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## **TECHNICAL TIPS**

### **THE ROYALE SABRE**

#### **1 NOTE**

Whilst the Club is happy to publish Members' comments and recommendations on suppliers, products, etc. it must be emphasised that they are personal views and do not imply any endorsement by the Club or its officers. Members must satisfy themselves as to the suitability of a product or supplier for their particular requirements.

#### **2 HELP AT HAND – TOP TIPS**

Some tips from John Willetts (he is using an early Sierra as a base):

The Sierra front cross member would not fit under the chassis so he cut off the engine mount bracket supports which aren't needed and had a small plate welded to the top of the cut to strengthen it.

A pair of braided steel front flexible hoses were used as the Sierras would not fit under the chassis without fouling some part of the suspension on one lock or another. John fabricated two L-shaped brackets to support these which were fixed to the front cross member. The original engine mounting brackets would not fit the Sabre engine mount bracket support arms which stick out from each side of the engine. The Ford part numbers for these are 6125819 and 6125816.

Sierras have three different diameters of anti-roll bar so make sure you get the correct size bushes. You may have to hacksaw off the old anti-roll bar brackets. The Ford part numbers for the two brackets are 6176932 and for the four bolts 6147850.

John's engine is fitted with a twin choke Webber. Some of these do not have any petrol return to the petrol tank, so only one line is needed. This requires fuel return inlet on the tank to be blanked off. Also many garages will flare copper pipes so you may not need to buy a flaring tool. There are also quite a variety of Cortina radiators, and many of them have pipe inlets with 90 degree angles on them. So to make life easier, try to get one with straight outlets.

John also quotes a professional builder, Wilf Dutton, as recommending tyre pressures for the Sabre of 18 to 21 psi. Obviously, this will depend upon specification etc. It would be useful to compile some lists for both the Drophead and Sabre of built specifications and tyre pressures. This would give new builders a base upon which to start experimenting with their set-up.

*Royale News – Issue 1 January '95*

- 3 The practice of re-inventing the wheel is, perhaps, not the best strategy to employ. To this end, there will always be variations on how to build a kit. Not everyone will want to build a kit in a way different to the manual. However, with such diversity in the available donors there are bound to be alternative ways, or procedure that were not required for the vehicles constructed from which the manual was completed.

New kit owners would therefore benefit from the knowledge gained from constructors. A technical briefing booklet may be beneficial to those who have not reached a certain stage.

Enclosed with this is a technical briefing sheet as opposed to including it within this article. It has been submitted to John Preston and covers the exhaust, propshaft and radiator of a 2 litre Sabre DOHC.

Also enclosed is a technical reporting sheet. If you have found a way of doing something, or a part that helps please fill in the sheet and return it so that others may benefit, including part numbers wherever possible.

In addition, feedback on companies providing services would also be beneficial so that others may be made aware of those providing good service.

*Royale News – Issue 2 March '95*

#### 4 **SABRE 2 + 2**

I have received a call from a Dave Bell about a Sabre 2 + 2. He is very interested in the Sabre but requires at least an additional seat at the back for his young daughter.

John Barlow is currently up to his eyes in overseas orders and has not fully developed this option. Apparently John's idea is to retain the standard body tub, but to reposition the hood.

Is anyone building their car as a 2 + 2? If you are then please give Dave a ring and also please let me know so that others can be informed.

*Royale News – Issue 2 March '95*

## **A STRANGE FEELING – A BUILDER’S DILEMMA – CHOOSING A DONOR VEHICLE**

Having decided to build a kit car, I needed a donor. The Exchange and Mark and various other publications were studied. There seemed to be a lack of damaged Granada’s.

There were a number of Sierras though of varying price. The ones that caught my eye was about 30 miles away. The advert stated that it was a Ghia, clean, low mileage and cheap. A telephone call established that it was a 1988 with an ‘F’ plate.

The question about mileage had the odometer being check and a reply of 39,000 with the added comment that the look of the vehicle seemed to support it. I decided to have a look. However, before setting off I had spoken to John Barlow and asked what to avoid in a crashed car.

On arriving at the yard, I saw the car. A red Sapphire that looked good from the back, offside and rear, but decidedly unhealthy from the nearside. It has been hit very hard in the doors.

I looked for common sense signs that there was no problem as well as John’s points, such as looking for distortion where the suspension etc. mounted. All looked fine. Admittedly the roof had been pushed up and the passenger area floor pan bent. Overall the car looked as though it had been cared for. There was no signs of wear on the carpets.

The engine was started and sounded just fine. A drive was offered, so off I went around the industrial estate. It seemed to drive remarkably well.

I returned and queried that there were no number plates or VIN label. I was informed that they always remove these to stop people climbing over the wall and stealing them.

The strange feeling now came on. Did I really wish to buy a vehicle that was damaged like this? Normally, when looking to buy a vehicle each small stone chip is looked for, pointed out to the owner as a bargaining point if negotiations proceed. But hey, there are two doors, completely stoved in.

The price was £900 including delivery and an offer to buy back any parts that I did not want. I took the plunge.

The car was delivered. I summoned the ear of a neighbour who is a motor mechanic. He gave the mechanicals a clean bill of health and advised against doing anything to it.

So the fun began. I decided to keep it mobile for as long as possible.

The interior was removed, with the exception of the driver’s seat. The offside doors were then removed and stored safely. The dashboard was then stripped out, and still the engine ran. The following items were then removed:

Bumpers, lights, boot, bonnet, seat belts, headlining, nearside doors (with the aid of hammers, chisels, hacksaws and angle grinder).

Having stripped off as much as I could with it running now came the time to remove the engine and gearbox.

The radiator was removed, I then went to work with the angle grinder, cutting out the metal at the front so that the engine only required raising above the crossmember and then the car pushed back to remove it still attached to the gearbox.

All the little items such as clips etc. were removed.

The steering column was then removed, followed by the fuel tank and pump.

The shell was jacked up and the rear suspension removed. Finally, the clamp bolts to the struts were undone, the stub axles removed from these, followed by the removal of the suspension.

The time taken equated to a weekend.

I arranged for the shell to be collected. This was done with a Transit pick-up and two people who manhandled the shell onto the vehicle.

I assembled the items that I did not want and telephoned the company that had supplied the car. Yes, they were interested in the parts, how much did I want. I stated £150. This was accepted. On the day of my journey to Bamber Bridge, I loaded the parts onto the collection van and delivered them.

I retained the Ghia wheels as slave wheels. Once the Sabre is complete I will then sell these.

However, I had forgotten to remove two items from the shell – the rear suspension bump stops. These cost £20 from the Ford dealer.

*Royale News – Issue 2 March '95*

## **6 DONOR v PARTS**

I have heard debates about whether it is better to buy a donor car or parts. Obviously the latter prevents having some form of wreck lying about, being slowly dismantled. However, if it comes as a 'runner', then all the parts match.

Peter Hare followed the 'parts' route, which he successfully did with his last kit car. However, he has discovered that the engine management system did not function. One good feature about the Ford is that it will run with a defunct control box. Enquiries at his local Ford dealer indicated that he had the wrong box. A new one costs in the region of £437 plus vat. He should by now possibly have a correct box from the parts supplier.

If you are following the donor method, please either write or telephone Peter or myself with chassis number, engine number and 'box' part number. This will enable a list to be published to assist others to ensure that they have the correct parts.

*Royale News – Issue 3 June '95*

## 7 **THE VITAL SPARK – Peter Hare**

No, not the Clyde puffer of the TV series, but the ignition spark that is vital to the running of all petrol engines.

Having transferred the Sierra electrics from the donor car to the Sabre, the great day came to start up the engine only to find that there was no spark at any of the plugs. After repeated checking of the wiring, I gave up and called in Steve Hewson of Hometune, who confirmed that the wiring seemed to be OK and then turned his attention to the EEC IV control module. After checking the part number and checking in his reference manual, he announced that I had got an ECU from a 1.6 CHV engine and there was no way that it would function correctly with my 2.0 DOHC engine!

When sourcing my donor car, I had opted to buy a ready stripped car and it would appear that the ECU had inadvertently got switched with the bits from another Sierra. Although my supplier would have exchanged the ECU for the correct unit, I decided to play safe and accept Hometunes offer of a guaranteed service exchange unit. Once this was plugged in, the 2.0 DOHC sprang into life immediately.

However, this was not the end of my problems. After approximately 1,000 miles including a holiday trip to Devon, the engine died on a local shopping trip. The fault appeared to be temperature sensitive, since the engine would restart after a 10 minute cooling period and run for a few miles and then cut out again. The symptoms seeming to point to the EFI ignition amplifier unit which feeds the ignition coil, so this was replaced only to find that the problem was still present!

The fault was finally traced to the crank position sensor which feeds the ignition timing signal to the ECU. So far as I know, this is a very simple inductive sensor which should be far less prone to failure than the complex electronics of the ECU and EFI modules. Since replacing it, the Sabre has covered another 1,000 miles without any problems, despite extreme temperature while queuing to get into Silverstone for the Coys Historic Meeting – more than can be said for a Lamborghini which we saw emitting steam like a Stanley steam car.

While members who have stripped their own donor vehicle should have no problems with incorrect part numbers, anyone buying ready stripped component may care to note that I now have a fairly comprehensive cross reference of ECU part numbers to most of the Sierra/Granada engines, should they wish to confirm that they have the correct ECU for their engines, please call me.

One useful tip learned during this saga is that the EFI ignition module needs a good thermal heat sink. Ford mounts it on to a metal body panel with a heat conducting jointing compound but with the GRP bodywork of the Sabre, this is not possible. As an alternative, I have mounted it on a substantial aluminium plate with cooling fins to give good heat dissipation.

*Royale News – Issue Nov '95*

## 8 ENTREPRENEURIAL ELECTRICS – Peter Hare

I know that Royale can supply a custom made wiring loom for the Sabre, but having used a complete Sierra loom and fuse box on my previous kit car (Marlin Cabrio) I decided to repeat the exercise on the Sabre.

My personal assessment of the factors for and against this exercise are:-

The original Ford wiring diagrams and colour codes are retained which could be an advantage if you ever have to call upon the services of a Ford garage.

All the original Ford fuses are retained – this gives excellent protection and ensures that a single fuse failure is unlikely to be an instant disaster (eg. total loss of lights)

The original control relays are retained which avoids putting the full load current through the relevant switches. This puts less load on the switch contacts and reduces the voltage drop in the wiring. It is also a convenient way of retaining circuits such as dim-dip, wiper intermittent delay, engine management etc.

### DISADVANTAGES

The Ford fuse/relay box is large and difficult to locate in an easily accessible position.

There are a lot of redundant wires in the Sierra loom, which will not be used in the Sabre.

Many of the cable runs will be either too long or too short for the Sabre layout and will require modifications.

### ON BALANCE

I felt that the advantages outweighed the disadvantages and even though the exercise added significantly to the build time, I feel that the end result was worth it.

The first essential is to label *every* plug, socket terminal etc. as you disconnect it from the donor vehicle – don't try to rely on memory – by the time you come to install the loom into the Sabre it will have entangled itself into a malevolent ball of multi-coloured spaghetti which bears no resemblance to what you recall of the original loom.

The first problem with the installation in the Sabre is deciding where to locate the fuse box. I decided to use approximately the same position as in the Sierra, i.e. on the right hand side of the scuttle underneath the air intake moulding. Of course, this is where the wiper motor normally lives but this was evicted to a new home elsewhere. By cutting away the base of the fuse box, it sits on the scuttle moulding with its top face just below the level of the air intake moulding into which a hatch and cover can be fitted giving easy access to the fuses and relays.

The whole of the wiring harness has to be fed down through a hole in the scuttle directly beneath the fuse box and hence it is an advantage to remove all the unwanted wiring to make the loom easier to handle. This is a somewhat time-consuming task and requires considerable concentration checking colour codes and routings against the Haynes wiring diagrams – remember, check twice and cut once!! Keep all of the redundant wire as it will be useful for later extensions to the loom.

Initially the mass of wiring under the scuttle looks quite daunting but don't panic – by carefully segregating the front and rear lighting circuits, the connections to the instrument panel and the various plugs and sockets for the sub-loom, a semblance of order can be restored and you can start to tape and secure the various sections of loom. (Tip, tie wraps are great but use the ones with a releasable ratchet –they are much more convenient and cheaper in the long run).

The sub-loom for the engine management circuits, ABS system, door circuits etc. will have to be routed so that they can be reunited with the main loom. (Tip – if you are using the ABS system, the coaxial cable to the front N.S. wheel is very short so the ABS control box needs to be located right into the left hand corner of the passenger foot well).

Earth connections are a frequent source of trouble – usually intermittent which makes them more difficult to locate and rectify. To minimise the risk of long-term problems, I prefer to create dedicated earthing points at strategic points around the car, using stainless or brass bolts. Even if these bolts are in contact with chassis, I run a substantial earth lead back from those earthing points to a central earth bolt which is connected directly to the battery negative terminal. This may seem a bit 'belt and braces' but it is better than trying to trace an intermittent open circuit on a cold, wet night at the side of the motorway.

With careful and methodical work (and a little bit of luck) you should find that everything will work as it did in the donor vehicle. On the other hand, you could use the Royale loom and save yourself a lot of time!

P.S. The evicted wiper motor is now mounted under the scuttle on the side wall just above the A post diagonal bracing tube on the driver's side. It is nicely out of the way but easily accessible, should it ever give any trouble.

### **EDITORS NOTE**

My fuse box is fitted in about the same place as Peters'. It has fitted without any cutting of the base and utilises its original mounting bolts. My wiper motor is attached to a purpose made plate that bolts on the left-hand side (British N.S.) joining point of the A post crossmember and the angle brackets tying this to the A posts. The plate is shaped to the contours of the under scuttle area. An advantage is that there is easy access with the battery box removed.

## 9 PROBLEMS WITH MT75 GEARBOX - Frank Moir

After considerable difficulty in removing the original spider from the gearbox I fitted the recommended Transit flange. When a correctly torqued I checked for axial and radial runout which was ok.

I then fitted the modified propeller shaft purchased from Royale and initially fastened the bolts to the drive flange at the differential end and torqued these up.

I then fastened the front propshaft flange to the Transit flange. When I rechecked the Transit flange for runout I found that when I rotated the propshaft assembly it was apparently running elliptically causing considerable movement at the gearbox mounting.

A cup of coffee later, I decided to check the radial positioning of the holes in the Transit flange and propshaft. These were OK.

I then rotated the propshaft 90° and retorqued the bolts, same again elliptical movement.

After further checks at stages during fit up it was apparent that the tail of the gearbox output shaft was fouling the yoke of the front universal joint on the propshaft and because of the shape of the yoke was being deflected when fully torqued up. Hence the elliptical movement.

I then talked to Royale who said that they had not experienced this problem before and that the joint at the front of the propshaft was a standard Ford item.

After a night's sleep and a further cup of coffee I ground 1.5 mm off the gearbox output shaft giving me approximately 0.5mm clearance between the end of the shaft and the front universal joint.

Result – the propshaft now runs true.

*Royale News - May'96*

## 10 TOO DARNED HOT – Jim Simmonds

Beware of the auto-factor.

My car is fitted with the 2.3 litre V6 engine. I obtained a radiator for a 2.3 Cortina from a local auto-factor and drilled the bracketry accordingly. However, all was not well and as I and the car boiled up at the side of the road.

I therefore removed it from the car and took it to a local radiator specialist. I told him that it was a 2.3 litre Cortina unit and asked if he could re-core it to give greater cooling. His reaction was to say that he could not as it had plastic tanks. In addition, he did not feel that it would actually cool a V6 and that the auto-factors should not sell them for that purpose.

If it had been capable of being re-cored, then this would have cost £40, but a new one was only £46 (all plus VAT).

With the new unit fitted both I and the car are a lot cooler.

The moral of this story is to use the experts.

*Royale News – May '96*

## 11 **SABRE SUSPENSION** – Peter Hare

Having got used to the novelty of driving the Sabre, I started to analyse its behaviour on the road and became aware that on moderately rough roads (as most roads seem to be these days), surface irregularities could be felt at the steering wheel. My first reaction was to carefully check the front wheel toe-in and gradually reduce the tyre pressures from an initial 27psi. This produced only minimal improvement so I then started to check the tightness of all nuts and bolts just in case any had “settled” during the initial running. I found that the bolts securing the A post brackets to the chassis could be taken up, presumably due to GRP of the floor moulding settling slightly after the original assembly. This again produced a small improvement.

As a result of a conversation with John Barlow, I turned my attention to the steering column and its attachment to the scuttle frame. The upper mounting bracket of the Sierra/Granada column is located quite a long way down the column with the result that any road shock transmitted through the chassis is significantly amplified at the steering wheel by the long overhand. This is more apparent with the adjustable column of the Granada, as the adjusting mechanism is slightly less rigid than the non-adjustable version. In the original Sierra/Granada donor this is not obtrusive, probably because of the greater compliance of the Sierra/Granada front suspension. I found that on my adjustable column fully extended it is important to check that the top of the inner column is still fully engaged in the outer column. I found that I had too much of the inner column projecting through the bulkhead and through the top steering universal joint.

Further road testing over my favourite pothole led me to wonder whether the front suspension travel/compliance was in some way restricted. In the donor vehicle the anti-roll bar is fitted to prevent excessive body roll when cornering and has to be stiff enough to cope with the maximum total weight of the car plus five passengers, a fully loaded boot and a loaded roof rack. Inevitably the manufacturer's choice of anti-roll bar stiffness has to be a compromise between minimising body roll under maximum load conditions without unduly restricting the independent operation of each front suspension unit. When compared with the donor vehicle, the Sabre has a lower body weight, a lower centre of gravity, a maximum of two passengers, a smaller boot capacity and no roof rack load so that the maximum rolling moment is considerably lower than in the donor vehicle and the standard anti-roll bar is far too stiff.

This is not a problem so long as the road surface is smooth and both suspension units are rising and falling in unison but as soon as one side has to cope with a pothole, any attempt at differential movement by the suspension units is resisted by the stiffness of the anti-roll bar which feeds the road shock back into the chassis. This in turn tends to rotate axially around the rear suspension with the result that the passengers are aware of the road shock and the driver feels it through the steering column. During a visit to Bamber Bridge, I asked John Barlow for his views on this matter and having driven my car, John suggested that in the light of his own tests on various anti-roll bar configurations, a reduction of the anti-roll bar torsional stiffness would probably provide a smoother ride without jeopardising the overall handling of the car.

The anti-roll bars fitted to the Sierras/Granada's appear to be either 26mm or 28mm diameter (early Sierras used a 24mm bar but this is not interchangeable with the later models due to differences in the U clamp dimensions) and a possible method of reducing the torsional stiffness, endorsed by John, is to reduce the cross-sectional area of the bar by grinding two flats along the length of the centre section of the bar, between the two U clamps. This calls for considerable care to ensure that the ground faces are absolutely smooth and uniform in order to avoid any possibility of stress points. For the same reason, the ends of the ground faces must be carefully faired into the original circular section of each end. My anti-roll bar is 26mm dia. And with the aid of an angle grinder I have machined two flats across the centre portion of the bar to a dimension of 18mm across flats. After some 800 miles of carried road surfaces I can confirm a marked improvement in ride comfort, only the worst potholes transmit any shock into the chassis/body and the cornering performance has not been affected. I think that further improvement could be gained by reducing the bar to 16mm across flats and I intend to try this when time permits.

The ultimate test would be to try running the Sabre without an anti-roll bar – my Marlin Roadster performed perfectly with no anti-roll bar, but this is not easy as the limbs of the anti-roll bar also act as rear legs of the bottom wishbone. Rally enthusiasts overcome this by replacing the anti-roll bar with adjustable compression struts fitted between the track control arms and the chassis. A separate fully adjustable anti-roll bar is then fitted across the front of the car so as to provide total adjustability and fine tuning of the front suspension. The only problem with the currently available compression struts (apart from the cost!!) is that they use rose joints instead of rubber bushes which results in the very harsh ride, but in a rally car everything is sacrificed in the interests of absolute performance.

I know that Jim Simmonds has explored the subject of modified anti-roll bars with some degree of success and I would be interested to hear the views of other members on the subject of suspension and ride comfort. I am also grateful to Jim Simmonds for bringing to my attention a very useful book, "The race and rally car source book" by Alan Staniforth, published by Haynes. This deals in very practical terms with the basic principles of competition car design and construction, the chapter on steering and suspension being especially informative with regard to anti-roll bar design.

Without boring you, with the mathematical details, Staniforth demonstrates that anti-roll bar stiffness is proportional to the fourth power of the bar diameter and this results in relatively small variations in diameter producing major changes in stiffness, so don't go mad with the angle grinder!

*Royale News – May '96*

## **12 GEARBOX FLANGE REMOVAL**

Several members who have changed the output flange on the MT75 gearbox have commented that even after warming the nut to soften the thread locking compound, the nut is still too tight to be removed with a standard ½” drive socket and tommy bar. Fred Ward has made up a heavy duty socket and spanner for this task and has kindly offered to loan it to any member.

## **13 ALTERNATOR ON EARLY 2L SOHC GRANADA ENGINES**

Paul Wise found that on his engine installation the steering column fouled the alternator. This problem was overcome by fabricating a modified alternator mounting bracket, details of which are available on the Club's Technical Reporting service.

## **14 EXHAUST SYSTEM FOR 2L SOHC ENGINES**

Paul has also sent a fully dimensioned drawing of the exhaust system which he had made up by Custom Chrome of Nuneaton for his Granada based Sabre. Again copies of this are available on a Technical Report.

## **15 TECHNICAL REPORTS – Peter Hare**

The Club's library of Technical Reports is growing, but only very slowly. If you have found an easy solution to a problem, a good source of supply or an interesting modification, please share it with other members by sending me the details for inclusion in our Technical Reports. Copies of existing reports can be obtained by contacting Jim Waites email [jjwaites@ntlworld.com](mailto:jjwaites@ntlworld.com)

*Royale News – Aug. '96*

## 16 **SABRE DOOR LOCKS**

A piece of cake. I cut and reshaped the links from the latch to the inner handle. I then filed flats onto the faces that met, leaving it rough and then joined the cut rods using large good quality electrical connector blocks, with the insulation stripped. The link to the central locking motor was handled in the same way. The link to the external handle was reshaped and did not require cutting. This is an absolute doddle.

Now for the fun bit, the link from the latch to the external lock. I had started with the O/S, I bent links and tried them, all to no avail. The door side impact mounting bracket was in the way. I eventually overcame the problem by drilling a hole in the arm of the latch closer to its pivot and then shaped the link so that it cleared the bracket. The N/S has the slot for the original link uppermost and a large area of metal below. I drilled this area so that the distance from the pivot was the same as the original.

At some point, I may well take off the O/S latch and have the original linkage connection slot welded up and then drill it, so as to reduce the effort needed to turn the key.

P.S. – playing to get the windows to operate correctly, I cut a piece of plywood to fit between the channels and then drew lines to check whether parallel – they were. However, fitting the mechanism and then the plywood showed that the operating arms were not correctly aligned, hence pulling the glass against one side of the channel. I was therefore able to bend the arms to align them and get the windows to operate.

## 17 **SUSPENSION** – Peter Hare

I've had another letter from Jim Simmonds as always technically interesting and thought provoking, this time about the modifications that he has carried out on his front suspension set-up.

Whilst attempting to achieve the recommended chassis/ground clearance and to get the track rods horizontal, Jim found that the gap between the coils of the front springs was down to 3mm which resulted in a severe limitation of the front suspension travel and a “solid” ride. Acting on professional advice, Jim replaced the original 10.5ins / 180lbs/ins springs with 8ins / 300lbs /ins springs which now appear to give a satisfactory ride.

I must admit that I found this somewhat surprising, so I had a look at my own car and found that the average clearance between the coils of the springs was 7mm, which equates to a vertical wheel movement of 97mm (3.8 ins). This seems to give a satisfactory ride – firm enough for enjoyable driving but not uncomfortable on a long journey. Knowing that Jim's V6 engine will be somewhat heavier than my 2L dohc, I decided to find out just how much my Sabre really weighs and how this weight is distributed between the front and rear axles.

A local factory very kindly offered me the facilities of their weighbridge which produced the following results:-

Total kerbside weight (half tank of fuel, no passengers)	1140 Kg
Front axle weight	500 Kg
Rear axle weight	640 Kg

These figures are interesting in that they reveal that the Sabre is only marginally lighter than the donor Sierra but there is a significant transfer of weight to the rear axle which presumably contributes to the nicely balanced handling of the car and the acceptable steering effort, even without power steering.

Armed with these axle loadings and the approximate dimensions of the front suspension linkages, I delved into "The Race and Rally Car Source Book" and calculated the theoretical spring rates required to provide a reasonably sporting ride, but not too harsh, and lo and behold, the spring rate came out at 183 lbs/ins, which is very close to the 180 lbs/ins springs supplied by Royale, so I have decided to leave well alone and await further news from Jim Simmonds.

In order to build up a database on this subject, I would be interested to hear from any members who are able to get their cars weighed, in the hope that we can begin to see how different engines and donor vehicles affect the weight and ride characteristics of the car.

## **18 THINGS THAT GO BUMP IN THE NIGHT – Peter Hare**

I had become aware of a nasty knock from the Sabre's rear suspension when the rear wheels encountered a particularly severe bump and I began to suspect a worn suspension bush or a loose shock absorber mount. However whilst under the car looking for the culprit I noticed impact marks on the underside of the GRP flange that runs across the inside face of the rear wheel arch and I quickly deduced that this was caused by the return spring of the handbrake linkage on the rear ABS calliper fouling the flange on full upward travel

Filing the flange back by approximately 10mm at the point of impact now ensures ample clearance and a quieter ride.

So far as I am aware, this is a problem only on ABS braking systems and could well be restricted to Sierra sourced ABS, since the Granada rear wheel track is slightly wider than the Sierra. I would be very pleased to hear from any members who have fitted either Sierra or Granada ABS systems or whether they have experienced this problem.

