381 mm is the diameter of the wheel rim

69mm and 71mm are the two measurements from the wheel rim to the vertical laser line top and bottom.

Tan $^{-1}$ is the arc tan button on a calculator or inverse tangent.

Conclusion

The revised set up is so much better than the MGB set up. It feels much more planted and the handling has improved no end, so all in all, fully recommended!