4.0 Front Suspension

Suspension-FRONT

4.1. FRONT STRUTS

The strut suitable for 90% of British Stage rallies is the one based on the original World Cup Strut, marketed by RS Parts (RH 9053062, LH 9053063).

The bump/rebound settings are 260/60 and its wedged stub axle is welded right at the bottom of the strut tube, which will allow you to drive your Halda from the front wheels, (rather than the speedo cable) by getting the stub axle drilled along its axis. We will cover this point in finer detail later.

Incidentally, adjustable front struts (spring height only) are now available, although the only advantage lies in the instant change of ride height, as the settings are identical.

Dealing with the struts as fully assembled units, the steering arms to use are the standard RS/Mexico arms (finis code RH 1443547, LH 1443548). These want to be bolted with the production bolts (finis code 1443784) using a nylock followed by a half nut.

Note that there are two problems in transferring Mk I World Cup struts to a Mk II shell, if you're building up a new car. Firstly, the Mk II strut has a spring seat 1½" lower as standard than the Mk I. This means that front ride height is going to be 1½" lower if you do a straight swap. This can be counteracted by either cutting and rewelding the seat higher - but watch you don't get full spring compression before the inbuilt damper bump-stop comes into play - or fitting a longer spring. Point two concerns steering racks. Escort II struts, excluding those on RS spec. cars have cast in steering arms, which means they must mate-up to a Mk II rack, with standard Mk II track-rod ends. On RS model Mk IPs, Mk I type struts with bolt on UNF tapers for the steering arms are fitted. However, RS Mk IPs do have a metric thread on the rack steering arms which necessitates steering rod ends having a metric thread and UNF taper.

To summarise:

Mk I struts have bolt on steering arms to take UNF tapers.

Mk II struts (except RS) have cast in steering arms (metric). Mk II struts RS have bolt-on steering arms with UNF tapers.

Mk I racks have UNF tapered track-rod ends.

Mk II racks have metric thread for metric cast steering arms.

Mk II RS racks have metric thread with special UNF tapered track-rod ends.

NB: Standard Mk II track rod ends are colour coded BLACK. RS track rod ends are colour coded GREEN (Pt No 1564468).

Application Chart - RS Front Struts

RS Models Mk I and II

Rally - Gp 4	905 4031*	RH front
	905 4032*	LH front
	905 3385	rear
Rally -Gp 1/2/4	905 3062*	RH Front
	905 3063*	LH front
	905 3385	rear (turreted) Gp 4
	905 2890	rear Gp 1/2
'World Cup'		
-General all purpose rally -	905 1219*	RH front
	905 1228*	LH front
	905 1492	rear (turreted)
RS2000 Mk I - Gp 1		
Rally	905 2655	RH Front
	905 2656	LH front
	905 2130	rear to 11/75
	905 2889	rear 11/75 on
Escort II - Sport. Ghia		
Rally -	905 2885	RH front
	905 2886	LH front
	905 3159	rear
Escort I - 1. 3L. GT. Sport		
Rally -	905 1870	RH front
	905 1871	LH front
	905 2130	rear to 11/75
	905 2889	rear 11/75 on

When fitting struts marked * must be fitted. a heavy duty top mounting kit (905 4002)

4.2. FRONT SPRINGS

Overall, the best all round spring to use is the Green/White (finis 905 2707) which is rated at 145 lb/ft, though you'll see from the table below that there is a wide range from 100 lb rating up to the 190 lb/in spring currently being used by the works.

When building a car from scratch, choice of springs can be a major headache, with everyone suggesting different ratings as if an expert. So, until you've got the rest of the car working properly, stick to proven set-ups.

4. 3. FITTING HINTS

Before you assemble the spring, check the three peenings which locate the ball bearing on to the top mount and ensure that the three captive nuts on the top mounts line up with the holes on the inner wing.

After compressing the spring, locate it on to the strut spring cup. Position the top spring cup, followed by one washer (supplied with 905 2278), the top mount and

the lock nut. Should the nut not lock onto the last threads of the piston rod, you will have to cut it down by the required amount for it to lock on. Note to tape the dust cap to the top mount to prevent dust getting to the bearings which will prolong top mount life.