## 19 **ABS MASTER CYLINDER ASSEMBLIES** – Peter Hare

Still on the subject of ABS braking systems, I had a call from Brian Rowson who found that the brake fluid reservoir of his Granada sourced ABS master cylinder assembly was fouling the bonnet side.

This surprised me as I was under the impression that all Granada ABS systems have the brake fluid reservoir on the engine side ( LH side ) of the master cylinder assembly and only the Sierra units have the reservoir on the RH side, where it protrudes approximately 10mm beyond the line of the bonnet side.

I encountered this snag on my own Sierra based car and overcame it by swapping the Sierra ABS unit for a Granada unit. Discussion this with John Barlow revealed that both types of unit can be found on both Sierras and Granada and as an alternative to swapping the unit, it is possible to elongate the mounting holes in the bulkhead so that the unit is moved approximately 10mm to the left so that the reservoir just clears the bonnet side.

## 20 **GEARBOX MOUNTING BRACKET**

Frank Moir contacted me regarding the clearance between the gearbox mounting bracket and the underside of the floor (or rather, the lack of clearance!!). Some brackets, I think they are the ones used with the MT75 gearbox, have two “bumps” which stick up above the mounting face of the bracket and which touch the underside of the floor before the bracket securing bolts are fully tightened.

I had the same problem and got round it by fitting 7mm spacing blocks between the bracket and the chassis, thereby creating space for the bumps. This lowers the gearbox by 7mm but this is well within the capabilities of the propshaft universal joints and it makes very little difference to the ground clearance.

## 21 **LOW TEMPERATURE BAKING OF GRP BODY PANELS**

John Preston wrote to me on this topic, as he has been advised that not only does it accelerate the paint drying/curing process but in the early stages of painting, it also helps to stabilise the GRP and minimises the risk of hollows appearing at a later stage. This sounds very plausible but I wonder whether we have any paint experts out there who can elaborate on this topic?

**22**     **DOES YOUR CAR SOUND LIKE A HELICOPTER?**

If it does, then you may be suffering from what Ford described as “the helicopter noise”. This was caused by a high frequency oscillation in the fuel pressure regulator of the early 21, dohc fuel injected engines and was most noticeable at tick over when hot.

Ford’s solution was to fit a new pressure regulator with a modified damping mechanism to eliminate the oscillations in the fuel line. Most engines will have been modified under warranty but if you do have the misfortune to encounter this phenomenon, the modified regulator is part no. 7045224 and it can be fitted quite easily without any need to remove the fuel rail or the inlet manifold.

*Royale News - Nov. ‘96*

**23**     **SAFETY CHECK – BRAKE CALIPERS** – Peter Hare

Paul Feeley has brought to my attention a potentially dangerous situation with regard to the bolts securing the brake callipers to the hub carriers. Paul found that after a relatively low mileage, these bolts had become very loose to the point where one calliper was in imminent danger of parting company with the car. Enquiries suggest that the bolts used at the factory are coated with a locking compound and if they are removed in service, they are given a spot of Loctite on refitting. Although this incident was experienced on the rear callipers of an ABS system, it could also occur on the front callipers of any other braking system.

It is strongly recommended that all calliper securing bolts be Loctited during assembly and checked for security during the early life of the car.

**24**     **TRACK CONTROL ARM BUSHES** – Peter Hare

Early Granada’s/Sierra’s had a reputation for accelerated deterioration of the rubber bushes between the track control arms and the anti-roll bar (often referred to as the Compliance Bushes). Ford introduced a modified design of bush which is reported to have a greatly improved life and performance.

The modified bushes can be identified by the wavy pattern moulded on the outer faces of the bush and the metal inserts where the bushes are inserted into the TCA and where the anti-roll bar passes through the centre of the bush. The bush is in two parts which are fitted one from each side of the TCA, the central metal inserts being pulled together as the anti-roll bar nut is tightened up.

The Ford part number of the modified compliance bush is 5021729 – refer to the Haynes manual for information on the correct fitting of the associated dished washers.

## 25 **DASHBOARDS & DOOR CAPPINGS**

I had a letter from Nick Nichols recently with news of the customised dashboard, burr walnut veneer on a birch ply base which he has had made by Rob Hancock of BH Veneered Dash Facias. Nick is delighted with the results and tells me that Rob now has a pattern for the Sabre dash which he can adapt to customers' individual preferences for instrument and control layouts. Nick is also having matching door cappings from the same source and these too should be available to other Sabre owners who are looking for the classic 1930's styling.

By chance, Rob's premises are only a stone's throw away from me, here in Alsager and I can give my personal endorsements to Nick's recommendation as I had a dashboard from him for one of my previous kit cars. Rob is ex-Rolls Royce and is building up an enviable reputation in the classic restoration market so his order book is filling up quite quickly. If you are interested, Rob can be contacted at BH Veneered Dash Fascias, Unit 2, Townend Farm, Audley Road, Alsager, Stoke-on-Trent, ST7 2QR. Tel: 01270 883933 (current information correct Nov. '14)

## 26 **WIRE WHEELS FOR THE SABRE**

In his quest for the 'classic look', Nick is also planning to fit wire wheels to his Sabre and has had discussions with John Barlow regarding the correct specification, particularly rim offset.

Talking to John at the Exeter Show, he told me that he has identified a suitable splined adaptor to fit on to the Ford hubs and is now awaiting a sample wheel from Motor Wheel Services. As soon as I have further news from John, I will pass it on, but in the meantime I would be pleased to hear from those members who are already using wire wheels. Information on diameter, rim size, number of spokes, rim offsets, splined adaptors, sources of supply, etc. would be most useful.

On a cautionary note, if you are offered second-hand wire wheels and/or adaptors which look as though they may be suitable for the Sabre, please be VERY CAREFUL. I have seen second-hand wheels with dodgy spokes and badly corroded rims, both of which may be hidden under a quick coat of paint. Badly worn spines on both wheels and hub adaptors may be concealed under a generous layer of grease but are potentially dangerous if they fail under heavy breaking.

The moral is to use components only from a reputable source or to examine them very carefully if they are second-hand.

### **SABRE WIRE WHEELS – Barrie Evans – added Dec. '12**

5 stud (Granada hubs) Wire wheels are available from mwsint.com. This is the same manufacturer who supply the Morgan Car Company. Their web site has photos of several Sabres including mine fitted with wires. Manufacturers Ref: chrome XW774 bolt on chrome wire wheels fitted with 185hr15 Vredestein tyres and 175/185R15 Classico tubes. The front valance will require slight modification by filing away a small amount of GRP to give the larger tyres sufficient clearance.

## 27 MAPS

No, not the cartographic type - they're the navigator's responsibility. I'm talking about the Manifold Absolute Pressure Sensor, (those of you who were sensible and stuck to good old fashioned carburettors can go and put the kettle on, take the dog for a walk or just skip to the next article).

On the DOHC engine, the EEC IV control unit uses the manifold pressure as one of the inputs to control the fuel injectors and I suspected that a fall-off in acceleration and throttle response was due to a fault MAPS unit as its voltage output was a constant 4.9 volts regardless of the variations in manifold vacuum. Horrified by the cost of a replacement unit, I mentioned it to the friendly Ford service manager who informed me that unlike many sensors, the MAPS unit output is a variable frequency signal at a constant voltage. A quick check on the diagnostic oscilloscope showed the frequency of the MAPS output to be varying with manifold pressure as per specification.

As it turned out, the lack of performance was diagnosed as possible gumming up of the injectors and a dose of injector cleaner in the fuel tank seems to have done the trick.

I suppose that the moral is to check the simple things first and not to get carried away by the high tech stuff.

## 28 UNDERSEALING THE WINGS

Why? You may ask, does the build manual call for the wings to be undersealed when we all know that our lovely grp wings cannot fall victim to the deadly tin worm.

Those of you not experienced in the running of grp bodied cars may not be away that a large stone thrown up by the tyre on the underside of the wing can cause a star shaped crazing of the top surface gel coat, even though there may be no obvious damage to the main body of the grp laminate. If this occurs, respraying alone is not sufficient and it is necessary to sand out the damaged gel coat and rebuild the grp surface prior to repainting.

This is more common in thin (cheaper?) mouldings and hence is less likely to be a problem with the very substantial Royale mouldings but having seen the size of some of the debris that gets on to the motorways these days, it is prudent to give the underside of the wings a thick coat of underseal to absorb the initial impact of foreign bodies (Very sorry Monsieur, I didn't see you lying in the road).

Having spent several uncomfortable hours under my own car applying a thick coating of underseal, I would strongly recommend that this job be done before the wings are fitted to the car. It is much easier to apply underseal if the wings are upside down at a convenient working height so that any excess drains down towards the top of the wing where it does the most good, rather than dripping off on to the garage floor, up your sleeve, into your hair etc. !

An even better alternative to underseal is Rubbercote (available at most of the major shows) which gives a very tough and resilient rubberised coating. The major drawback is that it flows more than conventional underseals and takes rather longer to cure by interaction with atmospheric moisture – hence the advisability of applying it before the wings are fitted.

*Royale News – Feb. '97*

## 29 **SPEEDOMETER DRIVE ON THE MT75 GEARBOX**

I am grateful to Fred Ward for information about a potential problem with the speedometer drive on the MT75 gearbox.

At a fairly advanced stage of assembling his Sabre, Fred found that there was no drive to the speedometer cable and this eventually turned out to be due to the speedometer drive skew gear being loose on the gearbox output shaft. In common with several users of the MT75 gearbox, Fred had changed the gearbox output coupling from the three armed spider to the Transit circular flange coupling and although the retaining nut had been correctly tightened, it had failed to secure the bearing/spacer/skew gear assembly that is mounted on the output shaft. Further tightening failed to cure the problem so Fred removed the drive coupling and fitted an additional spacer washer, 1/8" thick to the shaft assembly (diameter small enough to pass through the oil seal), replaced the coupling and tightened it all up again. Success – speedometer drive restored.

The interesting corollary of this story is that Fred managed to accomplish this rectification with the body tub in situ over the gearbox. This was achieved by cutting access holes in each side of the transmission tunnel, the nearside cut-out being approx. 11" x 7" extending from the high point of the gear-lever bracket back to the propshaft coupling, giving access to the gearbox output shaft and the speedometer pinion housing. The offside hole was approx. 6" x 6" positioned to give access to the speedometer cable connection.

Covers for these two cut outs were made from the pieces cut from the inner door panels, approx. 1/2" larger all around than the holes and secured with 3/4" x 8 ss c/s self-taps into Spire nuts clipped to the edges of the cut outs.

Whilst this is not a task that one would relish, it's easier than dropping the gearbox or lifting off the body tub and the advice to all current builders is to check the speedometer drive before you fit the body tub.

N.B. Fred has supplied me with an exploded view of the MT75 gearbox which I can copy to anyone who is interested.

### 30 **REAR WING SPLASH GUARDS**

Also from Fred comes a suggestion for an alternative material for the splash guards fitted inside the rear wheel arches. Fred has “acquired” a couple of lorry mud flaps approx. 24” x 24”, manufactured from a rubber/plastic material approx. 1/8” thick which he thinks may be as good as or even better than the aluminium in the manual.

### 31 **KEEPING YOUR COOL – Jim Simmonds**

Having had discussions with Bagshot Radiators I have obtained the following information about Cortina radiators which may be of use to other Sabre owners:

The standard radiator will cope with a maximum of 120 bhp. The uprated one, with double the number of tubes, will cope with 15 bhp.

Something for builders to bear in mind. I am about to fit the uprated one as a 2.3 V6 plus auto box has absolutely no margin for error with the standard radiator.

**EDITORS NOTE** – I can vouch for the need to ensure that the radiator is adequate. My car is fine as long as it is moving. Become static in a jam and the temperature rises and rises. I am currently using only the viscous fan. The next step is to purchase a radiator that has far more tubes than mine already has AND to fit an electric fan. Obviously it is easy to be wise after the event, but I would urge anyone still building their car to err on the side of caution and over specify the requirements for this area, especially if you plan on continental touring in the car.

### 32 **THE SPARK OF GENIUS – Peter Hare**

Are you aware that the motorist owes a great deal to the electrical engineer ?

Three of the greatest car designers who helped to shape the emerging motor industry at the turn of the century. Ferdinand Porsche, Rolls Royce and Henry Ford, all gained recognition as electrical engineers before they turned their attentions to the motor car. Whilst Royce and Ford adopted the petrol engine as their prime mover, Ferdinand Porsche saw the advantages of electric transmission and built a series of practical vehicles with electric motors incorporated into each wheel hub, (thereby creating the first 4s4 drive ? ). In 1900, just as in 1996, battery weight/capacity limited the range of his vehicles so Porsche designed a ‘MIXTE’ system using a petrol engine to drive a dynamo to feed the hub mounted motors. A century later it all sounds remarkably familiar!

“Plus ca change, plus c’est la meme chose”

*Royale News – Feb. ‘97*

### 33 **ROYALE OWNERS CLUB TECHNICAL SEMINAR – Peter Hare**

#### **At HONILEY COURT 12<sup>th</sup> APRIL 1997**

*During the seminar there was a great deal of useful discussion and I have endeavoured to summarise the relevant comments, as shown in italics after each of the sections below. Where appropriate, these comments will be relayed to Royale as part of the Club's policy of encouraging the mutually beneficial exchange of information.*

#### **INTRODUCTION**

These notes are a summary of the salient factors which have emerged in the past year as a result of the many conversations that I have had with Members and others who are involved in the building and running of Royale cars. Not surprisingly, these discussions have been predominantly about the Royale Sabre, but many of the issues raised may also relate to the Royale Drophead and feedback from Drophead owners is always welcomed.

#### **BASIC KIT and BUILD MANUAL**

I am not aware of any significant problems with the basic kit quality and many people have commented favourably upon the strength of the mouldings and the high standard of the gelcoat.

A number of members have spoken to me seeking clarification of various points in the build manual or suggesting amendments. I have updated my own copy of the manual in line with these comments and sent it to Royale who have undertaken to incorporate the proposals at the next update.

*The overall high quality of the kit components was endorsed by the meeting but some members reported flaking paint finish on the front suspension wishbones. These were queries as to whether the chamfering of the front chassis cross member was now standard or only for specific engines.*

*There was a suggestion that guidance in the manual on the routing of the ABS cables from the callipers to the ECU would be helpful.*

### 34 **ENGINES & TRANSMISSIONS**

There is no clear preference for any particular drivetrain, but the big V6 and 2L DOHC engines seem to be popular and Royale report that approximately 10 customers have specified automatic transmissions.

Alternator/steering column clearance may be marginal with 2L SOHC engines and a shorter fan belt or modified alternator mounting bracket may be required.

Differential ratios between 3.14:1 and 3.92:1 are available. I am using a 3.92:1 differential, MT75 gearbox and 2L DOHC engine with complete satisfaction. Information on other member's choices would be helpful when speaking to potential builders.

*No specific engine problems were reported (despite some reservations expressed in certain quarters of the used vehicle trade over the 2L DOHC engine). It was agreed that as a sensible precaution, cambelts should be replaced during build and there was a request for advice as to when timing chains should be replaced.*

*There was a query as to whether the Capri V6 engines can be fitted to the Sabre without major modifications.*

### **35 RADIATORS**

Several members have obtained heavy duty, high capacity or rally spec. Corina radiators rather than risk the marginal performance of cheap aftermarket products. Local radiator rebuilding specialists seem to provide good service at very reasonable prices and national companies such as Anglo Scottish or Serk Marston are worth a try.

So far I have had no reports of serious over-heating, even when running without an overflow/expansion tank.

*It was agreed that it would be helpful if the manual could advise which Cortina radiators are most suitable, together with advice on the position and angle of outlet pipes.*

*A member commented on the need for a radiator cap with a maximum relief pressure in order to get the water temperature high enough to operate the electric fan thermostat before the radiator started to vent to atmosphere.*

*A Drophead owner suggested that an electric fan mounted close to the Drophead radiator would be more efficient than the engine driven fan which is too far back from the radiator to ensure good cooling under extreme conditions.*

### **36 SUSPENSION**

There have been no reports of significant problems during assembly, other than concern at the excessive angle of the rear drive shafts at the rolling chassis stage. This returns to normal as the assembly proceeds so have faith and do not attempt to cut down the rear springs.

Modifications to reduce the stiffness of the front anti-roll bar seem to be beneficial and Royale are now including the relevant instructions in the manual.

*Members expressed general satisfaction with the all-round performance of the suspension, several builders having modified the front anti-roll bar in accordance with the manual. One owner of a V6 engine Sabre reported that he had fitted 300 lb in front coil springs in order to avoid the springs going solid under severe bump conditions and has found that this gives a satisfactory ride*

*There were differing views as to the suitability of Granada rear springs as some Members felt that they made the rear height too high at the rear.*

### **37     STEERING**

Most builders seem to be using the manual version but those who have used the donor power steering system report satisfactory operation in contrast to John Barlow's misgivings of twitchiness or over-sensitivity when he tried it on the prototype Sabre. On the 2L DOHC engines the power steering pump gets in the way of the steering column and hence needs to be relocated on the left-hand side of the engine. Has anyone carried out this?

*Members who have fitted power steering have expressed satisfaction with the results but unfortunately none of these owners were able to attend the seminar. There was a request for confirmation of the gear ratio of the rack currently fitted to the Royale demonstration car.*

*A Drophead owner reported that the power steering extension pipes supplied with his kit were a little too short for easy installation and suggested that this be checked with Royale.*

### **38     BRAKES**

No problems have been reported with the standard system but there have been minor difficulties with some of the ABS installations. Warning light malfunctions can usually be traced to wiring/component faults and there has been a report of an open circuit pressure switch, which disabled the hydraulic pump. If DIY continuity tests are inconclusive, a diagnostic rig in the hands of a competent operator will usually trace these types of faults.

The difficulty with the ABS hydraulic reservoir fouling the bonnet side on some Sierra master cylinder assemblies can be overcome by elongating the mounting holes in the bulkhead\* and moving the whole assembly a little to the left but, in order to avoid this situation, Royale are now specifying that only the Granada unit should be used.

*\*A member stated that this was not correct as the realignment of the master cylinder necessitated blanking off the original cut-outs and cutting new mounting holes much further to the left which in turn affects the fitting of the pedal box. In the light of this it is essential to obtain a Granada ABS unit with the reservoir mounted on the left-hand side of the master cylinder, as recommended in the build manual.*

### **39**     **WHEELS**

The 15" x 4 stud steel wheels are proving popular on Sierra based cars, even though retaining clips have to be fitted to secure the chrome hub caps. Importing these wheels via Perry Engineering seems to be cheaper than ordering them through local Ford agents.

There is also a significant interest in spoke wheels despite their weight and cleaning problems, but rim offset is a major factor which is complicated by the additional offset created by the use of centre-lock adapters. Wire wheels which bolt directly on to the Ford hubs are an alternative and Royale are currently awaiting delivery of the first batch of these wheels with the appropriate offset. I understand that these will be for the 4 stud Sierra hubs only, but Royale will release full details via the newsletter as soon as they can offer them to customers.

### **40**     **TYRES**

A tyre width of 185 appears to be the maximum that can be used without fouling the chassis on full lock and an 80 profile gives maximum ground clearance and looks right. Has anyone found a 185/80 tyre other than Avon.

*It was reported that 185/80 x 15 tyres are available under the brand names of Marshal and Kuhma, but care must be taken to ensure that the speed ratings are compatible with the performance capabilities of the car on which they are to be used.*

### **41**     **BODYWORK**

I have had several enquiries about the door glass height settings and I have asked Royale to clarify this in the build manual. Royale have advised me that the dimensions quoted in the current manual are intended to give an initial approximate height setting and the final adjustment is best left until the hood is fitted, when the glass height should be set to align with the side rail seals. Royale have also advised that the Granada lift units incorporate an additional adjustment between the glass clamp and the roller guide which makes this final setting of the glass height much easier. Fitting of the boot lid seems to cause some difficulties – the seal flange needs cutting back to allow the boot lid to fit into the boot aperture until it aligns with the ear body contours. There have also been reports of minor discrepancies in the boot lid curvature that may necessitate a degree of compromise when aligning the lid. Royale tell me that assembling the components of the boot lid is carried out while the sub-assemblies are still in their respective moulds and hence any variation in contour once the completed assembly is extracted from the moulds should be minimal and should not exceed 1-2mm.

Assembling the hood frame and hinge mechanism is a trifle tricky and it is essential to get the various components the right way round so that all the holes line up.

Fitting the hood material needs patience and perseverance and I would suggest that it is better to stretch and clamp the fabric temporarily, leave it for 24 hours and repeat the process several times to make sure that it is fully stretched before making the final attachment.

The side rails above the door glass seems to have caused some confusion, possibly because there were introduced as a retrospective modification and I have asked Royale to ensure that this is clarified in the build manual.

The build manual instructs that the bonnet should be riveted to the centre hinge but I would suggest that using countersunk screws and nyloc nuts is more convenient when it comes to dismantling, the bonnet for painting or for repairs in later life.

The Ford heater in the Sabre is more than adequate but with the hood or hard top in position its effectiveness is limited by the lack of an air exit to ensure a good airflow.

I have been experimenting with various solutions and I am currently trying two exit vents in the floor at the bottom of the hood stowage bay.

Seats continue to exercise the ingenuity of many members as none of the usual aftermarket seats seem to meet with general approval. I hear mention of Capri, Volvo, Rover 2000, etc. as possible alternatives to my Ford Escort source – how about some feedback on this very important topic?

I have had one or two comments about poor quality of chrome plating particularly on the Drophead bumpers, and John Barlow has assured me that any Royale manufactured parts with unsatisfactory plating will be replaced or replated. I have also been making preliminary enquiries about stainless steel flat blade bumper's but it looks as though these could be quite expensive, especially if owners want to surface finish and polish comparable with chrome plating.

*There was unanimous agreement that the accuracy and quality of the GRP mouldings are excellent.*

*A member suggested that minor adjustment of the flange carrying the seal across the lower edge of the boot opening can be achieved by carefully warming the GRP with a hot air gun until the flange can be eased inwards to facilitate alignment of the boot lid within the boot aperture (This should not be necessary but if attempted, it must be done with great care and only as a last resort. – P.H.)*

*A minor problem was reported with replacement door glass which appeared to be slightly larger than the original, necessitating realignment of the glass guides. This will be checked out with Royale.*

*Several Members reported difficulty in finding a jack which will go under the chassis when changing a flat tyre and it was proposed that Royale be approached to see whether jacking brackets could be incorporated into the chassis to facilitate easier wheel changing.*

*The ideal seat is as elusive as ever but there was a suggestion that Metro seats are worth considering.*

## 42 ELECTRICS

I am not able to ascertain any clear preference between the Royale and donor vehicle looms. Installing the Royale loom is probably much quicker and simpler but there have been comment on problems with interfacing to the engine management systems. An analysis of the more likely donor engines reveals some 9 different interfaces (and that does not include the automatic transmission variations). Most donor vehicles have the engine management and ABS relays on a sub panel under the dashboard and they will be transferred to the Sabre as part of the relevant engine management or ABS sub looms, but on the SL DOHC Sierras, the engine management relays are mounted in the main fuse panel and are part of the main loom of the donor vehicle. The Royale wiring harness does not allow for this anomaly so a sub loom is currently being introduced to cope with the 2L DOHV EFI engine. On later donor vehicles the ABS system has two pump relays, one of which is activated with the ignition switch in its first position ® so that hydraulic pressure can be obtained without the engine running, thereby ensuring that full braking is available if the car is being towed. I understand that this connection is not incorporated in the Royale loom and I would suggest that Members consider running an extra wire from the R terminal of the ignition switch to terminal 86 of relay M13.

I would be interested to hear from members who have experienced any difficulties when installing the Royale wiring loom.

Over the years Ford made several changes to the functions and wiring of the steering column stalks. Connections to the horn, wiper delay, windscreen washer, etc., may produce some interesting results, especially as in some cases Ford continued to use the same plugs and sockets in the steering column looms.

*It was felt that the introduction to the Sabre build manual and the accessory price list should make it clear that the Royale wiring loom covers all of the necessary electrical services plus interfaces for the engine management, ABS and electric window system which must be recovered from the donor vehicle for interfacing into the Royale loom.*

Member noted that if builders insist upon using the donor vehicle loom from a later Sierra or Granada, the fuse box is quite bulky and there could be installation difficulties.

## 43 DRIVING / HANDLING

On my car I suspect that the donor Sierra rear springs may be too soft under full load conditions and Granada springs may be more suitable. Comments on this topic, from the owners of Granada based Sabres, would be interesting

The front shock absorber and spring rates seem better suited to the heavier V6 engines and even with the thinned down anti-roll bar, I find that the front suspension sometimes 'thumps' on bad potholes.

Any tendency to scuttle shake tends to be amplified by the large overhand of the Ford steering column, especially the Granada adjustable column whose clamping mechanism is less rigid than the non-adjustable version. I found that rechecking all the bolts in the scuttle frame improved the situation, special attention being given to the bolts anchoring the A posts to the chassis.

Despite these minor niggles, I find the ride and handling of the Sabre quite satisfactory (and better than some production cars that I have driven).

#### **44 SINGLE VEHICLE APPROVAL (SVA)**

The club has purchased copies of both the SVA Test Manual and the MOT Test Manual in the hope that we will be able to advise members who have queries about testing procedures.

At present, all the indications are that kit cars such as the Sabre and Drophead will have to be subjected to SVA scrutiny before they can be registered. Kits purchased prior to 1<sup>st</sup> Jan 1998 are subject to certain concessions until 1<sup>st</sup> Jan 2000, but these concessions are relatively minor and should not be seen as significant relations. Preliminary inspections suggest that the basic design and construction of the Sabre should present no problems. However, there could be a need for minor changes to bonnet catches, running board strips, toggle switches etc. in order to eliminate unacceptable projections or sharp edges, and the examiner will be looking for the correct 'E' marks on lights reflectors, mirrors, etc. Steering wheels with drilled or slotted spokes will not be accepted and wood rims must be 'non-splinter'.

Whilst the preliminary indications are encouraging, we are pressing Royale to submit a car for approval at an early date so that they can give owners a firm assurance that cars built in accordance with the manual will obtain SVA certification.

*Members endorsed the Committee's view that Royale should be encouraged to put cars in for pre SVA appraisal, sooner rather than later.*

*Royale News – May '97*

45 **INDEX OF TECHNICAL TOPICS – JULY 1997 – Peter Hare**

The following Sabre Technical Reports are on file and available to Members on request. Please remember that the information contained in these reports has been sent in by other Members in good faith but it is your responsibility to ensure that it is appropriate to your requirements.

**No. 1 Auto transmissions** – Details of modifications to the transmission tunnel to accept the auto box.

**No. 2 Gearbox output flange** – Changing the MT75 gearbox output flange from the Sierra three arm spider to the Transit circular flange to enable the fitting of a standard Hardy Spicer propshaft universal joint.

**No. 3 Radiator** – Suggestion for high performance radiator to ensure improved cooling.

**No. 4 Exhaust system on 2L dohc** – Suggestions for modifying the production Sierra system to fit the Sabre chassis.

**No. 5 Wiper motor** – Wiring diagram with colour codings for interfacing the BL wiper motor to the Ford donor loom.

**No. 6 Engine ECU identification** – Part number identification chart for all EEC IV efi engine control units used on Sierra and Granada 4 and 6 cylinder engines, both manual and auto transmissions.

**No. 7 Heater Unit** – Hints for easier installation of the under dash section of the heater unit.

**No. 8 Power steering rack** – Warning on the effects of incorrect hydraulic connections.

**No. 9 Exhaust system on 2L sohc** - Suggestions for modifying the production Sierra system to fit the Sabre chassis.

**No. 10 Alternator on 2L sohc** - Details of modified alternator mounting bracket to avoid contact between alternator and steering column. (May be relevant to 2L dohc engines also).

**No. 11 Anti-roll bar** – Modification to front anti-roll bar to improve front suspension performance.

**No. 12 Donor wiring harness** – Comments to assist with the adapting of the Ford donor wiring harness for use in the Sabre.

**No. 13 Engine management schematic wiring diagrams** – Schematic diagrams to aid the interconnection between the engine management harness and the main electrical system.

The relatively small number of Technical Reports received from Members may be an indication of the high standard of design and production achieved by Royale but it is in the very nature of kit car assembly that builders will find easier or different ways of doing things alternative components and accessories, etc., so please share your knowledge and experiences with the rest of us. Just drop me a note with the essential information, sketches, etc., and I will type it on to the reporting form and put it on file.

#### **46 DIFFERENTIAL RATIOS – Peter Hare**

Sierra/Granada differentials usually have an aluminium tag attached to the casing stating the ratio but this is not very accessible when the unit is still in the donor vehicle so I am grateful to Mick Knight for news of an easier way to establish this information.

If you can find the vehicle VIN plate, box number 10 (4<sup>th</sup> box down on the left hand side) should contain a single letter or digit which defines the differential ratio, as follows:-

M – 3.14      A = 3.36      U = 3.62      3 = 3.64      T = 3.91      D = 3.92

John Barlow tells me that he favours the 3.92 or 3.91 units and I can confirm that this gives good performance through the gear cruising at motorway speeds. I would be interested to hear from anyone who has used any of the other ratios.

#### **47 PROTECTIVE PLASTIC COATING ON BONNET PANELS**

Two members have reported difficulty removing the protective plastic film from the bonnet panels prior to painting. It would appear that if the panels are left in sunlight for an extended period, the plastic film hardens and bonds itself to the aluminium so securely that it requires mechanical or chemical treatment to remove it, so it would be wise to keep the bonnet panels in a dark place or well wrapped up until you are ready to start work on them. If you do encounter this problem, acetone is reported to be a possible solvent but this is expensive and should be used with great care.

#### **48 INTERIOR TRIM**

John Preston has come up with a suggestion for a convenient method of adjusting the gap between the dashboard top and the base of the windscreen in order to accommodate any thickness of the material used to trim the dashboard top. John modified the dash mounting brackets supplied with the kit by cutting off the end that normally attaches to the scuttle frame and drilling a slotted hole in the leg of the bracket. A new bracket was made to attach to the scuttle frame using one of the existing 8mm frame bolts and the leg of this bracket was drilled and tapped to coincide with the slotted hole in the other half thereby allowing the position of the dash to be adjusted relative to the windscreen to accommodate whatever thickness of trim material you choose to use.

John also offers a word of caution to those of you who decide to use the up market Granada interior door handles on a Sierra based Sabre. There are two alternative access holes in the inner skin of the door, 45mm dia for sierra based cars and 19mm dia for Granada. If you use Granada handles make sure that you cut only the 19mm Granada holes, otherwise you will have problems when you come to fit the retaining plates for the door grab handles.

## 49 WHEELS AND TYRES

**Hub caps** – Further to Paul’s information on Sierra 15” steel wheels in the previous Newsletter, some members have been disappointed to find that these wheels do not have attachment points for chrome hub caps. A simple solution is to drill three equally spaced holes in the wheel and fit three ball headed studs so that the hubcap is a spring fit over the heads of the studs. John Preston has identified a suitable ball headed stud as Ford part no. 6730559 but be warned, they cost 96p each plus VAT and you will need 15 of them. Ford use them as pivots for the gas struts on tail gates so you could try raiding all the Ford hatchbacks in the local breakers yard.

I cannot imagine that these studs are ever replaced on Ford cars so if many Sabre builders start ordering them 15 at a time through their local dealers, it is going to cause consternation in Fords stock control / replenishment routines!

You may be lucky and find suitable hubcaps at one of the classic car auto jumbles but it is no dearer and much easier to use Lada units, part no. 21060/3102014/00 at around £57 for a set of four (inc VAT). John tells me that on his wheels he found a feint pressing line around the wheel at exactly the right pcd for the Lada hubcaps.

**Spoked wheels** – Sabre builders intending to use bolt-on wire wheels may be interested to know that Royale are still waiting for the delivery of the first batch of wheels from MWS, now several months overdue, so you will have to be patient and use your donor vehicle wheels as stop gaps.

**Tyres** – Following earlier comments on the availability of 185/80 x 15 tyres, John Preston has gained access to the computer at his local branch of National Tyres and has come up with the following additions to the Avon, Marshall and Kuhmer brands mentioned in the previous Newsletter –

Vreidestein – this is a well-established brand from the Netherlands

Barum )

Sime ) - these are thought to be continental or east European budget brands

Mabor )

Obviously, owners must take care to ensure that the tyres which they decide to use have an adequate speed rating, bearing in mind that the Sabre is no light weight and can put significant braking and cornering loads on the tyres.

## 50 STEERING WHEELS

If you are looking for a really nice wood rimmed steering wheel to complete your interior trim then you might be interested in the range of Italian steering wheels retailed in the UK by Kenmore Industries Ltd, tel. no. 01327 706881. I suspect that they are fairly pricey but they are beautifully finished and some of them have a definite “retro” styling which suits the Sabre.

## 51 ENGINE MANAGEMENT ELECTRICAL SYSTEMS

Knowing that some members find the Haynes wiring diagram somewhat less than user friendly I have prepared simplified schematic diagrams for most of the Ford engine management systems that are likely to be used in the Sabre, showing where they interface into the main electrical system. If you think that these diagrams may be of assistance, they are not available through the Club's Technical Report service, an index of which appears elsewhere in this Newsletter.

*Royale News – Aug. '97*

## 52 SVA TESTING

The DOT have now made so many U Turns on the SVA Legislation that I begin to wonder whether they know which way they are going. Here we are barely 2 months from the implementation date and the goal posts are still being moved – perhaps it is our own fault for being too complacent and Joseph de Maistre was correct when he wrote “Every country has the government it deserves”. I suspect that the television series “Yes, Minister” was much nearer to the truth than I ever imagined!!

So, it now appears that virtually all kit cars presented for registration after the 1<sup>st</sup> January 1998 will be subjected to the SVA test (at a fee currently quoted at £165) but the good news is that in common with the majority of responsible kit manufacturers, Royale have been in close consultation with the SVA authorities and on the Sabre the only significant criticism seems to be the bonnet catches whose hooks are deemed to be hazardous projections. Also, the front and rear indicators, the rear/stop lights and the rear view mirrors did not carry the relevant “E” approval markings. For kits purchased prior to 1<sup>st</sup> January 1998, the SVA clauses relating to hazardous projections and E marks for lights and mirrors will not become mandatory until 1<sup>st</sup> January 2000 so cars currently in builds should not have problems with these items provided that they are completed and tested before 1<sup>st</sup> January 2000. Royale have already sourced the necessary items to satisfy these SVA requirements and are incorporating them in the car currently being built for Germany.

There are one or two other items on the Sabre which have not been commented on by the SVA testers but are receiving minor adjustments by Royale in order to forestall any possible objections in the future from over-zealous examiners. I understand that these include the repositioning of the outer ends of the front bumpers a little closer to the front winds and fitting the windscreen washer jets closer to the windscreen. These are minor points but it is good to know that Royale are trying to pre-empt any potential problems. John has incorporated all of the above changes into the German car and is planning to put this car in for SVA examination in order to obtain formal DOT certification which will then provide customers with documented evidence of compliance.

The news for the Royale Drophead Coupe is not so good as there are some rather more fundamental features such as the external door hinges which will require modification to meet SVA requirements and I understand that Royale are not accepting any further orders for the DHC pending a review of design policy.

Although some kit car builders may regard SVA is a bit of a nuisance, I feel sure that all responsible drivers will go along with any sensible legislation that improves road safety and it is not unreasonable that self-assembled cars should be safety checked before being allowed on the public highway. However, I cannot help thinking that with something like 95% of road accidents being attributable to driver errors/failures, it would be considerably more beneficial to road safety if all drivers had to undergo regular in-depth examinations of their driving behaviour.

### **53 MODIFICATIONS TO ANTI ROLL BARS**

Those of you who were members in 1996 may recall that in the August 1996 Newsletter I wrote at some length about a modification to the standard Ford anti-roll bar to reduce its torsional stiffness, thereby improving the ride quality of the front bar to reduce its torsional stiffness, thereby improving the ride quality of the front suspension. This modification, which involved the grinding of two flat faces on the centre section of the anti-roll bar, had been tried initially on Royale's own demonstration car and after discussion with John Barlow, I tried it on my own car with beneficial results. Since then a number of members have followed suit, the most significant being Paul Treloggan whose car has covered some 14,000 miles without any problems. In the light of this, I was very sorry to hear from Bill Malham that his car had been failed on its initial MOT because the MOT tester would not accept the modified anti-roll bar. Correspondence from Royale stating that this is an approved modification was of no avail and Bill has now had to source and fit a standard unit which hopefully will satisfy the test authorities.

I have discussed this situation at some length with John Barlow and while we are both satisfied that when correctly carried out, this modification is both safe and effective and although many cars with this modification have been through several MOT's without any problems, we feel that we can no longer recommend this modification because it may result in an MOT failure.

John Barlow tells me that he will be withdrawing the modification from the build manual and I am withdrawing it from our Technical Reports (number 11).

I am still convinced that a softer anti-roll bar is desirable on the Sabre, especially when using the lighter 4 cylinder engines and I hope to investigate the possibility of utilising the 24mm bar from the early Sierras, although this will involve a modification to the chassis mounting clamps. This will give a 27% reduction in torsional stiffness (when compared with the standard 26mm bar) but this will not be as effective as the 40-50% reduction that was achieved with the former modification.

#### **54 TRACK CONTROL ARM BUSHES**

Still on the subject of suspension, I am grateful to Oliver Cooke for news of a Ford Technical Bulletin advising against replacing the track control arm compliance bushes with after-market heavy duty units. These heavy duty bushes, which attach to the anti-roll bar to the track control arm have been available for some time to overcome the premature failure of the standard Ford items which are a frequent cause of MOT failure. Although the heavy duty bushes overcome the problem, Ford state that the standard Ford bushes are specifically designed to distort under heavy braking in order to improve the cars stability whereas the heavy duty units do not distort and Ford believe that they could have been a contributory factor in some accidents.

While not wishing to doubt the wisdom of Fords advice, I wonder how this equates to Ford's own Ford Sport compression struts which replace the rubber mounted anti roll bar with noncompliant solid metal to metal joints – but then rally drivers appear to spend most of their time driving well beyond the point of stable handling.

#### **55 HOT ENGINES**

Oliver Cooke also passed on to me the comments of his local Ford mechanic who states that the 2L DOHC engine is liable to overheating (I have no evidence of this in my Sabre even in hottest weather) and that this can lead to premature failure of wiring insulation around the bulkhead behind the cylinder block with the attendant risk of fire, especially in the Scorpio. Sabre builders should ensure that all wiring is kept well away from the cylinder head or other hot spot. There are also reports of problems with plug/socket connectors in the engine management loom due to moisture and corrosion so it may be prudent to treat all plugs and sockets with a high temperature silicone grease such as Electrolube SCO,

#### **56 POWER STEERING**

Several members have expressed an interest in retaining the power steering on their 2L DOHC based Sabres but there is the fundamental problem of the power steering pump getting in the way of the lower steering column. A possible solution would be to move the PS pump to the left hand side of the engine into the position normally occupied by the air conditioning pump (when fitted). If anyone has carried out this modification I would be most grateful for details.

On the same subject, I seem to recall hearing of a car that uses an electrically driven PS pump with a small hydraulic reservoir (rather like the ABS pump). Does anyone know which manufacturer/model this might be?

**57**     **WIPER BLADES**

Although the flat windscreen wiper blades supplied by Royale looked very vintage, I found that their wiping performance was not up to the standard of modern blades so I changed over to 10" TEX units with flexible blades. I purchased mine at an auto jumble but if you have problems finding them, I am informed by Bill Malham that Holden Vintage and Classic can supply 10" wiper blades but only with the fitment for bayonet ended wiper arms. However, Holden can also supply the matching wiper arms to fit British Leyland wiper shafts. Holden can be contacted on 01885 488000. *(The Morris Minor Part Centre (London) – don't laugh, can supply 'spoon' fit TEX blades to fit the Royale arms, saving having to buy new arms – I found a 9" centre blade worked best. They can be contacted on 0181 543 2264/5888/0551. In addition, they also stock a number of 'period' accessories – Ed).*

**58**     **SABRE CENTRAL CONSOLE**

On my recent visit to Royale I noticed that the next Sabre due to go to Germany is fitted with a moulded centre console over the transmission tunnel. This covers both the handbrake and gear lever mountings and will accept the Form moulded rubber handbrake gaiter. It also provides a convenient location for auxiliary switches such as electric window controls etc. For further details.

**59**     **DIFFERENTIAL RATIOS**

Following the August item on the identification of differential ratios, I received a letter from Jim Simmonds stating that the information from Haynes did not appear to agree with the ratio/code letter on his Sierra donor. Further correspondence with Haynes revealed that their original information related to Granada's and that some Sierra differentials have different coding so I'm listing both sets of codes below.

Unfortunately this still does not answer Jim's query as his 2.3 V6 Sierra donor had a 3.38 differential and an M code.

**GRANADA**

M = 3.14     A = 3.36     U = 3.62     3 = 3.64     T = 3.91     D = 3.92

**SIERRA**

M = 3.14     A = 3.36     V = 3.38     U = 3.62     B = 3.77     D = 3.92

Acknowledgements to Haynes Publishing for supplying this information.

## 60 GEARBOX OIL LEAKAGE

Jim Simmonds also added to Teddy Bagnall's comments on oil spillage when removing or refitting Sabre gearboxes. Even on a very modest 20 degree ramp, oil will escape from the speedo drive aperture unless it is securely plugged and an even worse spillage occurs with the N. type gearbox as the splined output shaft has to be removed prior to removing the gearbox.

## 61 MOT TESTING – Paul Treloggan

As you will have read above, Bill Malham had his car failed at the MOT because of the work carried out on the anti-roll bar. It take it that the failure was under section 2.4, Suspension General, G 1. This states:

### **Method of Inspection**

### **Reason for Rejection**

#### **G Suspension Arms and Linkages, Subframes, etc.**

- 1 Check the following members for Cracks, fractures, distortion, corrosion, wear and insecurity
  - a. Suspension arms (wishbones etc)
  - b. Trailing arms
  - c. Radius arms
  - d. Tie bars / rods
  - e. Panhard rods
  - f. Torque/reaction tubes
  - g. Anti-roll bars and linkages**
  - h. MacPherson strut casings
  - i. Sub-frames
  
- 2 Check that an anti-roll bar is fitted to an axle on which it is standard

- 1 A member
  - Cracked, fractured or insecure
  - Severely distorted
  - Seriously weakened by corrosion or wear
  - Which is adjustable and is loose in its adjustment threads, or its locking device insecure or missing
  - Inadequately repaired
  - **Seriously weakened as a result of deliberate modification**
  
- 2 An anti-roll bar is not fitted to an axle on which it is standard

As far as I understand the story, Bill presented his car for testing. The tester queried the anti-roll bar with his area office and the decision was that it failed. Confirmation from Royale Motor Co was not acceptable they required written evidence from Ford Motor Co that it was acceptable to do this.

I picked this up and decided to telephone the MOT Policy Unit. As I did not have the telephone number with me, I telephoned a local MOT test station to find it out. The tester was chatty, and asked if I had had a car failed. I therefore told him the story.

His reaction – you assess each vehicle on its merit and what it is. In the case of a kit car you take into account the reasons for doing something and make a decision based on that. Its poor consolation, but this inspector would have been satisfied with the anti-roll bar being ground down as the axle weights would have changed.

So onto the Policy Unit. A 'Customer Services' person took the details and said that she would need to pass the information to an engineer and that they would phone back. Less than an hour later, the phone rang.

There followed an interesting conversation. During it I made the following points:

The car being tested is a Royale Sabre, not a Ford Sierra or Granada. If it had been a Ford Sierra or Granada then it should be failed as the anti-roll bar would have been modified. The car in question is a Royale Sabre and that a standard anti-roll bar is as fitted to the vehicle submitted for test, i.e. ground down.

There seemed to be acceptance of this argument.

I also stated that the road-holding of a Sabre with an anti-roll bar, as fitted to Bill's car was far superior to one fitted with an anti-roll bar straight off of the donor. I stated that it seemed ridiculous if the MOT test was forcing a car to function in an inferior manner to which it could.

I did query whether clarification can be made for specific cars. I was told that it could, but that they did not like doing this. In this case, it could be a notification that the modified Ford anti-roll bar is acceptable, obviously subject to it having been carried out correctly.

The outcome was that it would be best if I wrote in, stating the facts and preferably backed up with a statement from the manufacturer about the anti-roll bar. All of this was very recent, and once I have received something from John Barlow, the letter will go off.

The Club has fully endorsed this 'modification' and obviously is concerned about this turn of event. Bill could have found the only MOT tester in the U.K. who would fail a Royale Sabre for this. As you will see in Peter's article, the Club and the Royale Motor Co have withdrawn this 'modification'. Unless agreement with the MOT Policy Unit can be reached, it would seem that they have successfully ensured that Sabres must have an inferior road-holding to what is achievable. Clever eh!! It seems tantamount to banning servo assisted disc brakes because they stop the car too quickly.

I find item 2 in the test interesting. Does this mean that no rally Sierras could pass an MOT as Sierras are fitted as standard with anti-roll bars?

The requiring of written evidence from Ford is also laughable. The DVLA is saying that your car must be registered correctly, i.e. in the case of a Sabre as:

MAKE: Royale

MODEL: Sabre

And nowhere on the V5 does the word Ford appear, because it is no longer a Ford. The MOT testers, in rejecting the evidence from Royale Motor Co. are effectively saying the evidence of the manufacturer, and this is THE REGISTERED MANUFACTURER, is of no consequence, what is required is evidence from a company that is not THE REGISTERED MANUFACTURER.

*Royale News – Nov. '97*

## **62 FAN BELT FOR 2L DOHC – Peter Hare**

A very useful tip from Oliver Cooke for those of you who have a 2L dohc engine fitted with a power pump. Removing the put to make room for a steering column leaves the problem of how to adjust fan belt tension. On cars without PAS the belt tension is adjusted by moving the alternator whereas on the PAS cars the alternator is fixed and the tension is maintained by a spring loaded tensioner pulley. Oliver's solution is to use a 1448 mm x 6 rib fan belt off a Rover 220 as this is exactly the right size to drive the alternator and water pump and retain the spring loaded tensioner – much cheaper and easier than changing the alternator bracket.

## **63 DIFFERENTIAL RATIOS**

This story keeps going like a soap opera! The latest information arising from further correspondence between Jim Simmonds and Haynes Publishing, suggests that Ford seem to have used virtually every diff ratio at one time or another. Haynes have dug deep into the archives and have come up with some Ford fuel consumption statistics which confirm that some 2.3 V6s were built with 3.14 diffs so Jim's VIN plate was quite correct. Haynes final comment is that if you have any doubts about your diff ration the best solution is to ask your local friendly Ford agent to check the VIN number of your car against the Ford database. End of story???

**64**     **ALUMINIUM COATING**

You may recall that several members reported problems with the protective plastic coating bonding itself to the bonnet panels during storage. Paul Wise also experienced this problem and after limited success with solvents and abrasion, Paul's daughter suggested boiling water and lo and behold the plastics softened up and came off quite easily. Sometimes the simple solutions are the ones we overlook!!

**65**     **WIRING HARNESS**

Frank Moir has been having fun with his wiring harness but a useful tip that he passed on to me is using small Terry spring clips to secure the wiring harness on its journey through the interior of the car. It is then very easy to unclip the harness for any checks, modifications, etc. Frank also suggest that before fitting the front wings, it is worthwhile bonding aluminium strips to the underside of the wings to provide anchorages for the headlamp, sidelight and indicators.

*Royale News – Dec. '97*

**TECHNICAL TOPICS – Peter Hare**

The marked lack of technical correspondence in recent months leads me to suspect that either the majority of Sabre buildings have hibernated for the winter or the ink in their pens has frozen solid. So, if this month's technical offering looks a bit meagre, the remedy rests with your good selves!

**66**     **WHEELS**

I receive occasional enquires from members about alternatives to the Ford steel wheel so in January while I was at the NEC Autosport Exhibition I made a point of talking to most of the wheel suppliers to see whether there were any alternatives that would be aesthetically compatible with the retro style of the Sabre. The old Compomotive CX had a lattice spoke style which didn't look too bad but Compomotive confirmed that this is no longer available (unless you are prepared to order a very large batch and looking at their current range, they are styled primarily for the modern high performance cars or the club racers. The story seemed to be much the same from the other manufacturers to who I spoke so it looks as though the choice is Ford steel wheels (part no. 16616400), bolt-on chromed wire wheels or modern alloys. You pays your money and takes your choice ..... Unless someone out there has found an alternative???

**67**     **WINDSCREEN WIPERS**

The three blade system on the Sabre copes reasonably well with the narrow windscreen but I have always been slightly irritated by the two unwiped areas which project down from the top of the screen where the wiper arcs intersect. A larger angle of sweep would eliminate this problem but this is limited by the right hand blade which cannot exceed approx. 95 degrees without over-running the windscreen frame. It occurred to me that by changing the left-hand and centre wheel boxes from the standard 40 tooth to the alternative 32 tooth, the left-hand and centre blades could sweep approx. 120 degrees while leaving the right-hand blade at 5 degrees. Having tried this modification on my own Sabre I can confirm that it works very well and with standard 9" blades, it virtually eliminates the previously upswept areas. If you have difficulties in obtaining 32 tooth wheel boxes, try calling Anthony Stafford on 01827 67714.

**68**     **GEARBOX DRIVE FANGE**

If you are using the MT75 Gearbox and decide to remove the three arm output shaft drive flange in order to fit the Ford Transit circular flange, then you will probably have a problem removing the securing nut. Oliver Cooke found that the solution was to grind off the excess spigot and then attach the retaining nut with a compressed air impact wrench which easily overcame the resistance of Ford's super strength thread locking compound. A neat solution if you are fortunate enough to have a compressed air supply in your workshop.

*Royale News – Feb. '98*

**69**     **TECHNICAL SEMINAR - Peter Hare – see attachment at end of document**

The seminar produced some lively discussion on a wide range of topics and I would like to thank all those who contributed to the debate and assure you that I will be forwarding your comments to Royale. Those of you who were not able to attend the AGM/Dinner will be pleased to know that no major problems were reported to the seminar and most members seem well satisfied with the overall kit quality though, almost inevitably, there were suggestions for further improvements – particularly in respect of the build manual, where it was generally agreed that more assembly diagrams would be appreciated together with additional guidance on how to actually undertake some of the instructions.

From both the seminar and the large number of telephone calls that I receive, I suspect that the electrical system continues to be the largest single problem for most Sabre builders. Royale have attempted to simplify things a little by provided separate looms for the Granada and Sierra base cars in order to accommodate the differences between the Granada and Sierra column switches but this still leaves the difficulty of the large number of different engine management sub-looms that builders will have to interface into their Royale loom.

The 2L dohc engine is particularly tricky as the engine control relays, which were in the Ford fuse box, have to be relocated and reconnected into the engine management sub loom. Trust electric at Harrogate tell me that they can modify the donor engine management sub loom so as to simplify interfacing into the Royale loom. For more information call Trust on 01423 501393. Having received some Ford wiring diagrams from Tony Doherty (thanks Tony) I have started to update my own schematic engine management diagrams to show more clearly how and where interface to the Royale loom. This is very time consuming so don't hold your breath but feel free to call me if you think that I can be of any assistance.

## **70 DOOR LOCK**

Recently I had an interesting conversation with Steve Price regarding his difficulties with transferring the locks and door latches from his very late Granada donor into the Sabre doors. From this conversation it would appear that Ford made major changes to the lock and latch mechanisms on their later models with the result that they are not compatible with the Sabre. Had anyone else come up against this problem?