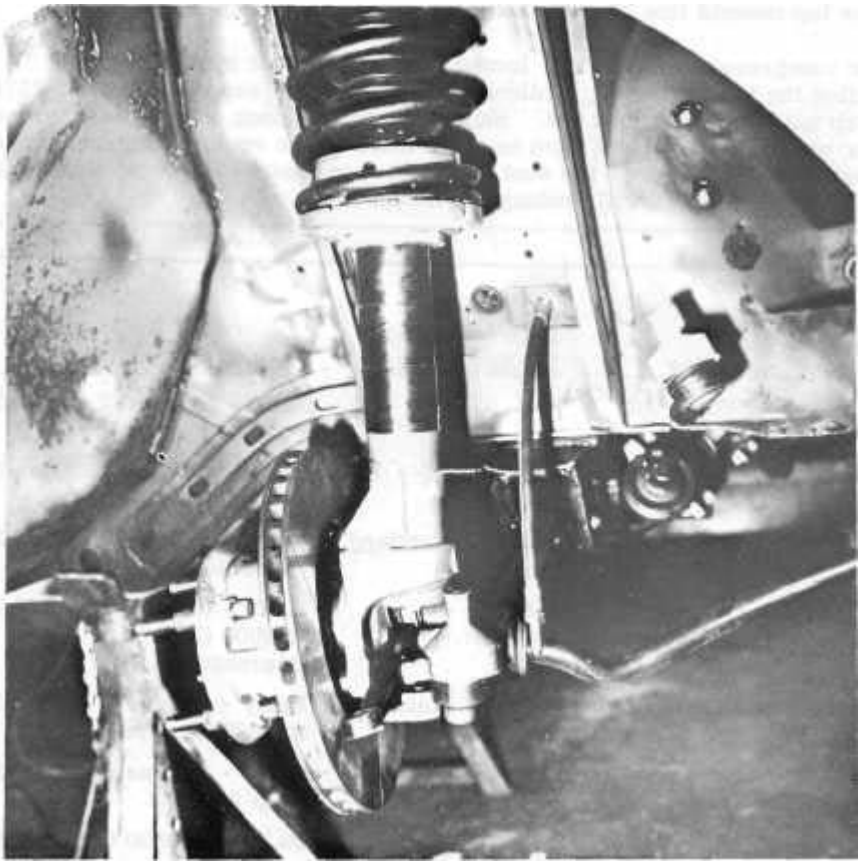
Front Spring Chart

Front Suspension Unit	Spring	Rate lbs/in	Ride Height (ins)	Application	
World Cup	World Cup	100	+1	Rally - club level - general	905 1296
	Green /white	145	+1	Rally - club level - forest	905 2707
	Blue /white	145	standard	Rally - club level - tarmac	905 2706
Gp 2/Gp 1	Green /white	145	+1	Rally - forest + RS2000 Gp 1 international	905 2707
	Blue /Write	145	standard	Rally - tarmac + RS2000 Gp 1 race	905 2706
	Green/yellow	190	+1	Rally - international - Gp 2, Gp 4	905 3387
Gp 1	Blue /White	145	+1	Rally - RS 2000 Gp 1 - general	905 2706
	-	160	standard	Escort II Sport, Ghia	905 2870

4. 4. FRONT HUBS

At the stub axle end, you should use the Gp 4 RS Parts Aluminium hub which accommodates standard wheel bearings and oil seals, together with the early Gp 4 studs also available from RS Parts; at the time of writing the current large stud arrangement as used on works cars is not generally available, although RS Parts will be marketing the set up.

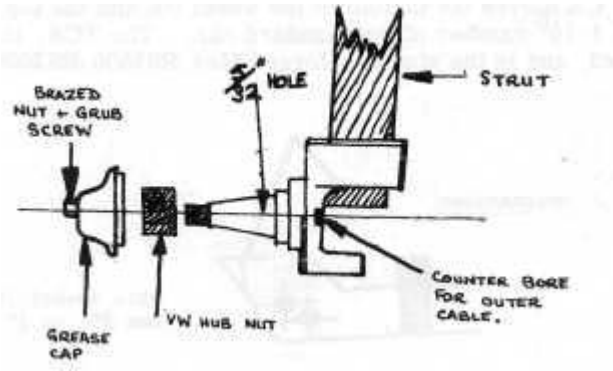
Having obtained the large 10" + vented discs and bells from A P Racing, pack the hub and inner wheel bearing with Castrol FCB grease, fit the inner bearing and tap the oil seal home. Bolt the bell to the disc, then bolt the assembly to the hub with standard disc to hub bolts. On the ventilated discs, no backplates are used, so push the lot on the stub axle, then locate the outer wheel bearing.