## **71 INDICATOR SIDE REPEATERS**

Although side repeaters are not really compatible with the 1930's style of the Sabre, they are valuable safety features and will be required under the SVA requirements which are expected to come into force on July 1<sup>st</sup>. John Willets was concerned that many of the repeaters used on modern cars are not aesthetically appealing but he suggests that Lada repeaters are worth considering as they are only 3cm. in diameter, are quite neat and cost only £5.75 each (+ vat) including a rubber gasket. John also sent me some literature on the "Fuel Cat" – not the pet moggy at the local petrol station; the device that can be put into the fuel tank to enable earlier engines to be run on unleaded fuel substituting tin molecules for the missing lead. John has used one in his 1989 2.0i Granada and completed some 50,000 miles on unleaded fuel without any adjustments and with improved economy, more engine power and very good emission figures on the MOT test. I must confess that I have always been a trifle sceptical about this type of device but the testimonials from satisfied users look quite impressive and John is going to use a Fuel Cat on the 2.0 Pinto engine in his Sabre. Has anyone else any experience with this type of device?

## 72 SOUND

Despite the very solid construction of the Sabre, its GRP panels transmit quite a lot of engine and road noise into the cockpit and this is particularly noticeable with the hood or hardtop in place.

Hence, it is well worthwhile putting plenty of sound insulation on the front bulkhead, the floor and the transmission tunnel and this is much easier to do at an early stage before the scuttle frame and dashboard are fitted. It is worth sticking thick bitumastic sound deadening panels directly to the GRP but remember to cut clearance holes around all fixing bolts so that you are not tightening down onto the soft bitumastic material. While you still have easy access, it is worth cutting and fitting a layer of thick high density sound deepening underfelt even though it will probably have to come out again until the final assembly and trimming. Having just spent several very uncomfortable house head first down the foot wells, I wish that I had had the foresight to do the job properly in the first place!

*Royale News – May. '98*

## 73 ENGINE COOLING – Peter Hare

Long association with kit cars leads me to suspect that cooling is one of the more common problems experienced by owners but fortunately this seems to be relatively rare in Sabres, especially during the current “summer”. However, builders should not be complacent and it is well worth investing in a good quality high capacity radiator and if it is not brand new making sure that it is given a good flushing out prior to installation. It is also a wise precaution to flush out the engine cooling passages, especially if the engine has been drained and left standing for some time – coolant sludge sets very hard when it dries out. A new thermostat and unrestricted hoses are a must and it is worth checking the radiator level during the initial engine run just in case there are any air locks in the system.

Some members have retained the original engine driven fan (either fixed or viscostatic drive) though many have fitted electric fans such as the aftermarket Pacet or Tripac products but if these seem a bit pricey you could consider John Preston’s alternative of a pair of Maestro fans. In a letter to me John writes:-

“I start from the premise that most of the current Sabres are being built with 2L dohc engines and as such the water temperature sensor has a two stage switch, the donor being equipped with two fans as standard. It therefore seems logical to equip the resultant Sabre with two fans to take advantage of the two-stage switch.

It should be noted that I have placed my radiator (Cortina competition rad.) behind the frame supplied by Royale. As I have not fitted an expansion tank, this gives easier access to the filler cap and leaves plenty of room in front of the radiator for my fans.

I obtained two Maestro fans at £5 each from a local scrap yard – I take the nice man’s word for it that they are from Maestros!!

These come complete with shrouds and in their original setting they sit with two lugs downward and one upwards. If one saws off the single lug on each shroud and then turns them on their sides, joining them with two small bolts on the sides from which the lugs have been removed. Take care with the penny washers – it may be necessary to trim them as the close proximity of the fan can catch them.

The resultant amalgamation is just short of the width of the radiator support frame. It is then a simple job to make two plates to protrude forward to carry the fans by their two lugs each side. I put a short length of rubber hose over each lug and then a short length of alloy tube of the rubber followed by a further piece of rubber tube over that also (talk about over-kill!!). These were then a push fit into holes in the new side plates. I sprayed the fans and surrounding furniture in matt black before assembly and they look as if they grew there.

There is a small gap between the shrouds and the radiator core from which the propelled air can escape without going through the core but I have made little rubber infills riveted to the shrouds at the top only and the air flow is excellent to the extent that one fan triggers off for only about 20 seconds to bring the temperature down and switch itself off. Having run the engine for ages at intermediate revs on the other summer day of this season, I have only managed to trigger off one of the fans. Perhaps the South of France will encourage the other one to come into play”.

## **74 WHEELS ETC.**

A few weeks ago I had an interesting conversation with Brian Clague who is building a Sabre using a 2L sohc engine tuned by Vulcan Engineering to give 160 bhp – it should be quite a quick car!

Brian rang to acquaint me with a problem he had with 15” steel Sierra wheels that he had ordered via Perry Engineering and which were received with transit damage. Although Perrys were happy to replace the damaged units it took several consignments to achieve a set of 5 undamaged wheels. I know that many members have ordered these wheels via Perrys without any problems but it highlights the need to check goods on receipt especially if they are to be put on one side until a later stage in the build programme.

Brian also suggested that 6mm grease nipples with spherical heads make satisfactory mounting lugs for chrome hubcaps.

Another tip from Brian is that it is easier to drill and tap the attachment for the rear brake line T piece before fitting the rear suspension as this restricts access at a later stage.

## 75 INDICATOR REPEATERS

Cars being presented for SVA must have side indicator repeaters so it is worth noting the Vehicle Lighting Regulations for fitting these items:-

- They must have the appropriate 'E' marking together with the additional code number '5'
- Must be located not more than 2600mm from the front of the car at a min height of 350mm and max of 1500mm.
- Must be visible in arc of 5deg to 65deg when viewed from the rear of the car.

Most Sabre builders seem to fit repeaters on the scuttle side between the bonnet and the door, adjacent to the chrome trim strip and this should be ok. But if you are planning to fit them elsewhere, check the regulations.

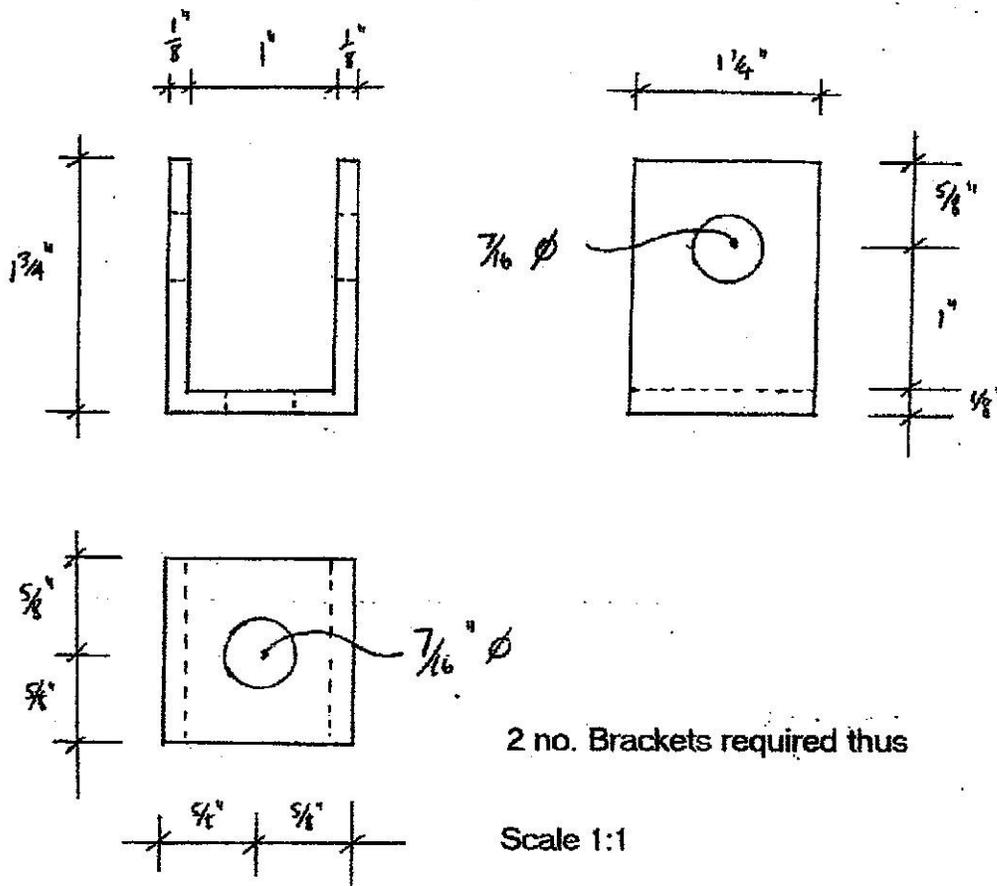
N.B. I am holding the Club's copies of the MOT and SVA testing regulations.

76 ELECTRIC WINDOWS

I know that many builders find the setting of the stops on the electric windows a frustrating business, especially as the final setting can only be made after the final fitting of the hood and the associated side rails. There is a small margin of adjustment in the original Ford assembly but this may not be adequate once the unit has been fitted into the door.

Les Walker anticipated this problem and replaced the original Ford stops with a pair of eccentric cams which engage with the Royale stop plates fitted in accordance with the build instructions. The cams are made from 1.25" dia. Steel bar and are mounted on M8 bolts through two holes drilled in the Ford motor mounting plate, either side of the original adjuster slot.

7 Aug '98



## **77 ELECTRONIC SPEEDOMETER CALIBRATION**

Someone rang me earlier this year with a query about setting the keypad codes on an electronic speedometer. Not having an experience with these high tech devices, I sought John Barlow's advice and he tells me that he has used the following code sequence with satisfactory results:-

\* 10498 # \* 30 000 0690 #

Personally, I have enough problems with my PIN number in the cash dispenser so I think I'll stick to my old fashioned Smiths cable driven speedometer.

## **78 UNLEADED FUEL**

Further to John Willets earlier comments on the Fuel Cat, I've received a valuable tip from Tony Blackwell which will be of interest to owners whose 2L sohc engines may be at risk from the planned withdrawal of leaded petrol.

Tony has had discussions with the Ford Technical Support Dept. who state that the cylinder head of the 2L sohc carburetted engine can be replaced with a head from a later 2L sohc fuel injected engine whose valve seats are designed to run with unleaded petrol. This modification is endorsed by Ford and has the additional bonus that the later head has larger valves so that the modified engine will breathe more easily and give better performance and economy with the original carburettor.

As a confirmatory check, heads manufactured to run on unleaded petrol should have one of the following codes stamped next to Number 4 spark plug hole: - L, P, PP, R or RR.

*Royale News – Aug. '98*

## **79 ELECTRICS**

It is always a pleasure to hear from fellow Sabre enthusiasts and the steady flow of phone calls and letters seem to confirm that electrics continue to be a source of frustration, particularly for those who are using the Royale loom.

The large number of variations in engine management systems, steering column switches etc., lead to some interesting questions which can result in me spending much time trying to correlate various Ford diagrams, Haynes diagrams and the Royale build manual in order to come up with sensible comments. Current discussions with Eddie Greenall have highlighted the potential pitfalls arising from the subtle but significant differences between the pre '87, '87 to '89 and post '89 models, particularly in the steering column switches.

At the Exeter Kit Car Show I had the good fortune to encounter the company who are now supplying Royale's looms from their premises in Crewe, only a few miles away from me.

I was quite impressed with the quality of the diagrams and literature that they produce for some of their other customers so I intend to seek Royale's agreement to my visiting them with a view to obtaining diagrams of the Royale loom. Hopefully this may lead to build instructions that are rather more user friendly.

Incidentally, I note that the Royale loom does not provide a dim/dip facility although this has been a requirement on production cars since 1997. Has anyone had any comment from the MOT or SVA testers on this topic?

Still on the subject of electrics, anyone seeking a relatively straightforward solution to the problem of interfacing a Ford fuel tank sender to a Smiths fuel gauge might consider using a tank sender from Holden Vintage and Classis (01885 488488). These are compatible with Smiths gauges and although their mounting flanges are not the same as the Ford unit, it should not be too difficult to graft the new unit on to the flange of the Ford sender. I know that some builders have done this using Smiths senders salvaged from B.L. donors but in my own experience, these second-hand units often have badly worn tracks on the sender potentiometers which give rise to erratic readings.

Holdens carry a huge range of classic electrical and lighting components and their catalogue is well worth having.

## **80 RADIATOR FANS**

At an NEC show I came across the Southport Motor Radiator Co. (01704 50006) who in addition to their specialist radiator services were offering a very nice electric fan at a competitive price. The fan is very slim and can be fitted either in front of or behind the radiator. Those who do not wish to spend valuable building time trawling through the breakers yards looking for suitable donor units may find it worth a phone call to Southport.

## **81 TRACK CONTROL ARMS**

Longstanding members who remember John Conroy's valuable participation in the founding of the club will be pleased to hear that he is still in circulation and having shed some of his business commitments, has now managed to start work on his Sabre. It sounds as though he is going to incorporate some very interesting modifications that I hope to detail at a future date but in the mean time I am grateful to John for information on replacement track control arms. If an arm has sustained accident damage or if the Outer ball joint has any wear, it will have to be replaced and John has found that Quinton Hazell d a very cost effective unit complete with a new inner rubber bush for £36 each.

QH part numbers are QSJ 1155S and QSJ 1156S.

## 82 **ALTERNATIVE PAINTING**

During a conversation with Tony Blackwell, he mentioned the possibility of using a marine two pack polyurethane as an alternative to conventional automotive spray painting. The paint that Tony has in mind is Blakes Polygloss which is designed to give a very high gloss finish on grp mouldings and is applied by brush so there is no requirement for specialist breather equipment. Blakes 901703 636373) have sent me their very informative technical literature which explains the application technique which gives a quality finish that even in a harsh marine environment should last 5 to 8 years so on a pampered kit car it should last indefinitely. The only drawback is the limited range of colours which are more suited to yachts.

## 83 **INSTRUMENTS**

Speedy Cables (0171 226 9228) are well known for their instrument repair and calibration service and the supply of non-standard speedo cables but Tony Blackwell has also found that they supply Royale with their customised instruments and hence are able to customise members own instruments as part of their recalibration service.

Tony also mentioned that in addition to their instrument services, Speedy Cables can also shorten hand brake cables for a very reasonable £5.

Peter Hamlyn thought that he would avoid the inconvenience of speedo recalibration by using VDO electronic instruments but the speedo arrived without the setting up instructions and it took several phone calls to Europa to obtain the missing literature. Peter has kindly loaned these instructions to me and I now have a copy on file should any member find themselves in a similar situation.

## 84 **SAY “CHEESE” (make a new tailpipe and limiting steering rack travel) – John Preston**

John Preston wanted to modify the rear section of his Sabre exhaust system in order to eliminate the rather unsightly rear silencer box and in consequence was casting around for a source of suitable stainless steel tubing to make up a new tailpipe. Being a student of the Lateral Thinking School of Kit Car Building, John quickly realised that as he lives in the middle of a major dairying and cheese making area, there should be a ready supply of stainless steel tubing and the people who know how to work with it.

John found that 2” OD stainless tube is used extensively in the cheese making industry together with a variety of preformed bends from which he could fabricate a new tail pipe without recourse to specialist pipe bending facilities which would have been somewhat expensive.

John has also been investigating methods of limiting the steering rack travel in order to avoid the risk of tyres rubbing on the chassis on full lock. He has established that Ford manufacture suitable clamps but has so far only identified the Fiesta version that is priced at a very hefty £47 + vat so if anyone has found a variable and more cost effective solution, please let me know.

*Royale News – Dec. '98*

## 85 **SPEEDOMETERS - Mechanical or electronic? – Peter Hare**

When selecting the speedometer for your kit car, the easy solution is to choose one of the modern electronic instruments that responds to electrical pulses from either the gearbox transducer or from an after-market transducer mounted on the propshaft. The connection to the instrument requires only a single wire which then eliminates the need for a special speedo cable with a Ford connector on one end and a Smiths on the other.

The electronic speedo is calibrated by the builder once the electrical system has been powered up. The only drawback to this solution is the cost – a new electronic speedo will make a £125 - £200 hole in your budget.

Suddenly, the good old fashioned mechanical speedo warrants a second look as they can be found at auto jumbles at a fraction of the cost of their electronic cousins. The problem is finding a unit with the correct calibration to suit your particular tyre/wheel/diff ration combination.

### **Calibration**

A nice new shiny electronic speedo should come with instructions for calibrating it once it has been installed and wired. This will usually involve keying in various codes via a pressure pad or miniature key pad attached to the speedo and has the advantage that it can be fine-tuned over a measured mile or recalibrated if you subsequently change your tyre size.

This facility does not exist in the venerable old mechanical speedo, whose design has changed very little during the last 50 years, so there are two possibilities.

The simple solution is to send it to a recalibration specialist such as Speedograph Richfield (tel. 0115 926 4235) who, once they have the details of your transmission, will service and recalibrate your speedo. If required, they can also supply a new speedo cable to the correct length and with the appropriate end fittings.

The second possibility will be attractive to those who enjoy a DIY challenge (is this a euphemism for stingy/mean/tight fisted?). The mechanical speedo reacts to the number of revolutions of the speedo cable for each mile the car travels and the easiest way to measure this is to jack up one rear wheel and turn the wheel through exactly 10 revolutions of the speedo cable to the nearest ¼ of a rev. This can be made easier by attaching a cardboard pointer to the speedo cable.

Because the other rear wheel is not rotating, the number of speedo cable turns must be doubled to compensate for the action of the differential.

If, for example, 10 turns of the road wheel resulted in  $8\frac{1}{2}$  turns of the speedo cable, doubling this figure to allow for the diff, gives 17 turns or 1.7 revs per revolution of the road wheel.

Next, you measure the rolling radius of the rear wheel with the tyre at its correct pressure and with the normal axle loading. The measurement is taken between the ground and the centre of the wheel so as to allow for the distortion of the tyre where it touches the ground.

Typically, a 185/70 c 15 tyre may have a rolling radius of 12.5 ins which gives an effective rolling circumference of  $12.5 \times \pi \times 2 = 78.5$  ins.

There are 63360 inches in a mile so our road wheel will make  $63360/78.5$  revs per mile = 807 revs per mile.

Going back to our speedo cable, we have established that it does 1.7 revs for each revolution of the road wheel so in each mile it will make  $1.7 \times 807$  revs per mile = 1372.

All that we have to do now is to find a speedo with this calibration (or fairly close). Most Smiths speedos have their calibration marked on the dial, either just below the milometer window or at the edge of the dial close to the bezel. It is usually preceded by a manufacturer's part number so only the last four digits are relevant. Eg SNT-3462/12/1400.

In this case the speedo will read approx. 2% low – an acceptable error, but if the speedo had a calibration of say 1000, it would read approx. 37% high – not acceptable.

In a very marginal case, a small error can be corrected by moving the pointer on its shaft to give the correct reading at a chosen speed but there will be an increasing error above or below this speed so I do not recommend this course of action. Better to go back to the auto jumble and try to find a unit nearer to your required calibration.

On reflection, I can see why electronic speedos are so popular!!!

## **86 FUEL GAUGE CALIBRATION**

Because Smiths and Ford use different resistance ranges for their fuel tank sender units, most kit car builders find that when they couple a Ford tank unit to a Smiths fuel gauge, there is a fuel gauge reading that bears little resemblance to the contents of the fuel tank. As with the speedometer, there are two possible actions.

Replace the Ford sender unit with a Smiths unit. You may find a serviceable unit at the breakers yard but they often have badly worn rheostat tracks and it can be a real struggle extracting the tank unit from the tank. An easier and more reliable way is to purchase a new Smiths sender from an auto-electrical specialist such as Holden (tel. 01885 488000).

Having obtained your Smiths sender, carefully remove the rheostat assembly from the tank unit stem and do the same with the tank unit from your Ford fuel tank. It is then a fairly simple matter to securely solder the Smiths unit to the Ford stem. It may be necessary to modify the length and/or angle of the float arm in order to achieve the correct float travel between empty and full. In practice you should find that the fuel gauge will give a reasonably accurate indication of full and empty but it may be less accurate around the half full region as tank unit rheostats are often matched to the shape of the donor tank.

Sometimes it is possible to recalibrate the fuel gauge to match up with the Ford tank unit. If you look at the back of a Smiths fuel gauge, you should find two small holes in the case just below the electrical terminals, these are often sealed with small cork inserts that should be removed. Each of these holes give access to a slotted hole adjuster, one of which sets the instrument zero and the other determines the range of the scale. I have found that by judiciously tweaking these two adjusters it is possible to get the gauge to respond with reasonable accuracy to the Ford sender.

This operation is best carried out on the bench with the sender and gauge connected to a 12v supply via a Smiths instrument voltage regulator so that the float can be moved between empty and full while the adjustments are being made. Be warned, the adjusters are very sensitive so the actual movements will be very small. Also, it can be a rather frustrating exercise because the two adjusters tend to interact so you may have to make repeated adjustments until you get an acceptable result.

Of course, there is a third alternative which overcomes both the speedometer and fuel gauge problems and that is to use the Form instrument panel from the donor vehicle. Some owners have mounted it behind the dash panel with cut outs to coincide with the Ford dials and the results can be very satisfactory if one is prepared to forego the aesthetic appeal of traditional gauges.

## **87 ROYALE WIRING LOOMS**

As I mentioned in the previous newsletter, I have been in discussion with the company who are now manufacturing wiring looms for John Barlow and they have been most helpful with the loan of looms and the associated manufacturing schedules.

From this information I hope to prepare a series of connection schedules and schematic diagrams which may be helpful to those members who are worried by matters electrical. I hope to have more news on this at the AGM Technical Seminar but this is dependent upon my computer being cured of its current tantrums which are driving me to despair!

*Royale News – Mar. '99*

## **TECHNICAL TOPICS – Peter Hare**

### **ALL QUIET ON THE TECHNICAL FRONT**

*Things on the technical front have been very quiet for the last six months. At this time last year I could expect at least one enquiry per day with a fair number of these from potential builders or from people who were in the very early stages of building but now it's down to one call per week, usually from members in the later stages of the build programme.*

*One consequence of this lull is a marked decline in new ideas and suggestions from members so I'm afraid that at the moment there are no earth shattering new ideas or perils of wisdom for me to pass on.*

### **ROYALE LOOM SCHEMATIC DIAGRAMS**

One small blessing of this lull in technical enquiries is that I have been able to complete my schematic diagrams of the Royale main and dashboard looms for both the Sierra and Granada based Sabres.

The schematic diagrams identify each of the loom's connectors and their functions. A separate schedule then identified each wire in each connector, giving the colour code and where the wire should be connected. While much of this information is contained in the Royale build manual, I hope that by presenting the information in a diagrammatic/schedule format it will ease the problems that some members seem to experience with their electrics.

Unfortunately, while the main looms have connections for the ignition and engine management sub-systems, the actual connections will vary according to the choice of donor engine and the complexity of the management system. For the basic carburettor engines with conventional contact breaker ignition, the electrical connections are relatively straight forward but for the fuel injection engines with electronic engine management systems, life is a little more complicated. In an attempt to simplify the situation I have put together schematic diagrams for a few of the more popular engine configurations showing how I believe the Ford engine management sub looms can be interfaced to the Royale main loom. I have also done some work on the interfacing of the Sierra/Granada ABS braking systems to the Royale looms.

If you think that any of the above schematic diagrams may be of interest to you, please feel free to ring me and I will send you copies of anything that may be relevant to your build configuration.

## **TECHNICAL TOPICS – Peter Hare**

*I have produced these notes on problems experienced by Sabre owners and reported recently.*

### **88 STEERING RACK GAITERS**

We have received reports from several members regarding steering rack gaiters disengaging from the retaining groove in the steering rack housing, resulting in a loss of rack lubricant and the ingress of harmful grit – potentially very expensive and possibly dangerous. The problem seems to occur when non Ford replacement gaiters have been fitted which may be slightly shorter or less elastic than the original Ford components and hence are not capable of accommodating the maximum lock to lock movement.

While there are possibly some after-market gaiters that will be quite satisfactory, it is probably one occasion when it's sensible to fit genuine Ford items rather than risk the messy and time consuming task of replacing them and cleaning out the rack housing.

*Just to state that I have also had problems with steering gaiters on my replacement steering rack and although I had checked mine routinely since built, at the last MOT one gaiter actually became detached during the test. This was fortunately fixed by the friendly mechanic at no charge.*

*I took this up with the supplier last year who said that they knew of no problems and that the gaiters were of the correct length but it is apparent that a problem does exist.*

### **89 IDLE SPEED CONTROL VALVE**

On the 2Ldohc fuel injected engine the idle speed is controlled not by the throttle butterfly valve, but by the idle control valve which allows a metered amount of air to bypass the closed throttle, thereby allowing the idle speed to be controlled by the ECU regardless of the engine temperature, engine load, etc. My own engine was prone to occasional bouts of erratic idle speed or a very slow return to idle speed on a closed throttle and I have heard of other owners having the same problem.

The idle unit is a needle valve controlled by a solenoid which rapidly opens and closes the valve in response to signals from the ECU, the open/close ration being adjusted by the ECU to maintain the correct idle speed but as the unit ages it tends to start sticking and fails to respond correctly to the signals from the ECU. I found that with the unit removed from the inlet duct, it is possible to separate the solenoid from the valve and wash them out with petrol or meths. This seems to overcome the problem for a while but I suspect that it is only delaying the inevitable visit to the Ford agent.

I believe that other injection engines use this form of idle control but may use a different design of valve – if anybody has knowledge of interchangeability of valve units between engines, I would be very interested to know.

## **90**     **CHROME HUB CAPS**

Many builders who use steel wheels on their Sabres opt for chrome hub caps to give them the 1930'2 – 40'2 style even though this necessitates adding fixing clips to the wheels to secure the hub caps. Sourcing suitable hub caps is not always easy but I have found that classic car shows and auto jumbles are a good source of supply as there are several restoration specialists who are manufacturing replicas for most of the popular classics.

If you cannot get to classic car shows, you could try R. Beeton, Tel. 01576 203970 – he had a very large selection of hub caps, wheel trims, vintage wiper arms and blades etc. on his stand at the recent NEC show.

## **91**     **ROYALE WIRING LOOMS**

Anyone who is using the loom supplied by Royale for the Sabre and is having difficulties with the installation instructions may be interested in a copy of my schematic diagram and connection schedule for the main loom and dash loom – there are separate versions for the Sierra and Granada based cars.

The large number of possible engine management sub systems also seems to cause concern although the actual number of wires in the interface is usually quite small. I have prepared simplified diagrams for some of the more popular donor engines which builders may find easier to follow than the diagrams in the Haynes manuals.

## **92**     **SABRE BOOT LOCK**

Paul Wise had the misfortune to suffer a failure of the lock on his Sabre boot but fortunately, not long before, an acquaintance had commented on the fact that the Sabre lock started life as the engine compartment lock on the VW Caravanette / Camper so Paul popped round to a local VW restoration specialist who was able to supply an original VW lock. Although it was a second-hand unit Paul is of the opinion that it is better than the one that came with his kit and probably cheaper than a new replacement.

*Royale News – Mar. 2000*

## **REGARDING TECHNICAL TOPICS**

I had several questions at last year's shows regarding the securing of the wiring under the front wings for side lights, headlights and indicators. The concern expressed was that they were no readily accessible securing points and that the finished wiring was untidy and could be subject to damage. There is no doubt that unsecured wiring can result in rapid failure at terminals.

I solved this problem in my car by glassing on to the underside of the wing some small tee pieces made from scrap aluminium removed when the bonnet was shaped. These support the wiring to the lights using plastic clips. The wiring has remained secure and is fastened to the top and front of the wings out of harm's way.

*Royale News – Mar. 2000*

### **93 STEERING RACK BOOTS – Oliver Cooke**

I bought a reconditioned rack for my Sabre and the boots were held onto the rack with wire, but the other end was free to move along the shaft as the rack moved. This seemed to be a bad thing as the boot was soft and a loose fit on the shaft. I did the obvious thing, put a tight cable tie on it, checking that full rack travel was possible afterwards all OK if a bit stretched. 4000 miles later MOT fail, split rack boot! I bought 2 Ford ones £11 each, they were a better fit and slightly longer and don't seem to be so strained at full lock.

### **94 REAR ROAD SPRINGS**

Having got my Sabre on the road the back end felt very soft and wallowed on dips to such an extent that my exhaust hit tarmac several times on the M25, very unpleasant. Checking with Royale it seems that the ride height was too low. At the rear of the main chassis, by the sub frame mounting, it should be in the region of 165mm to a smooth floor, mine was 148mm.

On comparison between my original Sierra springs and the genuine Sierra Ghia units the reason is obvious. I had selected a set of Low Rider springs, the top 2.5 turns were of 10mm wire tapering up to 15mm for the balance of the turns and it was 30mm shorter overall. A strange thing was it has a Ford oval stamped on it. The correct spring is 14mm wire and has an overall length of 310mm.

95 WINDSCREEN WIPERS

I fitted the recommended vintage style and all seemed OK. After a long trip in the rain I found to my horror that the screen was badly scratched. The reason the arm to blade mounting/reinforcing metal bracket was loose enough to allow the blade to flip so letting the bracket to touch the glass. To stop this happening to you reduce the arm spring tension (stretch the spring), grind the bracket down with a `Dremmel` or fit a sprung blade from S&J products or arms and sprung blades from Europa.

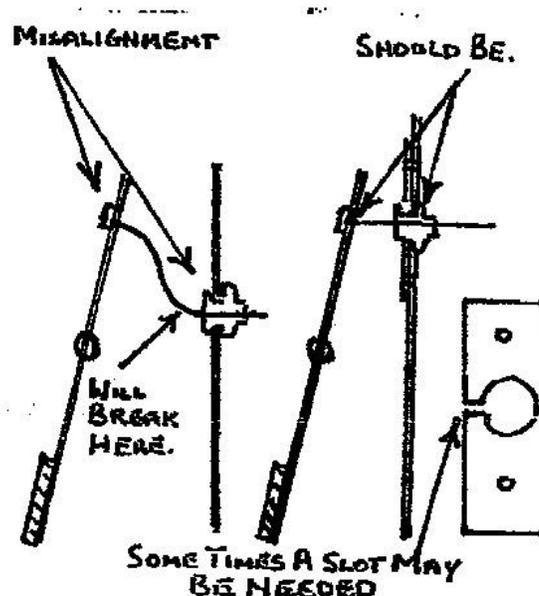
*The following contribution from Les Walker is a salutary tale and relates to a real breakdown Les experienced as he states in the middle of nowhere, so be warned.*

96 A STITCH IN TIME – Les Walker

The best way of curing a fault you must agree is not to have it happen in the first place. Breakdowns can be very annoying and time wasting, so any form of prevention of a potential breakdown must be worthwhile.

Try this one, it's bound to get you thinking. From Sods Law, breakage of the Sabre accelerator cable at the pedal end is bound to happen at the worst possible place i.e. on a roundabout or hallway through some traffic lights or on the country lanes miles from any help.

CAUSE – a frayed inner cable because of misalignment of the outer cable mounting hole in relation to the height of the pedal as shown in the sketch.



RECTIFICATION – elongate the outer cable mounting hole in the bulkhead so that it is higher and lower than the top of the pedal (i.e. where the inner cable clips onto the pedal). Drill a hole in a piece of 1” x 3” x 2mm flat alloy just big enough for the outer cable to snap in. Snap onto the outer cable and align the centre of the cable with the top of the pedal as shown in the diagram – connect the cable to the pedal and screw the plate in its correct position of the bulkhead with 2 off ½” x 8 gauge self-tapping screws. Seal round the edges to keep out fumes and adjust outer cable length to allow for correct cable tension and there you are a breakdown avoided.

Ask yourself, is your cable at the correct height at the moment – do I want to be stuck in the middle of nowhere.

## 97 SABRE – WIRING LOOM AND DASHBOARD – Bob Jeffery

The following notes may be of help or interest to anyone contemplating a similar exercise. I know that Peter Hare has already produced a technical report (Report Sheet No. 12) concerning the use of a standard loom in the Sabre. I too used the Sierra loom, but with a few differences. Hopefully my notes will add to the general knowledge of this exercise.

My Sabre is Sierra based and I decided from the outset to use the original loom, keeping everything as basic as possible, e.g. manual windows as per the donor car. Furthermore the car is fitted with an ex – SDI Rover V8. This is a carburetted engine and hence there is no engine management system to worry about. I felt that the main advantage of using the original loom and fuse/relay box was that the multi-way connectors should all plug straight onto the steering column and hence all of the steering column control functions should work again as per the original car.

The donor Sierra was a runner and was driven back to my house. Before dismantling it I checked that all electrical components worked. During the strip-down, I carefully labelled every connection. Having tested the entire loom from the car, I ended up with a large carrier bag stuffed full of wiring – a daunting sight! There were quite a few connectors which had no labels since they were not connected in the original car – presumably for ‘extras’ on the higher spec. models.

During the build I have used a spare bedroom as a component store and I spread the loom out on the floor where it stayed for about 6 months. Whenever I was fed up with doing other jobs, I spent many a ‘happy’ hour on my hands and knees tracing and understanding and modifying the loom.

My main aim was to remove all unwanted wires – an exercise which eventually got rid of up to 40% of the loom. This I did with reference to the aforementioned labelling and to the Haynes manual wiring diagrams.

Some care needs to be exercised here on two counts:-

Firstly the loom terminations did not exactly match those in the Haynes manual, although the colours were generally OK. This was especially so in relation to the instrument panel. It is wise to check where the wires actually go before cutting any out.

Secondly it is wise to follow each wire from end to end before cutting it out. The loom had several connectors which jumped off other wires along their length. These are, in my opinion, nasty little connectors which clamp on to a wire and bite through the insulation to make contact with the wire inside. Also there are several common points within the loom, so only part of a wire may need to be removed.

Typical wiring which can be removed, usually back to the relay/fuse box is that for: - seat belt warning light, heated rear window, rear wash/wipe, rear door courtesy lights, rear boot lock and in my case all of the engine management system wiring.

The original fuse/relay box was quite large, even with the outer weather proof box removed and it is an awkward cube shape. I decided to retain this intact (except for the removal of various unwanted wires and relays) and the only place I could find to install it in the Sabre was in the space occupied by the glove box.

In addition, I decided to make the dash in three pieces, the sections being joined vertically through the normal screw positions, and held in situ by these screws and cup washers. I think that the finished dash looks fine and has some convenient features:-

The L.H. section can be easily removed for access to the fuses and relays.

The centre section can easily be removed for setting/adjusting the electronic speedo I used, and for accessing most of the wiring within the dash. With the centre section removed (lowered) reasonable access can be gained to the instruments and their wiring around the steering column. I am sure that this is much more convenient than with a one piece dash.

Additions to the wiring loom are all the earth returns required as most donor components are earthed locally around the car. I made all of these after installing the loom and there are lots required. I ran a large wire (about 30A) from the back to the front of the car to carry all the rear earthing requirements.

There are three main requirements for multiple connections in the dash area.

These are:-

- a) Earths (numerous)
- b) 12V feeds (live when lights switched on) for illumination of all dashboard switches and instruments.
- c) 12V feeds (live when ignition switched on) to power up electronic instruments (if used).

I made provision for these by screwing multiway connector blocks to the vertical GRP stiffener panel behind the dash. These are easily accessed for connection as required.

The loom is now fully installed and I am relieved to say that everything actually worked as planned and I am pleased with the outcome.

## **98 SABRE HEATER CONTROLS – Bob Jeffery**

The build manual more or less just says to reconnect the heater controls on assembling the dash (except that one needs to be made longer). I found this just about impossible.

The job involves lying upside down in the footwell with arms contorted into positions they've never been in before. To improve access to the rear of the slider controls, I cut a 4" diameter hole in the underside of the mounding. This aids reconnection of the cables and replacement of the bulb holder for illumination.

As you will know the heater controls are mounted vertically in the sierra dash, but are horizontal in the Sabre. In the vertical position the cable runs are quite gentle to the heater unit.

When the controls are lowered and turned horizontal, the cable runs are tortuous to say the least; so much so that I could not get them to operate at all and feared that the control levers would break under the strain. This is because both the inner and outer parts of the original cables are very stiff. The inner wire appears to be 16 swg piano wire.

In the end I made up two new cables. For the outer I used plastic covered curtain wire (the type you hang net curtains on). This is roughly the right diameter and is very flexible. For the inners I used 18 swg piano wire from the local model shop. This is far more flexible than 16 swg but still stiff enough for the job. The combination is easily flexed into position and works well without putting undue strain on the lever mechanism.

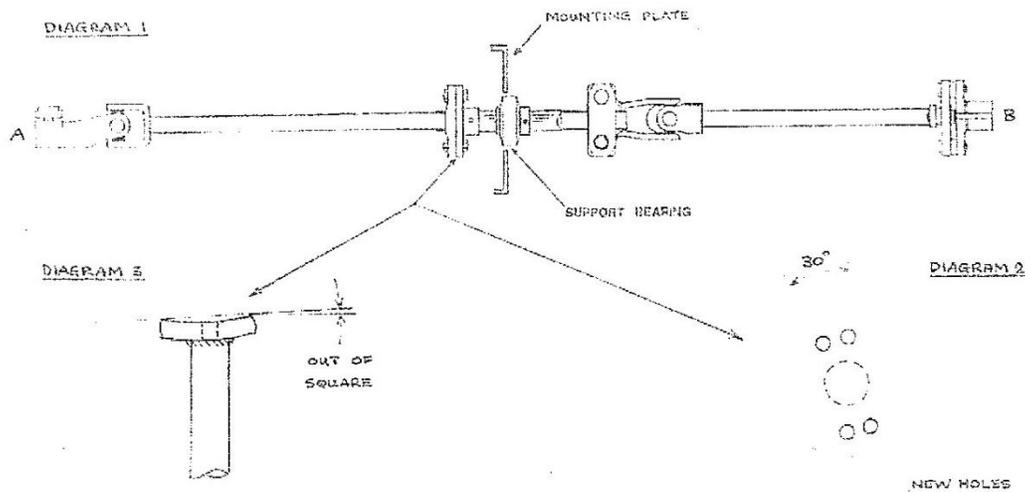
Don't forget that three of the heater unit outlets are for facia ventilation in the original car and need to be blocked up. I made some foam rubber plugs for this purpose.

## **99 SABRE STEERING SHAFT – Bob Jeffrey**

### NOTE 1

I don't know how the Granada steering wheel locates onto the column, but the Sierra type fits onto a hexagonal section. This means that one only has 60 degree positioning increments available.

The extended steering shaft assembly, including the extension section supplied by Royale is as shown in diagram 1. (Taken from the build manual).



The shaft assembled as shown but, however I put it together, I seemed to end up with a 30 degree offset between the input (steering column) end 'A' and the output (lower shaft) end 'B'.

As the lower shaft fits onto the steering rack spline in only one position, the assembly results in a 30 degree offset of the steering wheel in the central (straight ahead) position.

I found I could only cure this by drilling another pair of holes in the extension section flange, offset 30 degrees from the original (see diagram 2). Alignment is now perfect. Has anyone else experienced this problem or am I missing something fundamental?

NOTE 2

On assembling the steering shaft, I found there was a severe tight spot. I could see the support bearing mounting being flexed when the shaft was rotated.

Inspection revealed something I should have noticed before. The steering shaft (with flexible coupling removed), which bolts to the circular extension shaft flange, was not square. The flange is a crudely stamped out piece of steel and this was not welded squarely to the shaft – see diagram 3. (This doesn't matter for the original assembly as it is riveted to a flexible rubber coupling).

The face of the flange was slightly dished and was about 2 degrees out of square to the shaft. When this and the extension shaft were bolted together, it produced a 'dog-leg' in the shaft with the consequences described above.

I cured my assembly by some careful filing of the offending mounting face. Ideally one should have this face machined square to the shaft before assembly.

*This contribution is from John Preston and tackles a subject which has often been discussed between members.*

## **100 UPGRADED FRONT SUSPENSION FOR THE SABRE – John Preston**

For those of us with the early version of the Sabre the front suspension has, for some of us, been a constant problem due to its stiffness.

In order to save on trips to the dentist for fillings to be replaced, a softer longer-travel coil-over-shocks with 65 lbs. less spring rating, is available from Royale. They are also longer in length and therefore will not directly replace the original units. My kind and considerate wife (with obviously only interests at ears), bought me a new front suspension upgrade last Christmas.

Having an honours degree in procrastination (to match the one I already have in hindsight), I have just done the job and it is well worth the time, effort and money involved. The car is transformed and is now as it should always have been and as the more recent models are.

For the mechanically adventurous, this is how it is done:-

You should have access to a four inch angle grinder with both cutting and grinding discs and goggles; an electric or MIG welder (together with welding man if you cannot do it yourself); at least a 12" length of three inch x ¼" (or 6mm) sheet steel (this is a standard size); (depending on your view on the engineering integrity of my method) a foam cavity filling gun and cartridge; an exact 13" length of doweling; and of course the usual set of mechanics tools with optional big hammer.

Chock rear wheels. Loosen front wheel nuts and jack front up as high as practicable onto stands under chassis side members. Remove front wheels and brake callipers and discs. Suspend callipers out of harm's way.

Remove old coil-over-shock assembly, remove bolt, clamping lower wishbone to stub axle assembly. Loosen nuts securing long wishbone pivot bolt to chassis and separate wishbone from stub axle assembly.

At this stage you have two options depending on what occupies the engine bay. If you have room you can withdraw the wishbone pivot bolts rearwards to completely release the wishbones.

In any event, cut the fibreglass in the engine bay valance immediately above the wishbone arms to allow the wishbones to be swung up and secured out of the way. The longer suspension travel may make these cut-outs necessary anyway. You will not be able to work with the angle-grinder with the wishbones in a lower position.

If you have removed both or one of the wishbones completely, it is handy to have a couple of old bolts of the same diameter as the wishbone pivot bolt to pop into the ends of the wishbones for reasons which will now become obvious.

Remount the wishbone by popping the old bolts into the wishbone ends to allow it to pivot easily, and mark either side of where the rearmost arms strikes the chassis. Either tie wishbone up out of the way, wedge a suitable piece of wood between it and the chassis or, if you have removed the wishbone altogether, remove old bolts and dismount wishbone.

Use angle grinder to carefully cut and grind the corner out of chassis to accommodate rear wishbone arm – it is a case of cut a little at a time until the arm drops with suitable clearance into the gap.

This is where the 13” piece of doweling comes in. Put the shock absorber mounting bolts back into their respective holes in both the mounting bracket and the wishbone and you should have the necessary clearance to fit the new assembly without an arm striking the chassis when your doweling slips easily between the two bolts with the wishbone sitting down on the chassis cut-out. You may find that the end of the front cross-member securing bolt protruding from the chassis stops the front arm sitting down – cut the offending bit off with the angle grinder. In its final position, the front arm should not strike the chassis but be just clear of it.

Depending on what you think is right, cut a length of steel plate into an ‘L’ shape to go under new cut-out with the 3” bit along the chassis to the front. Allow sufficient room for the weld.

When satisfied with fit, weld into place. (I had a primed hose-pipe nearby in case of accidents!!).

This is the point at which you may disagree with me but I took advice from a structural engineer – who thought that the chassis was wonderfully over-engineered for what it had to do. He also bore in mind the strength of the new chassis reinforcing plate and that the upper suspension bracket was welded to the chassis immediately in front of the cut-out section and therefore the stresses imposed would not be excessive.

If you disagree with the above – and you are on your own on this one – weld fillets into the hole you have created in the chassis. I am told that they will add little to structural integrity but you may find it more soothing on the mind. In my case, I scrounged a foam gun as used in the building trade and filled the chassis in the vicinity of the cut-out. (You must wear gloves when handling this material). When set, I cut the coat back with a Stanley knife and filled any air-bubble gaps.

Prime your work and paint to your satisfaction.

I set the springs about three screw threads up from the bottom and set the shocks in their central position – in my case ten clicks in from one end or the other of the adjusting screw’s travel. I will let you know how I get on with that setting but it leaves the car standing exactly level with half a tank of petrol.

Reassemble, remembering not to fully tighten the wishbone pivot bolts until the full weight of the car is on the wheels.

Enjoy a new comfort of driving usually reserved for plutocrats!! *Royale News – Aug. 2000*

## **2015 - Technical info supplied by current chairman Peter Gibbons from ROC sources / back issues**

### **101    DOHC SPARKLESS**

The Sabre was booked in for its MOT so out I went to the garage to start her up. I had only been out for a long run the day before when she ran faultlessly, but as I sat there turning the key it was obvious that although the starter motor was turning beautifully the engine was not going to fire. Checked all the usual..... plenty of fuel, all leads clean and firmly connected, but still no deal. Removing a plug indicated no spark, however 12v was present at the ignition coil, which must have been at least 15years old. The culprit must be a faulty coil so out I went and picked up a new coil for £20.00 from my local motor factors. That was the easy bit ..... removing the old one was a nightmare.

The coil on my car is mounted on an aluminum heat shield deep down in the bowels of the engine bay along with the ignition module and suppressor. The nuts on the retaining bolts were impossible to access as they were sandwiched between the heat sink and the offside inner wing. The components must have been assembled on a bench and then installed in the car.

Removal of the offside front wheel gave access to the four heat sink retaining bolts. These were eventually removed as I had to jam a ring spanner on the nuts to prevent them turning as I was on my own and do not have gorilla length arms. The wiring loom prevented lifting the heat shield high enough so worked continued in the bowels to eventually release the coil and its bracket.

I fitted retaining bolts so that if there ever is a “next time” the coil can be quickly removed.

3 hours later all was back together but alas the engine still would not fire!

Now as I am not an electronic physicist specializing in fuel injection engine management systems I was stumped.

My Adrian Flux insurance has a £32.00 breakdown insurance covering all eventualities including Home Start and Recovery to a local garage, so I phoned them. 40 minutes later a low loader arrived to transport the car to “Top Boss” in Derby about 7 miles away. All went well until the operative tried to use the power hoist to pull the Sabre up the ramp..... it failed to operate. After several calls back to his base it was obvious the young lad did not know how to even check a fuse.

I decided to step in and after showing him how to check that all fuses were sound ..... which they were... moved on to the operating switch which was loose and spinning in its mounting. Further investigation revealed a cable had been pulled from the switch’s terminal block. I carried out a temporary repair and with the hoist back in action the Sabre was safely pulled up the trailer and towed away.

2 hours later the garage phoned having diagnosed a faulty crank sensor (this senses the rotation of the crankshaft and transmits a signal back to the ECU. No signal .... No ignition. It is situated adjacent to the oil filter and the garage suggested carrying a spare in the future available from Eurocarparts.com at £27.54 free delivery). This was replaced, the car submitted for its MOT and again she passed with flying colours.

One Sabre back on the road to enjoy the best of the Autumnal weather before mothballing for the Winter.

Barrie Evans



## 102 FITTING REMOTE SERVO

Those of you that know my car will remember that it was built without a Servo due to the amount of space the WebCon fuel injection gubbins takes up. Under normal driving conditions this is not an issue as I drive the car in a manner that takes the additional few feet required to stop into consideration. However, on our return from Italy last summer we decided to use Saint Goatherd's pass so that we could enjoy the fantastic scenery. Obviously going up was no issue but coming down I was literally standing on the pedal to negotiate some of the steep descents many on back on yourself turns. I was discussing this with Amir Monzoori who suggested placing Servos under the front wings due to the amount of space. I had in fact considered this before but thought the task was beyond my capabilities. You don't want issues with break at any time. After a little reassurance he suggested I order the parts and take it into his workshop for installation over the winter. You could say he made me an offer I couldn't refuse. Did I not know how much work it would be and so glad I did not undertake the task myself. Needing to fully appreciate the working of a twin breaking system is probably not too difficult but the fact we had to install two servos to match it up was a tad beyond me.

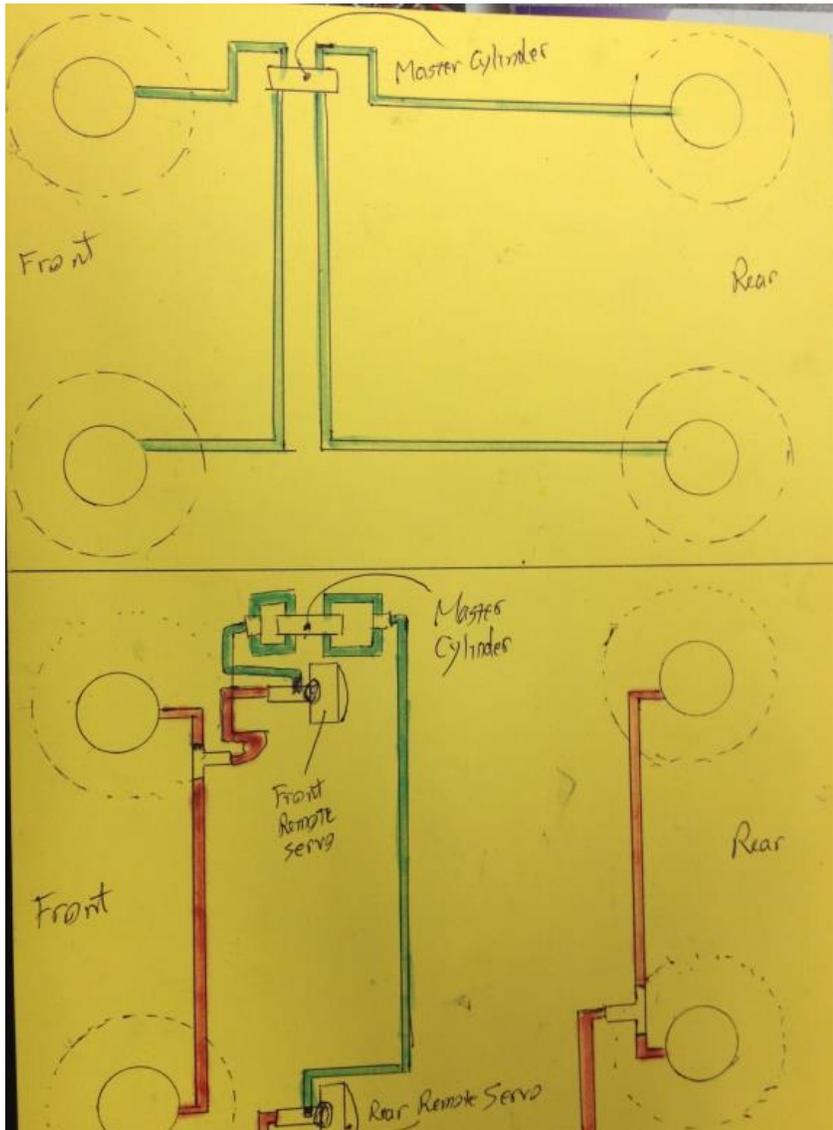
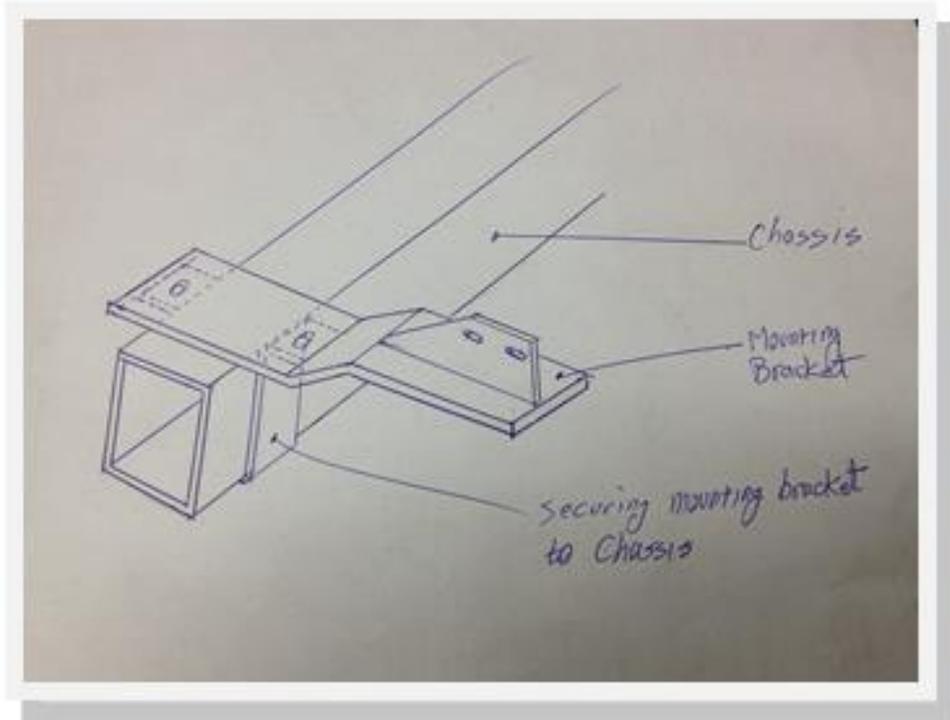
Servos were thus ordered and the car was delivered to Amis's workshop in North London for the install to be performed. While this was going on I also mentioned that the gearbox was a tad noisy and could be a bit rough, could that be investigated at the same time. This he also agreed to analyse and would let me know. Next thing I knew the box was out and sent to a specialist to investigate. Mysteriously the box was given a clean bill of health so the problem. The strange thing is the noise sounded just like a few loose ball bearings rattling away once the car got up to temperature. Eventually this was traced to a faulty clutch, not worn but weak springs. So if you have a rattle in your gearbox it may well turn out to be the clutch, if that makes sense.