Works adjustable front strut. Note double nuts on the steering arms.

4.5. HALDA DRIVE

If you wish to run your Halda via the front wheels, get the stub axles drilled out from one end to the other with a 5/32" drill. You will also require two right hand thread Volkswagen hub nuts. Fit the production washer next to the outer bearing onto the stub axle, followed by the Volkswagen hub nut and the dust cap suitably modified with a brazed nut and grub screw to pinch the Halda cable. Your struts are now complete and ready to be bolted onto the inner wings. Of course, with this drive, the Halda system is very accurate since there is no loss through wheel spin.



Remember, though, that only the latest struts (905 3062 RH, 905 3063 LH) are suitable for this modification. (Note:The works cars now rarely use the Halda for outright accuracy, using one of a number of electronic distance recording devices available on the market. In 1976/77 the works cars used 'Holtrip' recorders.)

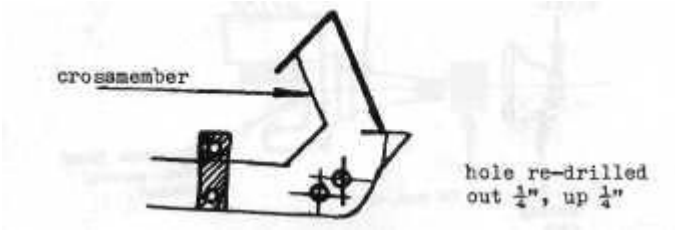
4.6. CROSSMEMBER

For stage events, you will have to use the only crossmember man enough for the job, the so-called 'World Cup' crossmember.

Finis code 905 1874 (Mk I and II) crossmember.
X Flow/BDA (905 1565 RH eng mounting bracket)
X Flow/BDA (905 1566 LH " " ")
SOHC (905 2738 RH " " ")
(905 2737 LH " " ")
905 3070 replacement bush
905 1748 spacer for X-flow/BDA engines prior to 8/70

Before installing the crossmember, it's a good idea to elongate the mounting holes onto the chassis rails, so that when you come to the fine tuning of your front suspension, you can even out the camber angles on both front wheels by repositioning the crossmember Mounting bolts to use are the production items.

Another inexpensive and easy mod is to increase the camber angle of the front wheels. This is a bit more, time-consuming, and of course, cannot be attempted within the Group 1 regs. The reason for this mod is, that if tall springs are used for stage rallying, the nose of the car is raised and the standard negative camber settings return to virtually zero in the static position. So, to counteract this the inner (crossmember) locating hole for the TCA is moved out 1/4", and up 1/4". The repositioned angle of the TCA moves the bottom of the wheel out and the top in, and gives you the 1-1½ deg camber of the standard car. The TCA, incidentally, is not modified, and is the standard forged Mex/RS 1600/RS2000 part.



4. 7. FRONT SUSPENSION GEOMETRY (an ideal standard setting)
Castor 3°
Camber 1° 30' neg
Toe in 1/8" max ride height 6 1/4" -forest
(under side rail)
1/16" to 0, ride height 5 1/4" -tarmac

4.8. T.C.A.'s

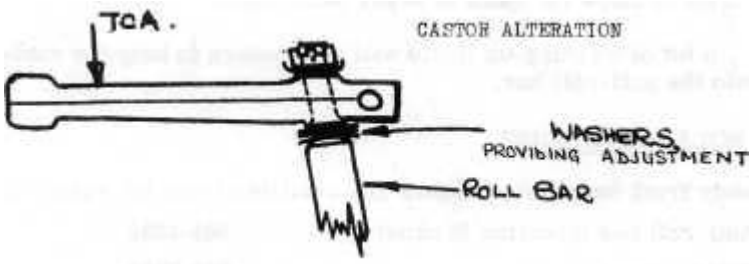
Now onto the Track control arms and anti-roll bars, which are the most easily bendable items of the suspension, so remember to carry a full quota of spares. If you convert a TCA into a boomerang, you will have almost certainly bent at least a roll bar clamp and the anti-roll bar to TCA washers, so carry plenty of these as well.

The TCA to use (it's the only one around anyway) is the standard Escort I/II item,

which you want to equip with the hard bushes available from RS Parts. On Mk IPs it is desirable to increase the castor action of the front wheels which will also increase the steering self centering. This leads to greater stability, as the car will not tend to dart off the road on the opposite side at the exist of a corner.