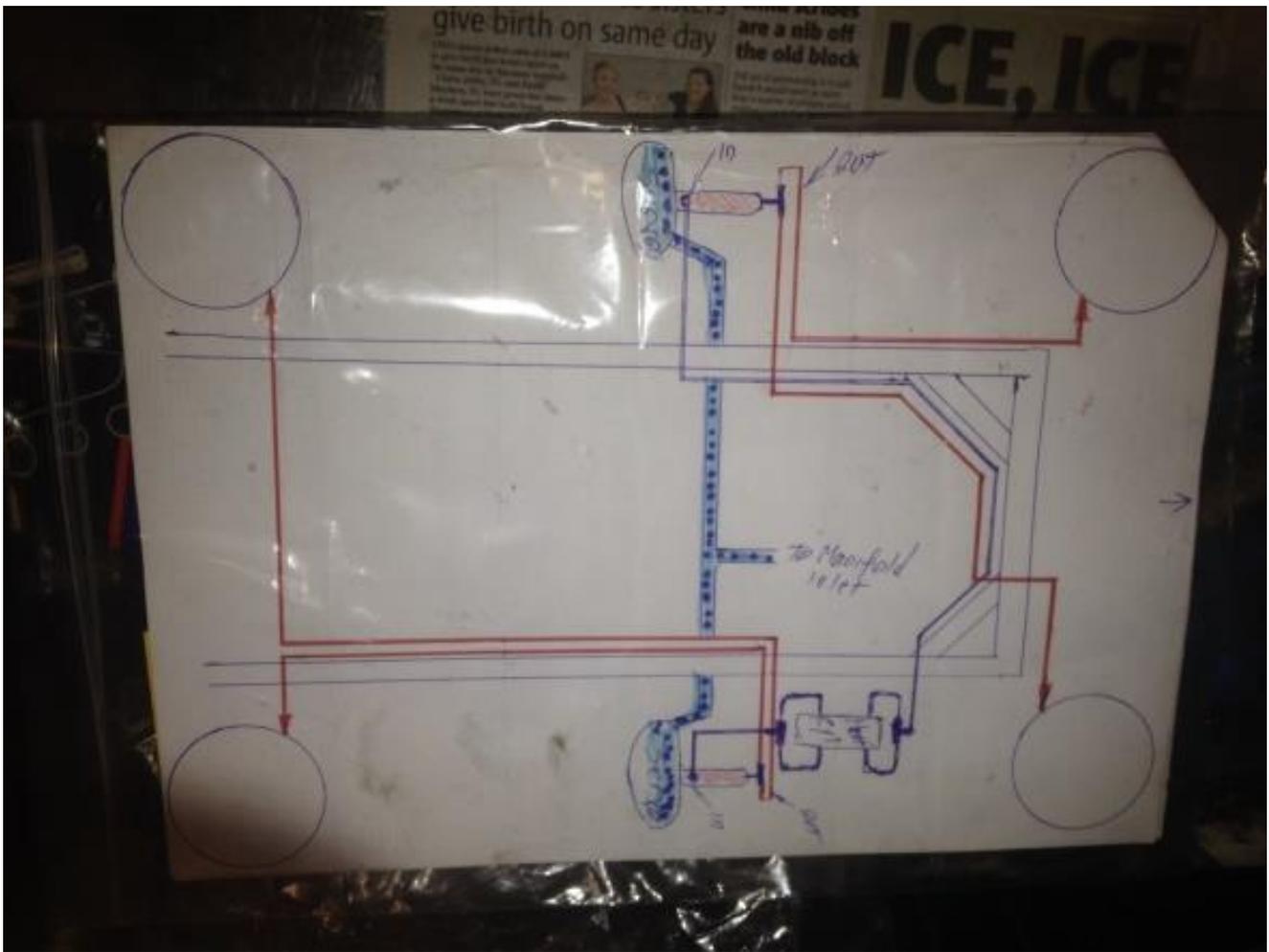
I digress, brackets were made, pipes were removed and reinstalled, covers to protect the servos were fabricated and fitted and the car was returned better than it has ever been and the braking system is so good now that John Nasarris will probably come close to hitting me up the back side on our next adventure.

I cannot thank Amir enough for the expert work he and his team have dedicated to my car and the generosity shown to me whilst all this was happening. I was kept informed at every stage of the process and I can only praise the whole team for making a wonderful job of the install. I would never have been able to manage this task myself and so thank my lucky stars I did not attempt it.

Thank you Amir and your team very much. If anyone needs more pictures of the process please ask and I will forward them to you, we have lots.

Peter Gibbons





103 **ROYALE SABRE SUPPLIERS LIST**

ROYALE SABRE SUPPLIERS LIST

Item	Supplier	Part Number	Price	Contact Number	Contact
Chasis					
Body Kit	Moss Mouldings		2553.46	01695 571111	
Front Suspension conversion Kit					
Propshaft	Dunning and Fairfax			01132 489619	
Sabre Seal Kit	Vintage Supplies			01692 650084	
Windscreen and Finisher	RAC Windscreens	HT 1719		01213 222383	RAC part number HT 1
Side windows	RAC Windscreens	2431955-template 113 is 5mm toughened float 840x490			
Bonnet fixing kit	S&J Motors	BFC/015	14.46	01257 262881	Steve & John, c/o Sprir
Boot catch / handle	S&J Motors	BFC/260	10.64	01257 262881	
Door glass and fitting kit	Various suppliers(Pilkington)				RAC part number 2431
Grill mesh kit	S&J Motors			01257 262881	
BumperKit	S&J Motors & Royale			01257 262881	
Bumpers are MGTF (50's)	Halls Garage		74.95	01778 570286	
Bumpers are MGTF (50's)	Moss MG Spares ( Web Site)		74.95		
Bumper bolts .312 X 1	S&J Motors		0.43	01257 262881	
Bumper bolts .375 X 1.5	S&J Motors		0.64	01257 262881	
Chrome strip set (Half moon Brass)	M-Machine and Simmal	250 kilos min order		+44 (0)1325 381300	Peter <span style="border: 1px solid black; padding: 2px;">01772 324</span>
Chrome strip set plastic	Woolies-Market deeping			01778 347347	
Badge set	Classic Badges			01530 830840	
Tread trip set and filler	Vintage Supplies			01692 650084	
Clutch pedal	Ford				
Brake pedal	Ford				
Interior Panel set	Moss Mouldings & Royale			01695 571111	
Hard Top and Fitting Kit	Moss Mouldings & Royale		260.75	01695 571111	
Torpedo side lights	S&J Motors	LUC/1130	23.40	01257 262881	
Petrol filler flap weather shield lock	S&J Motors	~7/08996	8.51	01257 262881	
Wiring harness and instructions	Trust Electrical				
<b>Lighting Kit</b>	S&J Motors	Several Bits		01257 262881	
Headlight unit sealed beam np	S7J Motors	ELC/025		01257 262881	
Headlight plastic bowl	S&J Motors	ELC/020		01257 262881	
H/Light w/loom no pit	S&J Motors	ELC/ 030	4.68	01257 262881	
Bonnet stay kit SMALL	S&J Motors	BFC/015	14.46	1258 262881	
Bonnet stay clip	S&J Motors		0.20	1259 262881	
Quadoptic full kit	S&J Motors	ELC/ 35	52.76	01257 262881	
Stop/Tail Land Rover	S&J Motors	ELC/045	5.53	01257 262881	
Side repeater oblong	S&J Motors	ELC/050	6.80	01257 262881	
Reflectors	S&J Motors	LUC/RER25	5.53	01257 262881	
Indicator Rear/L Rover	S&J Motors	ELC/046	5.53	01258 262881	
Indicator BMC Plastic	S&J Motors	ELC/041	4.25	01259 262881	
Number plate light & S&J Chrome	S&J Motors	ELC/017	12.76	1260 262881	
Rear fog light	S&J Motors	ELC/055	7.25	1261 262881	
Headlamp Rim Mini on Steel	S&J Motors	BFC/115	8.51	1262 262881	
Headlamp Rim Mini on Copper	S&J Motors	BFC/115	12.77	1263 262881	
Wiper Wheel box kit	S& J Motors	WBX/013	4.25	01257 262881	
Wiper Arm Adj 10-12.5	S&J Motors	WBX/300D	8.08	01257 262881	
Wiper blade 9"	S&J Motors	N/A	7.23	01257 262881	
Double washer set	S&J Motors	ACC/101	2.98	01257 262881	
Demister vent cobra sj	S&J Motors	BFC/005	10.63	01257 262881	
Reverse light and bracket	S&J Motors	ELC/ 56	7.25	01257 262881	
Interior light	S&J Motors	ELC/004	10.64	01257 262881	
Interior Mirror ss/chrome/ brass	S&J Motors	MIR/015	17.02	01257 262881	
Tex door mirror	S&J Motors		21.28	01257 262881	
Walnut dash and radio fascia	P.W. Cooper woodtrim		215.00	01270 251432	6-7 Quakers Coppice,
Interior grab handles	S&J Motors			01257 262881	
Steering wheel and Boss Kit	Moto-lita				
CH Demister vents	S&J Motors			01257 262881	
Door mirrors	S&J Motors			01257 262881	
Front number plate bracket	Royale				
Tyres	Various suppliers				
Hood (Mohair)	Trimming Edge			01942 257267	Steve Derbyshire, 184
Hood bag	Trimming Edge				
Sabre centre consul	Moss mouldings			01695 571111	
Hidem Banding x 3.5 metres	Trimming Edge			01942 257267	
Grill chrome finisher	Car builder			01580 891309	
Sabre carpet set	Trimming Edge			01942 257267	
Sabre Radiator core	Various				
Hood frame					
Interior Handles / Info	John Barlow			01257 252700	Unit 6, The Conway Sit
Boot Badge	W N Baines				22 Alder Close, Leylan

## 104 BOOT LIGHT FITMENT

Ever wished on those dark nights that your Sabre was fitted with a boot light like most modern cars?

I decided to fit two second hand Ford foot well/boot lights and recess them into the fibre glass rear chassis covers so that there was less likely hood of them becoming obscured. I checked and found that there was sufficient clearance for the lights and an IR movement sensor/control unit which will control them, instead of an ungainly bracket/microswitch. Bought new off eBay for £12.00. Cut out the opening for the lights with my Multi tool (painful) and drilled the hole for the PIR and two for fixing the control unit.

A 2core 7amp multicore cable was taken from behind the dashboard, behind the upholstery panelling and through the near side hollow door sill, via the existing electric aerial cable hole and into the boot and top shock absorber mount void. (This area remains pretty dry but for an added precaution and to keep dust out) I sealed the hole in the boot floor around the chassis uprights with Gaffer Tape. Another length of the cable was then fed neatly beneath the carpet and sound insulation to the other void and taped down to the boot floor. I then soldered all joints and insulated them with insulation tape. (see photo). After disconnecting the battery I then made the final connection.

The red wire to the live side of the existing footwell light and the black to a suitable earth. The small controller was set up to work in day light only mode and stay on for 5secs until movement is detected. For improved illumination the existing filament bulbs were replaced with 6xLED WHITE lamps bought off eBay for £2.29 a pair. Reconnected the battery and tested operation. Note that LED lamps are polarity sensitive so ensure you put them the right way round otherwise they will not work! The covers and carpet were refitted.....job done.

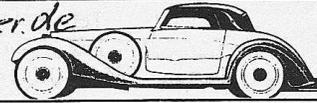
P.S If you also wish to improve your windscreen low brightness courtesy light then replace the 38mm filament festoon bulb with a direct replacement 6xLED WHITE 38mm bulb off eBay for 99p free postage/packaging from Japan. Takes 10 days to arrive but an absolute bargain. How do they do it? -  
Barrie Evans



Margarete Meier  
 Im Nordfeld 26  
 29336 Nienhagen

Tel. 05144/493792  
 Fax 05144/493793  
 Mobil 0170/8313228

*info@l-meier.de*



*Brass profile* **Messingprofile**

Profilquerschnitt Maßstab 1:1	Bezeichnung	z.B. eingebaut in folgende Typen	Bestell- Nr.
	Nagelleiste 10mm breit	Vor- und Nachkriegs fahrzeuge	MP 001
	Nagelleiste 12mm breit	Vor- und Nachkriegs fahrzeuge	MP 002
	Trapeznagelleiste 12mm breit	300, b,c,d 300 S, Sc	MP 003
	Zierleistenprofil 25 mm breit	Vorkriegsfahrzeuge 170/220/300,b,c	MP 004
	Zierleistenprofil 30 mm breit	Vorkriegsfahrzeuge z.B. 290/320	MP 005
	Zierleistenprofil 30 mm breit mit Sicke	Vorkriegsfahrzeuge z.B. 290/320	MP 006
	Zierleistenprofil	300,b,c	MP 007
	Zierleistenprofil 15 mmm breit 7 mm hoch	170 SCA Motorhaube 170/220CA Einstieg	MP 008
	Zierleistenprofil 14 mm breit	Ponton 220 S Coupe/Cabrio	MP 009
	Zierleistenprofil 18 mm breit 5 mm hoch	z.B Wanderer W25K	MP 010
	U-Profil für Ausstellfenster 11mm breit 10,5mm hoch	300,b,c,d 300S,Sc	MP 011

## 106 CENTRAL LOCKING

As I have now finally finished my Sabre, passed the IVA, passed the MOT and sent off my documents to DVLA, I am now waiting the reported 6 weeks for the paper process to either complete or send me a request to take the car to another VOSA inspection in order to create the logbook. Time to make those finishing touches in preparation for the big day, by which time winter will be here I'm sure.

During my build, for some reason, I decide that I would not put a key lock in the door, probably to avoid key scratches below the lock as it was used.

I initially wired the two door lock solenoids to a toggle switch in the boot, the idea being that I could lock the car from there and then lock the boot, with a key, yes I do have some Irish blood in me, and that worked fine but now I have the opportunity to refine the process. I found, and give details below, of a trustworthy 4 channel remote control toggle switch which when wired as detailed below, works great and is reliable, for less than £20.

If anyone is interested I have given as much detail as I can below although I am not indemnifying the wiring, it seems to work in line with the original wiring diagram which in my case was for an Mk 3 Granada 2.9i Auto.

The unit itself can be bought from;

[http://www.amazon.co.uk/Channel-Wireless-Control-Receiver-Transmitter/dp/B00C1SSWHW/ref=sr\\_1\\_23?m=A17M1OH9UAKGE7&s=merchant-items&ie=UTF8&qid=1383320917&sr=1-23](http://www.amazon.co.uk/Channel-Wireless-Control-Receiver-Transmitter/dp/B00C1SSWHW/ref=sr_1_23?m=A17M1OH9UAKGE7&s=merchant-items&ie=UTF8&qid=1383320917&sr=1-23)

or

<http://www.ebay.co.uk/itm/121104193817> where there are more details / specification information

On my solenoids there are 4 wires, Red, Brown, White and Yellow and basically 12v + is connected to the Red, the Brown is not needed with this solution. The solenoid then switches the -ve to the white to lock and onto the yellow to open. Below I have drawn a small schematic for the connections I used which correspond to the "A" channel on the remote key fob.

I also have installed a battery isolator in line with the battery earth connection and the way I have wired the remote control, it is not affected by this. When I lock the car with the remote and then isolate the battery the car stays locked, although it does open immediately when the isolator is reconnected.



## Central locking part 2

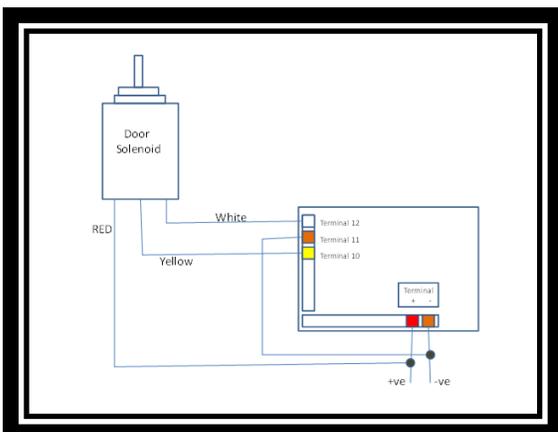
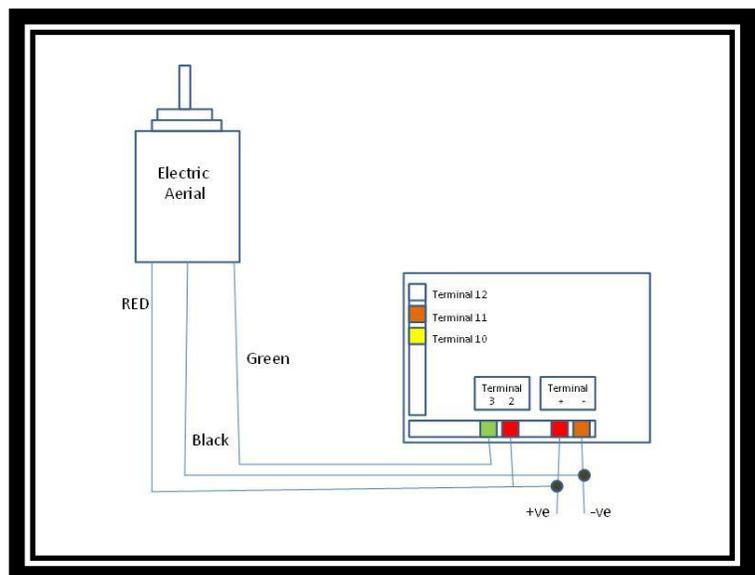
Having completed the central locking I decided to upgrade the manual aerial which I originally installed to an electrically operated one. Unfortunately I had not run wires from the Radio CD player to the boot for the appropriate connections and did not want to start to take out carpets and panels. To cut a long story short, I figured out that I could use one of the other channels in the remote control switch to control the aerial. Again, below I have shown the connections I have used which correspond to the D button on the key fob. Pressing the button once drives the aerial up, and it stays there, and pressing it again drives it down.

Ten pounds for remote locking and a tenner for the aerial – Bargain.

If anyone is interested I am happy to discuss and can be contacted on 01942 894756 or [Retiredearly@live.co.uk](mailto:Retiredearly@live.co.uk)

This took me less than an hour to put together, there must be lots of members out there with little “gems” that are worth sharing, so to echo Peters’ quarterly request, I, and I am sure many others, would be very interested and reading about other members bespoke solutions. If I can do it, anyone can!!!

Tony Doherty



**Tech Article****The Removal of****SPIDEY**

Yes, that's that horrible little Devil the "star crack," that we never want to see, but likely experience all too regularly.

That is of course unless you do something about it and protect your lovely shiny pride and joy, by painting several coats of underseal or bonding a rubberised matting to the underside of the wheel arches, which will effectively protect the wing from damage due to stones being flung into the wing by the tyres.

Unfortunately, I did not fully protect the underside of my wheel arches and consequently have had to put up with Spidey's presence for some years now, with one in each of the front wings and one in the rear nearside wing. Not so noticeable admittedly, but bloody annoying nonetheless. I was always reluctant to repair this minor damage, for obvious reasons.....after all, 'Spidey' wasn't so bad and I didn't want to make a pig's ear out of him. That was until one day a ruddy great JCB swung round inexplicably and sideswiped the rear wing where Spidey was residing - which created an incentive to do something about it.

Of course, if you have pots of cash then you could get your damage repaired by a professional, but if you're like me - tight - you might want to have a bash yourself, however, it stands to reason that if you do attempt such a challenge, then it is essential that you plan and understand the steps fully.

OK, it's decided, now let's get going. First stop is Halfords for a couple of cans of U-pol high build primer, clear lacquer, fibreglass kit, tub of Isopon P38, various grades of Wet & Dry from 100 to 1200, some tack rags, and a couple of large aerosol cans of finish paint which, given the original manufacturers colour code of your car, Halfords can prepare in shop.

It doesn't matter if the damage is major or just a hardly discernible 'Spidey', the course of action is the same - brutal - this is the time to be brave. So it's out with the 4" angle grinder with 80 grit sanding disc, or an electric drill or even a rasping file like a 'Surform' - but I like my angle grinder as it is more controllable.

Clean the wing thoroughly, top and underneath, before you start grinding as any contaminants will be ground into the repair area. It is necessary to remove the loose flaky material and grind out all the damage and if the crack, or damage goes all the way through, then so should the grinder. Removed all the damaged material until you have achieved a nice gentle feathering back to the surface, which should be around 50mm all around the repair area.

If you find you need to go all the way through, then the underside will need prepping for matting/laminating as detailed below with fibreglass chopped strand mat to initially bridge the gap and strengthen the repair. If the gap is wide, the application of wire mesh, or perhaps an "ally" plate may require riveting in.

Then progress to the main repair area on the outer surface, and the first step will be to strengthen and reinforce the ground out portion with a bridging filler in the scar area. There are various methods to reinforce the repair, one of the most popular methods is using Isopon P40 which is a chopped strand mat in a putty style resin base, that is stippled into the repair area after being mixed with a hardener, and makes a very good solid reinforcer, which will stop the crack from reforming and



propagating through the filler to the surface. My preferred method is to paint a resin, mixed with hardener over the ground out area, then cut a piece of fibreglass tissue and lay it into the repair to make a laminate, stippling the tissue/mat into the previously applied resin before it is cured, and this can be done a number of times to suit the depth of repair.

While the laminate is still tacky, it's time to use a finishing filler and there are many very good products and many favourites, my particular choice is Isopon P38 as it's readily available, easy to use and gives a good solid repair which is very easy to sand. It can be applied in one go, however if the fill area is very deep, it's better to fill in layers, as there is a likelihood of the filler cracking if laid up too thick, consequently wasting all that good work - filler is only cosmetic and the key is in the laminating process to build up the repair, so if done well, the filler should end up being a single pass skim.

**Filler Tip:**

1. Don't mix too much hardener into the filler paste as this will create a violent chemical reaction that will heat the material too quickly and possibly lead to cracking of the filler.
2. Use a mortar board, or make your own out of ally plate with a piece of broom handle screwed in the centre and keep it meticulously clean - not absolutely necessary perhaps - but anything that helps the process to be cleaner and easier to manage is worthwhile.
3. Whatever you're mixing on, don't use cardboard, as it will absorb the resin.
4. For spreading the filler, I prefer a wide (75mm) thin flexible plastic spatula - flexibility facilitates application - particularly around changes in profile.
5. Most good fillers can be applied in relatively thick layers - but best not to, as cracks can appear - keep it thin as possible.
6. Make sure the final fill layer has enough time to cure to avoid shrinking prior to primer application - maybe even 24 hours if time permits.
7. I don't use putty fillers, also known as 'stopper' or 'knifing putty' - they are designed for very light scratches and are air drying, so any application thicker than a gnat's leg will sink due to solvent evaporation and the stuff takes ages to dry

So, the filler has been mixed correctly, applied with great care and the repair area is now effectively covered, slightly



## Cracked fibreglass 2 continued...



overlapping the original paint boundary, raised just a little above the original surface and we're now ready to begin the sanding/profiling stage.

### Sanding Tip:

1. Use a good quality 'wet and dry' abrasive paper, not those that you can buy online - like the pack of 200 for 99p - they fall to pieces and have poor grit bonding properties.
2. Sanding blocks are great - I prefer the rubber type - perfect for flat surfaces giving an even profile, only use your hand for tight or complex surfaces, or you'll end up with wavy paint.
3. Don't sand with a circular motion, use straight lines in an X format, nor stay in one area too long, keep it moving and watch out for low spots.
4. The key is in getting the filler correctly profiled - not the primer
5. To maintain a good technique and posture for that final fine profiling technique.....look to your inner Zen.

Starting off with a 100 grit paper on the sanding block, the profile is roughed into shape and then progressively worked into the finished profile using 200 or 300 grit paper. Sometimes it is necessary to refill voids or flat spots with filler, and sanding again. The surface is soon ready for primer.

### Primer Painting Tips:

1. If you're working in the garage make sure there is plenty of space to move around the area freely.
2. Protect all areas not to be sprayed using masking tape and newspaper.
3. Remove all polishes from the area, particularly if the repair is in a garage as the spray will pick up silicone particles and deposit in the paint leaving craters, impossible to remove without going back to the beginning.
4. Damp down the area and keep it clean.
5. Optionally, the repair area can be coated with a sealer prior to the primer application to prevent lifting.
6. Use a good quality high build primer - etch primers are sometimes used on GRP, but usually direct to the gel coat - I didn't use an etch primer.
7. Don't use degreasers.
8. Use warm water with a tiny amount of washing up liquid when rubbing down with 'Wet & Dry' to lubricate and prevent clogging.
9. Use fresh water for washing down panel at each stage
10. Make sure the panel is absolutely dry before painting.
11. Keep the spray coats as light as possible. Don't over

wet the application as the thinners will lift the previous coat.

12. Spray a very light coat of a dark coloured paint between primer coats to establish where the low spots are after rub down - known as a 'blending' or 'guide' coat.

It is really important to keep the application as dry as possible, which is not so easy with a spray can, by avoiding that overwhelming desire to see the finish surface in one coat. Use a dark blending or guide coat between primer applications, gently sand with a 600/800 grade paper, picking out the high/low spots. The primer phase is completed when nicely blended into the original without any ridges.

### Final Painting Tip:

1. Clean with fresh water after each coat and dry thoroughly
2. Use a sticky 'tack rag' after drying to remove any dust
3. Keep the aerosol can well shaken.
4. As with the primer stage, keep the coats as light as possible.
5. Don't rush, take a break between coats.

Apply several very light coats, rubbing down between each with 600 to 800 grit paper to achieve a nice even coat perfectly blended into the original. Finish off with 1200 grit paper, and as it is metallic paint, then a final coat of clear lacquer is applied.

After a few days the whole wing was buffed by hand using various grades of polishing compound.

The final result was very pleasing indeed and almost undetectable alongside the original. A couple of days work, 30 quid and a reasonable job was achieved.....and very satisfying too.

The photos show the before and after which gives a fair idea of the quality that can be achieved doing a quick job using aerosol cans and very little experience.

In summary then - yes, it is feasible to repair 'Spidey' (and JCB damage) using canned sprays, but I wouldn't tackle a front wing or larger area with an aerosol. The quality of repair of course is dependent on the preparation and application skills. However, if you want the highest quality of finish, and we all do, then there is no alternative but to have it done professionally. Nevertheless, 30 quid and a weekend in the garage will give some breathing space to save up for that £300 repair - or the £3000 full respray when the colour doesn't match.

Have fun....!!

Len Coote



## 108 FAULTY FUEL SENDER

My fuel gauge had not been registering for some time so this winter I decided to investigate the cause by a process of elimination.

First the gauge was checked for operation by earthing the cable to the tank sender unit. The needle moved to FULL. This would indicate the wiring or the sender unit itself was faulty. The wiring was checked and found to be sound.

Next stage was to check the sender unit which is combined with the electric fuel pump within the Granada donor fuel tank. I lifted the carpet in the boot and peeled back the “horse hair” type sound insulation, which had been well stuck down. A thin layer was left still glued to the floor and no trap was visible.

The tank would have to be dropped .....good job I ran the tank low before SORN.

I jacked the rear end up as high as possible, fitted axle stands, disconnected the battery, fuel filler and overflow pipe. I supported the underside of the tank with a wooden spreader and trolley jack and unscrewed the two tank straps. The tank was slowly lowered revealing that there was in fact a 4” hole in the underside of the boot floor. Returning to the inside of the boot I dug away at the remaining underlay and found a thin brass sheet with recessed screws. So with some difficulty (I didn’t realise how heavy the tank would be) I put the tank and all associated pipes back together again!

The following day I removed the access trap, disconnected the 2 electrical plugs and earth lead from the sender unit. By inserting the probes of my multimeter into the two small holes on the Ford quick release petrol connector I managed to disconnect it. The spring clip for the fuel return pipe can easily be released with a pair of taper nosed pliers. The sender retaining ring was gently released by tapping the tabs with a blunt screwdriver until it lined up with the slots. Remove the gasket carefully for reuse. After a bit of a juggle the whole unit was released from the tank. I sealed the hole left p of the tank with Gafa tape as a temporary measure to prevent the petrol from evaporating.

Searching the internet for a new/second hand unit proved impossible. My local Ford agent found the unit still on their parts system for £305.00 but it was obsolete. However, I then contacted the Granada 1234 Club, who were very helpful and directed me to Fitz at Top Boss Performance Tuning of Derby. Tel: 01332347406. As he is only about 6 miles from me I visited his garage. Now Fitz breaks Ford Granada/Scorpios for their 24v 6cylinder Cosworth engines and rebuilds/tunes them up to 500bhp. He never throws anything away and has two lockups stuffed with any spare you can think of. A sender unit and fuel pump was quickly found along with two foot well lights which I also needed ..... all for £40.00.

I fitted the unit, refitted all pipes and electrical connections, reconnected the battery, switched on the ignition and hey presto the needle didn’t even flicker! After cleaning the earth stub on the top of the sender and the inside of the earth connector the needle slowly moved for the first time in years eventually stopping at 1/3 full..... no wonder the tank was so heavy!

- TOP TIPS to save time:
1. Drain the tank of petrol as necessary.
  2. Visit Specsavers before bothering to remove the tank.

See photo attached if you wondered as I did what the unit looks like. Unfortunately I understand that none of the parts are replaceable or can be repaired.



## 109 FITTING REMOTE SERVO

Those of you that know my car will remember that it was built without a Servo due to the amount of space the WebCon fuel injection gubbins takes up. Under normal driving conditions this is not an issue as I drive the car in a manner that takes the additional few feet required to stop into consideration. However, on our return from Italy last summer we decided to use Saint Goatherd's pass so that we could enjoy the fantastic scenery. Obviously going up was no issue but coming down I was literally standing on the pedal to negotiate some of the steep descents many on back on yourself turns. I was discussing this with Amir Monzoori who suggested placing Servos under the front wings due to the amount of space. I had in fact considered this before but thought the task was beyond my capabilities. You don't want issues with break at any time. After a little reassurance he suggested I order the parts and take it into his workshop for installation over the winter. You could say he made me an offer I couldn't refuse. Did I not know how much work it would be and so glad I did not undertake the task myself. Needing to fully appreciate the working of a twin braking system is probably not too difficult but the fact we had to install two servos to match it up was a tad beyond me.

Servos were thus ordered and the car was delivered to Amis's workshop in North London for the install to be performed. While this was going on I also mentioned that the gearbox was a tad noisy and could be a bit rough, could that be investigated at the same time. This he also agreed to analyse and would let me know. Next thing I knew the box was out and sent to a specialist to investigate. Mysteriously the box was given a clean bill of health so the problem. The strange thing is the noise sounded just like a few loose ball bearings rattling away once the car got up to temperature. Eventually this was traced to a faulty clutch, not worn but weak springs. So if you have a rattle in your gearbox it may well turn out to be the clutch, if that makes sense.

I digress, brackets were made, pipes were removed and reinstalled, covers to protect the servos were fabricated and fitted and the car was returned better than it has ever been and the braking system is so good now that John Nasarris will probably come close to hitting me up the back side on our next adventure.

I cannot thank Amir enough for the expert work he and his team have dedicated to my car and the generosity shown to me whilst all this was happening. I was kept informed at every stage of the process and I can only praise the whole team for making a wonderful job of the install. I would never have been able to manage this task myself and so thank my lucky stars I did not attempt it.

Thank you Amir and your team very much. If anyone needs more pictures of the process please ask and I will forward them to you, we have lots.

Peter Gibbons

## 110 **GRANADA HUBS**

**The query below was asked by Peter Edwards in the last magazine.**

I'm thinking to upgrade my Sabre's front suspension to 5 stud Granada hubs. I know Sabre's can be built with either Sierra or Granada front suspension parts. If I go the Granada route I presume I'll need a Granada cross member, tie rods and hubs but were the Royale's fabricated top wishbones the same or are there two different types/lengths? Thanks, Peter Edwards p.f.edwards@lineone.net

### **Answer from Colin Greenhough**

I read the enquiry from Peter Edwards about converting his car to Granada running gear. My car is on Sierra axles but I used a Granada front crossmember, which is better and what most builders did because if you use the Sierra one you have to cut off the original engine mounts as they will foul the sabre chassis. (The engine mounts are on the crossmember on both Sierras and Granada's which we don't use on the sabre because we mount it on separate brackets on the chassis rail). So, yes you can use either crossmember regardless of what running gear you choose. Also you can simply bolt your five stud Granada hubs onto your Sierra stub axles at the front. The same can be done at the rear with a little modification depending what drive shafts you've got and whether the Sierra is on discs or drums.

## 111 PETROL TANK

As promised I can now give you some info re the tank on my Sabre.

As I live in London, we have numerous speed humps, holes in the road and general disrepair to the road surfaces. So much so that whenever I drive my Sabre the fuel tank would scrape these obstacles until a few weeks ago it decided enough was enough and I ripped a hole in it!

I then decided to re-site the fuel tank in the boot as this would stop further damage.

I found a company OBP Motorsport based at Longlands Ramsey Heights, Cambs. PE26 2RQ. Tel. No.01487 812301 (Contact David)

who were very helpful in supplying an alloy tank of 10 gallons capacity which will fit nicely in between the hinges of the boot lid.

(I sent them a drawing of my requirements which they adhered to after a fashion.)

You will see from the attached photos that it fits perfectly, however, they fitted the flow and return pipes the "wrong way round" as I had asked for the flow to be on the right side.( This means a reversal of the pipework which I will do in the spring when the weather is better!)

However, they are holding the drawings so if anyone else wants to go down this route contact them and they can fabricate a tank at a cost of £290.40 including a fuel sender unit and VAT.

I also bought a fuel filler cap and piping from Car Builder Solutions which I think finishes the car off nicely.



112 SUSPENSION KNOCK

JIM WAITES GRANADA BASED SABRE

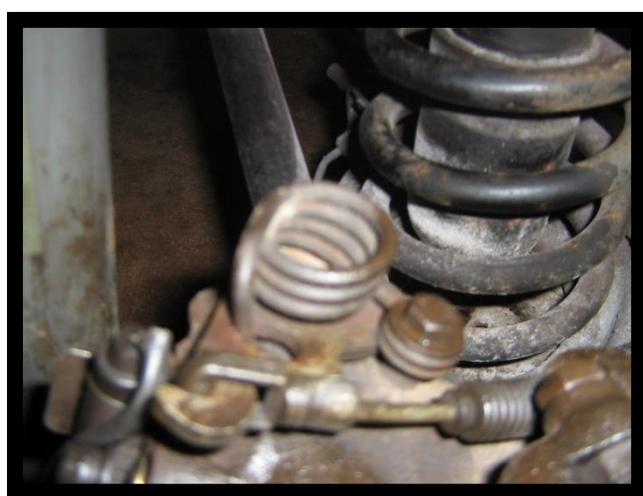
Whilst driving on some of the worst roads that my Sabre has ever been on this year in Ireland with a fully loaded boot I found the rear suspension seemed too bottomed out on some of the very large potholes that seem to plague their minor roads.

On returning home and looking into the problem I found that it wasn't the suspension bottoming out, it was in fact the rear brake calliper hand brake spring (see photo 1) fouling the flange where the upper and lower body panels are joined together.

With the rear wheels off it only took 10 minutes to grind away the flange on both sides by 5 mm.(see photo 2) A coat of black paint to seal the fibre glass, wheels back on, JOB DONE.

My car is fitted with Sierra estate rear springs as the Granada springs (colour code blue/green/white) made the rear of the car too high.

The modification I did to the front suspension (see July 2010 Magazine) didn't bottom out at all. Must have done something right there then.



TECHNICAL ARTICLE

# Threads & Thread Repair: Helicoils

A problem that at some time during our JBA build most of us will encounter, will be the need to generate a threaded hole or repair a stripped / damaged thread. So here are some basic notes that may be of help to those not familiar with these things.

## TAPPING HOLES (generating a threaded hole)

The basic tools for putting threads into a holes are taps, there is nothing special about these pieces of kit, they are available at most of the kit car shows and from E-Bay.

We will only consider the basic type for the purpose of the JBA build and that is "hand taps". As it says on the packet, they are used by hand in a tap wrench. The tap wrench is a holder for turning the tap.



Ratchet "T" wrench

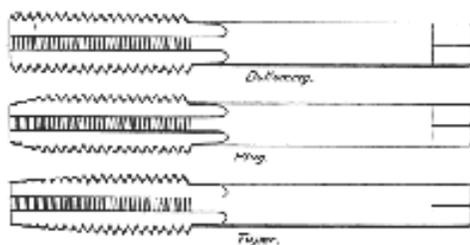


Standard wrench

Most sets consist of 3 taps. Cheaper basic sets may only have two taps, which in most cases is more than satisfactory.

The difference in these taps is the taper at the front end (or "lead in"). The taps are used in a defined order, and the names are descriptive of their purpose and the sequence in which they are used, these being:

- 1) Taper tap: the first approx 8 threads reduced for lead in and starting a tapped hole.
- 2) 2<sup>nd</sup> tap or plug: the first 3 -5 threads reduced.
- 3) Bottoming or finishing tap: one or two threads reduced, and used to complete the last few threads in a blind hole, i.e. that doesn't go right through.



There are two basic qualities or grades

1. Carbon steel: OK for occasional use and cutting threads in softer materials. Not really suitable for the harder or higher strength steels and stainless, as they will lose the sharp cutting edge. OK for use in these harder materials if you only want to tap few threads.
2. HSS (high speed steel): the better of the two grades, maintains sharp cutting edge longer, even when used on some of the higher strength steels and stainless steels.

The hole to be tapped is drilled to the root diameter of the thread, see table for drill sizes. Another quick and easy way to find a drill of size that will suffice is to use the corresponding nut as a drill gauge, the drill should just fit through the nut.

Recommended drill sizes for metric coarse threads

Thread dia x pitch	4 x 0.7	5 x 0.8	6 x 1.0	8 x 1.25	10 x 1.5	12 x 1.75	14 x 2/0	16 x 2.0
Tapping drill	3.3	4.2	5.0	6.8	8.5	10.2	12.0	14.0
Helicoil drill	4.20	5.25	6.30	8.35	10.50	12.50	14.65	16.60
Clearance drill	4.1	5.1	6.1	8.2	10.2	12.2	14.25	16.25

Screwing the tap into the hole cuts the thread. A cutting lubricant or threading compound should be used. If not available, some lubricant like WD40 or 3in 1 oil will help. It should be remembered, that when a thread is cut it will result in some swarf being produced, so about every two turns the tap should be "backed off" (unwound) a turn or more to break the strands of swarf being produced. On deeper holes it will be necessary to remove the tap completely and clear the swarf from the hole and the tap flutes.

Taps have the flutes cut into them to generate the cutting edges. Their cross sectional area is considerably smaller than the corresponding bolt size and hence have a lower torsional strength. Consequently, do not try to turn a tap with the same kind of force you would apply to a bolt, as they are weaker and far more brittle. IF A TAP GETS BROKEN YOU CAN'T DRILL IT OUT - IT IS HARDER THAN A DRILL it will need to be removed by spark eroding.

If the hole being tapped is a "through" hole then once the taper section of the tap exits the reverse side of the material, then it will not be necessary to use any of the other taps.

## REPAIRING THREADS

If a thread gets stripped or damaged then there are 3 common options:

- 1) Scrap the part and get a replacement;
- 2) Drill it out and re-thread to the next size up;
- 3) Repair with a helicoil (wire thread insert).

There is nothing magic or mysterious about helicoils, and if you have the equipment it is an easy job. The equipment consists of a special size drill, a tap, an inserting tool, and of course the helicoil insert. It normally works out cheaper to buy the equipment than to have the job carried out by somebody professionally. Also, if you have the fitting kit, it is sometimes possible to re-thread the hole with the (bolted on) item in place.

So what is a helicoil, and what does it do.

Helicoil is a trade name for wire thread inserts, like Hoover is to vacuum cleaners and Biro is to ball point pens.

They look like a spring with a little tag on the end. They are made from diamond shaped wire, normally stainless steel, which is screwed into a specifically sized threaded hole. The inside of the spring then becomes the replacement thread.



*The Helicoil*



*The locking helicoil*



*Typical Helicoil kit: Drill, Tap, Fitting tool, Tang break off tool, and helicoil inserts*

There are two basic types:

- "Free running," which will give a standard thread, and are normally natural or silver in colour, and
- "Locking," which as the name implies, give the same effect as a lock nut, such as a nylock. These locking helicoils are identified by being red in colour, the locking effect being generated by one of the coil turns having a flat section.

Metric helicoils are specified by 3 significant parameters, i.e. thread diameter, thread pitch, and the installed length. As the installed length is different to the free (uninstalled) length, the length is referred to as a multiple of the thread diameter. For example, an M6 coarse (1.0 mm pitch) x 12 mm installed length helicoil would be M6 x 1.0 x 2D.

If a shorter length is needed some coils can be cut off using a pair of good quality side cutters. Count the number of turns to work out the installed length. Number of turns x pitch = installed length.

Once the hole has been tapped, the helicoil is installed using the insertion tool. It's a relatively simple operation of winding the helicoil into the newly threaded hole, the normal depth to install them is one to one and half turns below the surface.

Once installed the insertion tang is removed using the tang break-off tool, which is put down the bore of the helicoil and given a sharp tap with a hammer. The tang then breaks off, and all being well, installation is complete.

If something goes wrong, then it is possible to get helicoils out. If this situation arises and help is needed, then feel free to contact me. ■



Der Maxxis MA-1, bietet ein Preis-Leistungsverhältniss wie kein anderer Reifen aus dem Oldtimersegment, der MA-1 mit seiner M+S Kennung ist bis zu einer Geschwindigkeit von 180 km/h freigegeben und ist der optimale Reifen um mit Ihren Oldtimer gemütlich über die Landstraße zu cruisen. Der schmale Weißwandstreifen an der Seitenflanke lässt Ihren Oldtimer im Stil der 70er Jahre wieder aufleben.

P155/80R13	93S	TL	15 mm	M+S	645	mm	208	mm
P165/80R13	83S	TL	15 mm	M+S	593	mm	170	mm
P175/80R13	86S	TL	15 mm	M+S	610	mm	178	mm
P185/80R13	90S	TL	15 mm	M+S	626	mm	187	mm
P185/75R14	89S	TL	20 mm	M+S	636	mm	186	mm
P195/75R14	92S	TL	20 mm	M+S	652	mm	200	mm
P205/75R14	95S	TL	20 mm	M+S	668	mm	207	mm
P205/70R14	93S	TL	20 mm	M+S	646	mm	212	mm
205/70R14	95V	TL			646	mm	212	mm
P215/70R14	96S	TL	20 mm	M+S	660	mm	216	mm
P205/70R15	95S	TL	20 mm	M+S	671	mm	212	mm
P205/75R15	97S	TL	20 mm	M+S	693	mm	206	mm
P215/70R15	98S	TL	20 mm	M+S	685	mm	222	mm
P215/75R15	100S	TL	20 mm	M+S	706	mm	220	mm
P225/70R15	100S	TL	20 mm	M+S	701	mm	233	mm
P225/75R15	102S	TL	20 mm	M+S	721	mm	226	mm
P235/75R15	105S	TL	20 mm	M+S	736	mm	240	mm



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**A journey back in time**

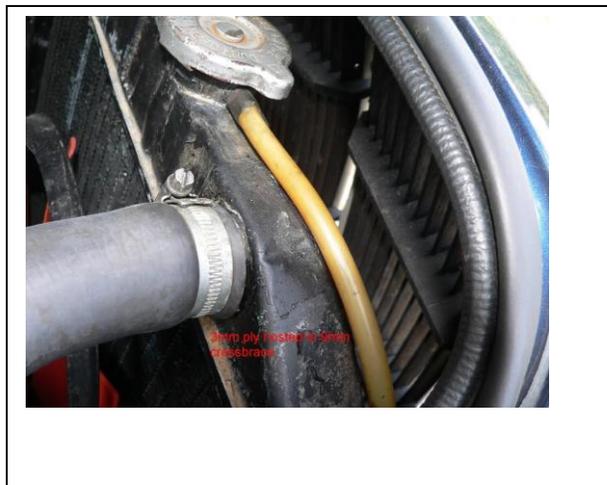
Longstanding members of the ROC will recall that in issue no 10 (Nov 2001) of the News, I wrote an article for the magazine entitled “Rocking Horse Droppings”. The article contained many of the trials and tribulations of trying to bring my Sabre closer to the Post Vintage Thoroughbreds of the era, which had inspired John Barlow’s design. In the end after much research I concluded that the Sabre owed much to the Delahaye 135 that was built between 1935 and 1950, when Delahaye ceased trading. In those days you would buy a chassis and choose a coachbuilder that offered their own variant of bodywork style on the chassis. John’s inspiration had clear influences of Chapron in the sweeping curves and running boards, whilst Figoni and Falaschi used more voluptuous curves with no running boards. In addition the chromed strip on the bodywork ran horizontally on the Chapron body, as on the Sabre, whilst it curved down to the base of the rear wing on F&F bodies. Neither coachbuilder however offered faired-in headlights until after the war. So what does this mean for our Sabres?

Their most probable heritage is a circa 1949 Delahaye 135, with coachwork by Chapron. Even then Chapron used a spare wheel mounted in a neat cover on the boot lid which John may have considered a bridge too far for a kit car. It should be noted that the correct wheel covers would have been stainless steel discs, even in 1949, on the Chapron body. It is also of some interest that the original engine would have been a 3557cc, 6-cylinder producing 125hp. The fact that John chose a 1998cc, 4-cylinder Granada engine producing 125 hp is either a happy coincidence or design genius.

After my research I set myself the task of replicating the original as closely as possible. This meant addressing several changes to the kit, which I will cover in a series of articles in forthcoming issues and will encompass.

- Radiator Grill
- Wheel discs and retaining studs
- Steering wheel
- Dashboard
- Door trims and window winders
- Seats
- Instruments and switches
- Exhaust
- Number plates

It took me three and a half years to complete my car and yes I still have a wife. Was it a success? Let the following true story be the judge.



I usually take my car to Goodwood for the revival meeting, which is all about turning back the clock to the 1950s. Needless to say it is a Mecca for classic car enthusiasts from all over the world. I have been privileged to get access to the pre 1950 classics enclosure over the years and one year returned to my car to find a gentleman pacing around it. He looked for all the world like Albert Einstein, but he said nothing. To break the ice I said, “Perhaps you are wondering what it is”. There was no response, just an embarrassed silence. So I continued with “It’s a replica of a Delahaye 135”. At this point his face lit up and in broken English he said “and I am ze President of the De-lahaye owners club”.

Well I just wanted the ground to open up and swallow me because if anyone was qualified to put me in my place, this was the man standing before me! I expected a tirade of how dare I compare my car to the genuine article, followed by a long list of inaccuracies. But no, he called over his large entourage of ladies and gentlemen, (At this point I have to explain that everyone at Goodwood dresses up in period costume and when you see a bevy of Parisi-a ladies, dressed to kill, it makes the entry fee doubly worthwhile). “Cette une Delahaye” he announced and encouraged them all to take pictures. I tried to correct him and emphasised it was a repique, but he wasn’t having it and complimented me on the wonderful restoration. He then went on to enquire how I had sourced large instruments, (they are 5¼in.diameter), because they can no longer find suppliers in France for their own restorations. He was mortified to hear that I had had to make them myself so could not help. More on this subject in another chapter. They all waited for us to drive off, which I achieved almost silently lest they should hear the sound of a 4-cylinder engine when they were expecting a 6.

It is fitting now that new kits are available at £6500, that we should have a few “how to do it” articles for any new builds that wish to follow a similar path to mine. Let’s kick off with the radiator treatment.

The photographs clearly show vertical slats where the kit car uses a mesh. There are twelve of these on each side as on the original and the spacing to achieve this is ½ in. I am often asked how did you bend those metal slats into such precise curves or did I have castings made at great expense? Well I did look at the latter but was put off by the cost. It's not the castings that are expensive, but the pattern making leading up to a production run. (New owners of the Sabre brand please note). On the question of bending slats of metal into smooth curves without kinking them, I didn't rate my chances. My only bending machine was a 5in. dia. cast-iron drainpipe, still attached to our cottage, around which I had formed the bonnet curves!

The answer, in the end, was relatively simple and was inspired by the plastic chromed surround to the air intakes that come with the kit. I reasoned that if I could find a suitable section of chromed plastic I should be able to manufacture a plywood base on which to mount them. I had once owned a Mini so the solution quickly sprung to mind. The old Mini used to have a chrome strip that followed the curve of the wheel arches and sills, so it must be possible to source something similar. The choices seemed simple: either go to a Mini spares dept. and order enough spare strip for four Minis or try my luck at Stoneleigh. The latter came up trumps and I was able to buy 12m. of the stuff. Now the only remaining problem was what thickness of ply I would need. I hoped that the standard 4mm (replacement for 1/8in.) would do the job, No such luck; it just sprung off as quickly as I pushed it on. I then tried to source thinner ply and found that model makers were catered for with 1 and 2mm ply but not 3mm. What followed was a wild goose chase that began by inquiring if 3mm existed. I was assured it did and if I was prepared to order several hundred sheets the importers would be happy to oblige. Trying another tack I went to main distributors, who supply DIY chains and was told that there was no call for 3mm so they could neither supply me nor suggest where to buy it. I had the feeling that I had been fobbed off and resolved to go back again on a different day, when I might be able to have a quiet word with one of the workers rather than the office staff. So one lunchtime I went straight for the warehouse and caught a few of the workers having their sandwiches. I explained my plight, but they reiterated that there were no consignments of 3mm ply. However, I was taken over to a scheduled delivery of 9mm ply for B&Q, which seemed unremarkable other than the top and bottom sheets were badly damaged by the steel bands with which they were bound. I remarked that someone is going to get a poor deal out of that consignment. No they won't, I was assured; all bundles of ply come with two sacrificial sheets of, guess what, 3mm ply.



Eureka!

My next trip was to B&Q as they took delivery of their ply. Sure enough the sacrificial sheets were being discarded into a skip and I asked if I could buy some. Help yourself was the reply. I only needed half a sheet, so they just broke one in half for me.

Compared to the search for materials, which I compare to finding rocking horse droppings, the rest was child's play. Examination of the photo of the rear of the grill matrix shows three horizontal ply battens (9mm or thereabouts); slotted to take the 3mm curved slats at ½in. centres. The curved fronted slats (the backs can be straight) are sufficiently deep so that the three ply battens are not obvious from the front. Painting the matrix matt black helps this process. Once the chrome strip is added the assembly is held in place by the same struts provided to hold the mesh in place. A further give-away, for the eagle eyed, is that John made no provision for a dummy starting handle aperture at the base of the grill. To draw attention away from this detail, I have straightened the bumpers with extra inboard spacers and fitted a badge bar sporting appropriate age badges for French and Italian motoring clubs. My radiator grill has been in place for 12 years and looks as pristine as it did when manufactured. Incidentally I have had no overheating problems, so the airflow may be better than through the mesh.