This is simply done by moving the anti-roll bar clamp forward, or more accurately, the weld nuts on the standard bracket. Before you weld the nuts on to the bracket it's best to have a dummy run to check the setting. (This can be done with the struts and anti-roll bar on the chassis, but no road springs. With the car level the strut can be easily moved up 50% of its free travel - the point it just touches the internal bump stops - this will be the approx ride height of the finished car.

The desired castor angle can be set and the anti-roll bar clamp welded in position.) For fine adjustment, the parallel section of the roll bar that passes through the TCA can be machined back to allow four standard washers to be fitted. These can be fitted in any combination either side of the TCA - see sketch.



4. 9. DOUBLE ANTI-ROLL BAR MOUNTS

To stop those expensive McPherson units flapping in the breeze, a production Mk I Mexico/RS2000 anti-roll bar, finis code 905 2549 (this is a mainstream part, not an RS part, ie, you can ask any Ford Dealer to order you one) should be clamped to the body via the RS Parts twin roll bar mounting kit, finis code 905 1304. These really do need to be beefed up because they provide the fore and aft location of the front struts as well as acting as the anti-roll bar mount. If the standard brackets are used, you'll find the constant pounding and dropping wheels into holes on the inside of corners will squash out the standard rubber. The bracket then bends with the resulting loads, and the tracking changes at will.

The complete kit comprises 2 foot brackets, 2 rubber mounts, 2 securing clamps and a new set of screws with lock tabs. It mounts via the existing holes in the chassis rails so no extra drilling is required but if you want a top class belt and braces job, tack weld the foot plate onto the side rails after you've bolted it into place. If you're using a magnesium alloy sump guard, you may have to file away a corner of the side rail foot to clear the wider mount.

4.10. FITTING ANTI-ROLL BARS

Firstly, buy a spare rubber, finis code 905 1302, which you should place on the middle of your roll bar. If you have an 'off, and bend, or shear the clamp, you will almost certainly have destroyed the rubber, so you can slide the spare one into position. Of course, there is the theory that if you have done that much damage, 10 to 1 you will have bent the roll bar as well; but you may not have enough time to change the roll bar, in which case, a shove with a bottle jack and a new clamp will keep you going until more service time is available.

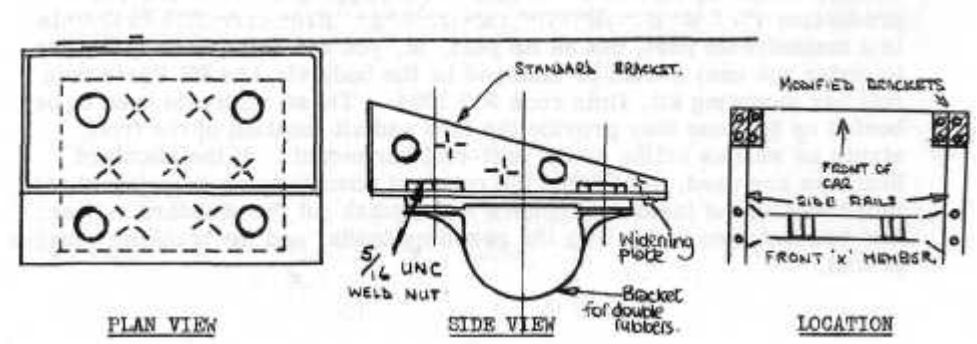
Next, you will find when bolting the roll bar up, that the two outer clamp bolts on each clamp (those directly below the chassis rails) will bottom on the actual chassis rails. So before permanent fitment, position the anti-roll bar brackets. Mark up the two outer holes, and drill out two ½" holes on each rail to allow the bolts to screw fully home. Thirdly, a bit of washing-up liquid will do wonders to help the rubbers slide onto the anti-roll bar.

4. 11. ANTI-ROLL BAR BUSHES

Heavy duty front suspension bushes are available from RS Parts, as follows:

Anti-roll bar mounting (double)	905 1302
TCA - inner	905 3166
- outer	905 3168
Steering rack mounting LH	905 3172
RH	905 3171

Double width anti-roll bar mounting drawings (not to scale)



Please be aware that these articles were written in the 70s and some of the regulations may have changed. Please consult the MSA Blue Book before preparing your car