N.B. The slats must be parallel to the airflow and not at right angles to the inclined intakes, (a mistake on the production MGA).

More instalments next time.

Norman Green



## 117 ROYALE SABRE, VOSA AND THE DVLA

Following on from my earlier missive where I bored you all with my stories of buying my Sabre, read on for the next instalment for those of you who've lost the will to live.

To recap, in Spring 2009 I bought my Sabre pre-built and virtually completed by someone else. He'd sorted the SVA test, mine was the last kit car to go through SVA before it morphed into the IVA, and I handled the VOSA and DVLA registration process and ended up with the next random F Reg in the sequence.

All well and good and I happily drove it for a year or so both in the UK and France, then in late summer 2010 had a new engine put in from a 2003 Focus and at the same time I bought a personalised plate, E5 ABR.

Which if you were to space it out illegally, could almost say E SABR. Shame I'm not from Yorkshire, it could be quite good eh?

Not that I'd do such a thing of course.

Sad or what?

Eventually, during 2011 I decided I ought to get the paperwork straight so despite advice to the contrary from a couple of people who know about these things, I sent my V5 off to the DVLA in Swansea notifying them of the engine change and at the same time, asked them to change the registration number to this personalised plate I'd bought.



BIG mistake. Asking the DVLA to do two things at once was a real mistake and as I mentioned I'd been advised not to do that, get them to do one at a time otherwise they get flustered.

To say the least, it was a bad decision to ignore that advice

It turned into a long running saga where they wanted proof that the engine had been changed and wouldn't accept photos. So I had to get a statement from my buddy who'd done the work on his garage's headed paper saying that the engine had been changed, which they wouldn't accept as a fax or by e-mail it all had to be posted. Then they asked for photos having previously said they weren't acceptable, then they lost the V5 and the paperwork to change the Reg, oh it all went really pear shaped. In the end I ended up with two V5's one for the old number and one for the new, as well as two tax discs. When I phoned them for the umpteenth time to tell them I had two V5's and two tax discs, they told me it was illegal and impossible for me to have that and when I asked what to do with the old one was told, "oh, just destroy it and send us confirmation that you have". How odd is that? Anyway, let's move on a year to this May.

I knew my first MoT would be due early July 2012 so I put the car in for a pre MoT test with my local garage so I'd have the MoT in time to renew my road tax at the end of June as well. He spotted a couple of job's I'd need to do, change the steering rack and track rod ends, sort out the hazard warning lights which weren't working reliably and "hide" evidence of the wheels rubbing on the chassis – "just give the chassis rails a coat of paint before you bring it for the MoT" was the fix for that one.

So last week in June I booked it in for the MoT confident that it'd pass easily. Except his computer won't let him do it as per the V5.

The V5 says on the front page, section 3 Special notes; rebuilt - assembled from parts some of which were not new SVA/IVA cert issued 28/06/09 emission limit %CO4.5; HC 0.12 and then in Section 10 it says Date of First registration; 06 07 2009.

As I mentioned earlier, two things have changed since it was first registered in 2009. Firstly I changed the old Sierra 1.8 CVH engine to a 2003 Focus Zetec and secondly I put a personalised plate on it, the E Reg as against my "proper" F reg.

When the tester tried to book the car on to the computer for the emissions test he immediately got a message back saying that since the date of first registration is 2009 it has to meet 2009 emission levels. After playing around with his computer a bit more he managed to get it to accept that having an older engine than the year of registration, at the best he could test it to 2003 emission levels. This is a totally different standard to Now with the engine as it is we can't meet either of these emission levels. In order to get down to those levels I'd need to install a cat, re-map the ECU and a fit a lambda sensor and it'd cost c£500 at the least.

To say the least I disagreed with him and insisted he phone the area test examiner at VOSA but unfortunately he'd gone home early and the chap he spoke with didn't have a clue so we had to wait till Monday to get a proper position from VOSA.

Oh and the tester's on my side since he's got a Q plate kit too. Over the weekend I posted the "problem" on Pistonheads website and got a lot of advice, the upshot being that the computer's wrong and the car should be tested to the emission levels shown on my V5, i.e. %CO4.5; HC 0.12. Actually to confuse things even more, I've still got the V5 for the old registration plate which shows the same emission levels and the fact that I have two different V5's really did get them scratching their heads and at one stage I'm sure I heard the word "ringer" mentioned

A couple of people on Pistonheads gave me some very valuable information, not least of which was the names and phone numbers of two senior test managers within VOSA who know the rules, as well as the website location where you can get chapter and verse from the MoT test-ers handbook.

If anyone's got any questions in general about MoT's, not just for kitcars, this website has the testers own manual on-line so is a very valuable source of information;

<http://mottesters.co.uk/files/special%20notices/MOT%20Inspection%20Manual.pdf>

Come the Monday I phoned the MoT tester early and gave him the reference details from his manual as well as the contact names at VOSA and within half an hour he called me back to confirm that his area examiner agrees to test to the levels in my V5. Phew, that's a fight avoid-ed.

So later that day, after a bit more messing about, he tested my Sabre and it passed. But only just. We had to fiddle around for quite a while to get the CO down to 4.5. The hydrocarbons were easy but we had real trouble with the CO. At one stage it was consistently hovering around the 6.5-7.3 mark and it was only by really revving the wotsits off it and giving it a good blast to clear the soot that we got it inside the 4.5. Not sure what'll happen next year though, maybe I ought to drive it more.

So that's it. With a nice fresh MoT certificate, new tax disc and insurance, I've got a year's legal motoring to look forward to.

Anyone fancy making up a convoy and going somewhere?

**This is the final result of our endeavours to provide a quality badge for your cars, looks the business but some might thing £80.00 is too high a price.**



Some of you may recall that I've been searching for a pair of the sunblind or wind deflector hinges for a year or so now but with no luck. In fact I sent an e-mail round to a lot of members asking if anyone knew where I could buy some but no-one seemed to be able to help.

Last year I went to every kit car show, Detling, Stoneleigh and Newark hunting for them, whilst buying other bits of course, and I asked all the traders I could find. Several knew what I was on about but didn't have them or know where I might get them. Going on a "tip" someone gave me I even went to the MG spares day at the NEC in March since I was told they're a standard fit on one particular (unspecified) old MG car, but still no joy. I even got Peter to send me photo of his hinge and hawked it round all the shows this year too but still no joy. I kept the photo neatly folded in my wallet and referred to it at any relevant opportunity.

This was by now starting to become an obsession to the extent that I approached a local CNC machining company to see if they'd make a pair for me. I showed them the photo and they nodded wisely and were happy to tell me that if I gave them a proper dimensioned drawing they'd be more than happy to make me a pair. For around £140. Gulp. I didn't ask if that included VAT or not. All of a sudden I wasn't that keen on fitting the deflector.

But I still kept the photo in my wallet and if I was passing a car boot sale or car spares stand at a village show or fete or something I'd ask any likely looking trader if they could help.

Last Saturday we went to the inaugural Donnington Kit Car show at East Midlands. Since there weren't any Sabres there on the Saturday I guess it's not a popular destination yet for the RoCkers? Or maybe you all went on Sunday?

Anyway, wandering around the somewhat sparse exhibition hall I asked the usual suspects if they had my infamous hinges, but still no joy. In fact it was quite amusing, as I approached the SVC stand the big lad there whose name escapes me, he's about six feet thirteen tall with a big bushy ginger beard saw me coming and told me he still didn't have my bloody hinges before I'd even asked him. He remembered me from Newark and Stoneleigh since we'd shared a couple of jokes but he said, pointing down the hall, "go and have a chat with the guy at the end, he's into odd stuff and has got some really weird bits on his stand and seems to have sources for just about anything".

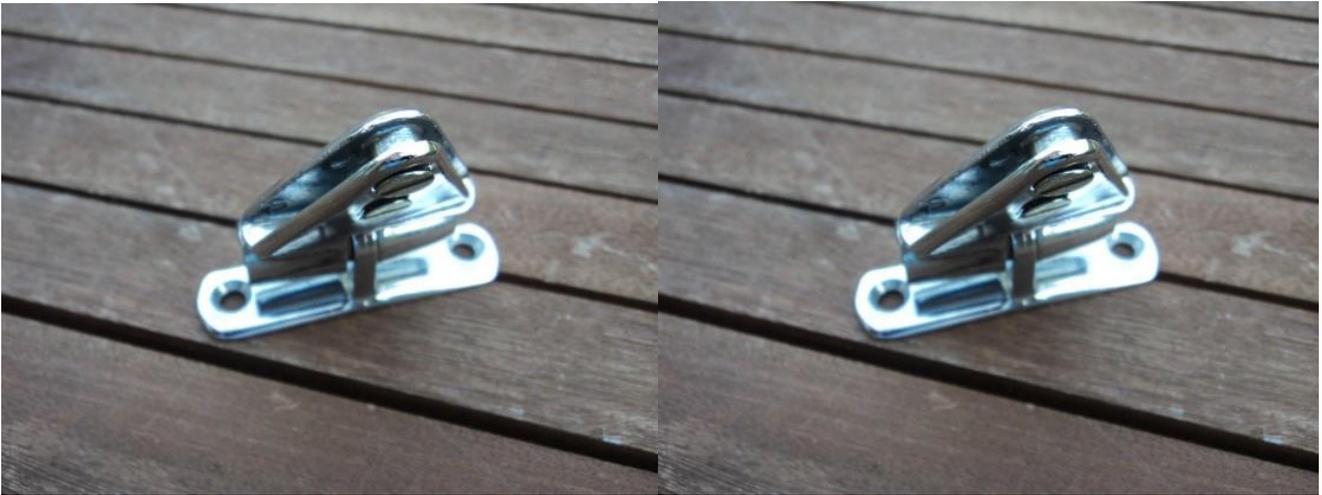
"Weird stuff? Weird stuff? Do I really look that odd?" I wondered.

So I wandered down and pulled out my dog-eared photo and asked the trader, "don't suppose you know where I might get a pair of these do you?"

"Hmm", he replied with a sly grin, "if you look in that box just off to your right, you might find something similar". And sure enough there they were. EXACTLY what I'd been searching for.

"Twelve pounds fifty each", he said, "how many do you want?" Ouch. I need two but you never know do you? So I bought three of the five he had while my wife wasn't looking. I thought of buying the lot but all of a sudden my wife came over as she saw my hand moving to my money pockets. It's amazing how good their eyesight can be at times isn't it? I could justify buying three, but five could have been a "challenge". So three it was.

And here they are? "Ah", you're all saying, "those brackets, I've got dozens of 'em lying in a drawer in the garage." Yeah, right



So today I decided to fit them.

One reason I wanted this type of hinge is that the screen surround on my Sabre already has tapped holes to take the hinge and ASSUMING the hinge holes are the same centres, it should be a doddle to fit. So what's the chances of it being right then?

Nope you're wrong. It was a perfect fit. The hinges fitted exactly in the existing holes.

So I just need to make the deflector itself. I'd scrounged a piece of Perspex from a buddy about eighteen months ago and it was happily sitting in the garage rafters awaiting its fate, so I dragged it down on to the workmate, cut it to length, rounded the edges and marked the hinge centres.

As you probably all know, drilling Perspex isn't exactly a tough job, but you should really drill a small pilot hole first, then open up to the 8.5mm needed using nice sharp drill bits. Small piece of masking tape so you don't scratch the Perspex as you're measuring and marking it out does the job perfectly.

## 119 TECHNICAL





So all that was left was to fit the Perspex to the hinges. And here it is, in all its glory.



And does it work? I'm really pleased to say yes it does. I went out for a drive this afternoon and the deflector seems to do exactly what it says on the tin, I'm really happy with it.

So all I need now is one of those nice transparent Royale stickers in the centre to set it off.

All in all, it took about two years to find the hinges and about an hour to make and fit.

And if anyone wants to buy some of these hinges, I can sell you a pair for fifty pounds.

Not really. You can get them from;

S&J Motors in Chorley. 01257 262881, e-mail: [sandjmotors427@yahoo.com](mailto:sandjmotors427@yahoo.com)

# DIY Blind Fixing

No, not how to mend an errant window fixture, or a miracle cure for our less fortunate optically challenged colleagues, David McDine gives us the low-down on what, where, and how to use captive fastenings

Other members who are building on their own are probably encountering the same problems as me, and that is, not being able to assemble some parts as single handed you cannot reach both sides at the same time to do up a nut and bolt, or the permanent fix of a pop rivet is not acceptable for items that need to be removed or strength purposes.

To help me overcome these problems I am utilising the following fixings almost all of which I buy on e-bay:

## POP RIVETS

The "POP" rivet which most people will be familiar with, needs the proverbial "pop rivet gun" to fix (e-bay search "pop rivet"). Available in various diameters, lengths, materials and types.

Diameter: The most common is probably the 1/8" followed by 5/32" and 3/16". Take care in choosing the size and material to be used, as the larger diameters can be a problem to install using the standard type of hand gun due to the force required, and need the alternative type of installation tools like the "lazy tongs" or a two handled riveter.



Standard type gun



Lazy Tongs



Two Handled

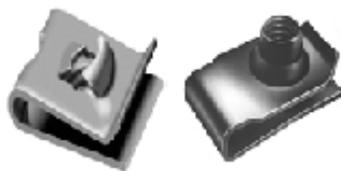
Head types: Various head types are available the most common and normally supplied is the domed head, followed by the countersunk, and a third type that should be of interest to the JBA builder is the large diameter head, which reduces the stress when used on fibre glass and other soft materials.

Materials: The most common materials are aluminium and monel, a zinc based alloy. Other materials available are copper and stainless steel. The stainless steel types are harder to pull (or set) and normally would be done with the lazy tongs.

## WATERPROOF RIVETS

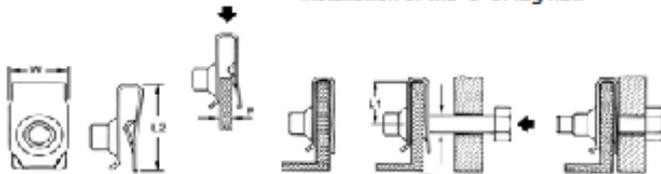
The body of these has a closed end and the "nail type" device that is pulled to "set" them is designed as a "break shank" as opposed to the standard open ended type which have a "break head" pin (the head being left, able to fall out and leave the rivet hollow).

## U-NUTS AND LUG NUTS



These do basically the same thing, pushing onto the edge of a thin sheet material and provide a strong fastening. The "U" nut takes a self tapping screw, the blades pulling down into the root of the screw thread as it is tightened giving a firm fixing, resisting vibration. The lug nut fits in the same way over the edge of the sheet material, but has a threaded turret for a standard threaded screw or bolt.

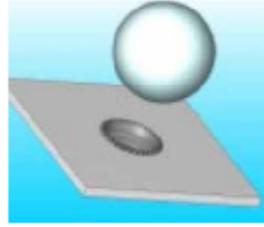
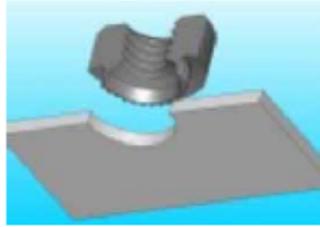
Both of these fixings require a clearance hole to be drilled in the sheet material prior to installation of the "U" or lug nut.



### HANKS BUSHES

These are a neat item, one of my preferred, relatively low cost like a nut with a swaging shoulder readily available in zinc plated steel and stainless steel. Access is required to both sides of the material into which it is to be installed, I have used the M4 size in my boot hinge, drilling the holes slightly larger and installing these bushes, I can now line up the boot lid, fit the screw at each end, close the boot and fit the rest of the screws into the captive threads.

A hole is drilled to be a snug fit on the bush, the bush fitted in the hole, and supported on a rigid surface (with the boot hinge I used my bench vice as the support). Using a profile punch or ball bearing, locate either tool onto the spigot and strike with a hammer to "peen" the spigot and embed the hexagons' 6 points into the sheet metal. Several blows may be required to fully peen over the spigot to make a flush and secure fit. When using a ball bearing, hold it in place with blue tack or a piece of masking tape, stopping it jumping out and getting lost.



### RIVET NUTS

Quite popular, available at most of the kit car shows. These have the advantage of one side fitting, if you can fit pop rivets you can fit these, can be used for putting threads into tubes (like the chassis rails) where the reverse side cannot be accessed, normally fitted with a purpose made fitting tool and mandrel, but can be fitted with a nut, bolt and spacer tube.



Normal size range 3 to 12 mm, available with countersunk head or pan head, available in aluminium, zinc plated steel and stainless steel. While the aluminium is the easiest to fit, it is the lowest strength.

### CAGE NUTS

These require a bit more effort in fitting, as a square hole is required, but as they are a floating nut, they have the advantage of taking up some misalignment of holes or out of squareness, particularly useful if countersunk screws are being used as the float will allow a screw to sit properly in the countersink.



### ANCHOR NUTS (PLATE TYPE)

Used extensively on aircraft and F1 cars, probably the Rolls Royce of captive fasteners, and the most expensive.

Attached with small screws, or pop rivets, nut is high tensile and floats for alignment purposes, and is a torque prevailing, self locking like a nylock but with better temperature resistance.



Any one has any questions, I should be at the Stoneleigh AGM

David McDine 13/02/12

## **Wedding Dreams are made of this**

### **Chris' Review on the Royale Build – A Royale Project**

Having read the article in September's magazine on Jaguar Replicas and Specials, I thought you might be interested in my story.

It all began way back in February 1992 when a work colleague bought a copy of Kit Car magazine into the office. On the front cover was a picture of this beautiful 1930's style convertible complete with large chrome headlights, running boards and side mounted spare wheels.

The car was called the Royale Drophead and was designed by John Barlow, the donor car being a Series XJ6. Having a young family at the time, how could I justify buying such a car? I finally persuaded my wife Julie by saying that the car would pay for itself by hiring it out for weddings when it was finished.

First I had to find a donor car, this turned out to be a 1979 Series II XJ6 that had received a rear end shunt. The XJ6 was quickly towed to my single garage and set about stripping the car and reconditioning the running gear. The Royale uses virtually the entire mechanisms of the XJ6, the exception being the heater which is rather large and instead uses the one from a Ford Sierra. The front and rear axle assemblies complete with their frames, the engine, gearbox, propshaft, exhaust system, hand brake cable all being unmodified and used as standard. Even the standard radiator is used, being turned through 90° to fill that large upright chrome grill.

One of the items to be modified is the steering column which is extended to accommodate the longer wheel base that is achieved by moving the front axle assembly forward, keeping the relationship between the engine and rear axle as standard, thus allowing all standard Jaguar parts to be used.

In December of the following year I collected the Royale kit which necessitated the hire of a car transporter trailer, taking the two reconditioned axles with us for temporary mounting to the Royale body/chassis when we arrived at Bamber Bridge. We met John and his team who quickly lowered the body chassis unit onto the two waiting axles.

After a long wet journey, we arrived home in Bristol where the Royale was carefully pushed into my waiting garage. Once the Royale was safely tucked away in the single garage, I realised I didn't have much room to play with!

The first job was cutting all of the holes and slots in the body, this was a very easy job as they were all pre-marked in the glass-fibre. The mouldings supplied were of an extremely high standard, so there were no problems making parts fit. The pre-marked holes in the body could be drilled and the corresponding pre-marked holes in the wings could be separately drilled, such was the accuracy of the moulding and the holes lined up perfectly.

Once all the holes had been drilled in the glass-fibre, the body and all its panels were removed from the chassis. The chassis was supplied in a raw state, so after removing the temporary bolted axles, the chassis was shot blasted, etch primed before receiving a final coating of chassis black.

Now the build could start in earnest.

The front and rear axles were finally re-fitted with new mounting rubbers, next the custom made fuel tank which was supplied with the kit, then the engine and gearbox complete with propshaft and exhaust. The rotated radiator was next, mounted on special brackets (all being supplied with the kit).

# TECHNICAL SUMMARY – ROYALE SABRE

COPY FOR MALCOLM & DAVE.

## ROYALE OWNERS CLUB

### ROYALE SABRE TECHNICAL SUMMARY

This Technical Summary is a compilation of the technical information received from members of the Royale Owners Club, arising from their experiences when building their own cars. Although the build manual provided by the Royale Motor Company with each kit is very comprehensive, it is inevitable that individual builders will develop their own methods of doing certain jobs and incorporate their own modifications and this summary passes on their know-how under the following headings :-

Section 1 - Engine, Transmission and Exhaust System

Section 2 - Cooling and Heater

Section 3 - Suspension and Steering

Section 4 - Electrical Equipment

Section 5 - Bodywork and Trimming

Section 6 - General

#### Acknowledgements:

Where members have written to me, I have attempted to acknowledge this in the text but in many cases information has accumulated from a great many telephone conversations and discussions at Club meetings and it would be difficult to mention everyone. To all those who have contributed to the fund of knowledge since the Club was formed in February 1995, I offer my sincere thanks.

Peter Hare.  
April 2000

#### Disclaimer:

*The views expressed in this document are provided by members and published by the Club in good faith but neither the Members, nor the Club, nor the Royale Motor Company can accept responsibility for the applicability of this information to any specific build situation and any member using this information must satisfy themselves as to the safety and suitability for their particular application.*

*Reference to any supplier of goods or services does not imply any recommendation or endorsement by the Club.*

## SECTION 1 - ENGINE and TRANSMISSION

(Associated diagrams are at the end of each section)

### 1.1. FITTING C3 BORDEAUX AUTOMATIC GEARBOX

(FROM 1983 2.3L V6 SIERRA)

Jim Simmonds kindly supplied the following comments arising from the fitting of auto transmission to his Sabre.  
*"There are two problems that have to be overcome when fitting an auto box.*

*The first is that the external levers and pipes on each side of the box increase the width of the unit and foul the gearbox tunnel.*

*The second is that the design of the housing for the gear lever is such that the top of the housing is some 4" above the top of the gearbox tunnel.*

*The first problem is solved by cutting out a section of the tunnel as shown in the accompanying diagram. This section was cut half along the longitudinal centre line and each half was bonded on to the floor with a 2.5" gap between the two halves. GRP was then used to cover the gap and also to bond the pieces to the bulkhead and to the rest of the gearbox tunnel.*

*This procedure will create a step of around 1" - 1.25" on each side at the rear of the modified tunnel. This will make the carpet fitting more difficult so I faired in the sides with MDF (I realised later that I could have used part of the GRP panel which results when the windscreen panel is cut out)*

*However, using MDF provided the solution to problem 2. I cut the MDF to produce the sides of a plinth which supports the Sierra centre console. The rear part of this console, which incorporates a tray which unfortunately fouls the hand brake and had to be cut off. This does however provide an opportunity to build in a switch box which will house the switch for the heater.*

*I also found that when the selector lever is in the Park position, the clip that secures the selector lever to the selector arm fouls the tunnel. In fact, after having cut an access hole I found that the clip protruded beyond the outside edge of the tunnel. This meant that the cover plate had to be made a top hat shape.*

*I cut another access hole where the kick down cable connects to the box".*

### 1.2. CHANGING THE OUTPUT FLANGE ON THE MT75 GEARBOX

Incorporating notes from: John Preston, Jim Simmonds, Fred Ward, Oliver Cooke, Dennis Farmer

The MT75 gearbox has a three pronged spider output coupling when it comes out of the donor car and this may have to be changed to a 4 hole flange to enable the gearbox to be coupled to the Hardy-Spicer U/J on the prop shaft. The nut securing the 3 pronged spider to the gearbox output shaft is VERY tight and John Preston supplied the following notes:

1. Do not try to remove the existing output flange until the engine / gearbox is in the chassis.
2. Use 2 old bolts in the spider to engage with a substantial bar which can be wedged against the chassis to prevent the coupling turning.
3. Adapt an old (but very strong) 11/16 Whitworth ring spanner i.e. grind away the shoulder and cut off the other end to allow the fitting of a tube for extra leverage.
4. Heat the retaining nut carefully to soften the Loctite.
5. A good clout with a substantial lump hammer should start the proceedings. If not, repeat with a long extension tube on the spanner for extra leverage.
6. Once the spider has been removed using a suitable puller, a Ford Transit flange, part no. 6171398 can be fitted using a new lock nut.

A later note from Oliver Cooke suggests that a compressed air impact wrench will also remove the spider lock nut.

Dennis Farmer reported that he found a Hardy-Spicer prop shaft U/J which couples directly to the original 3 pronged spider and which he had built up into a Sabre prop shaft. This avoids the trauma of removing the original spider coupling.

Jim Simmonds notes that the centre spigot of the gear box output shaft may protrude through the coupling flange and foul the prop shaft U/J. Grinding approx. 5mm off the end of the shaft will eliminate this problem.

Fred Ward filed a report warning that the new Transit output flange may not go far enough on to the gear box output shaft to clamp the speedometer drive pinion resulting in a loss of drive to the speedo. An extra washer on the output shaft before the flange is fitted will overcome this problem but it is essential to check this before the body tub is fitted as it is very difficult to remove and refit the flange once the body is in place. In this situation the only solution is to cut access holes in each side of the transmission tunnel.

The near side cut-out is approx 11" x 7" extending from the high point of the gear lever bracket back to the propshaft coupling giving access to the gearbox output shaft and the speedo pinion housing. The offside hole is approx. 6" x 6" positioned to give access to the speedo cable connection. Covers for these holes can be made from GRP offcuts from the doors or windscreen cut-outs and secured with self taps and Spire nuts.

### 1.3. GEAR BOX MOUNTING BRACKET

Some gear box mounting brackets (possibly those used with the MT75 gear box) have two bumps that stick up above the level of the mounting face of the bracket and which touch the underside of the body floor before the body tub is bolted down on to the chassis. One solution is to cut two corresponding holes in the floor and bond covers to the inside of the floor once the body tub is bolted down. The alternative is to fit 7mm spacers between the gear box bracket and the chassis brackets and although this lowers the gear box slightly, it is still well within the alignment capacity of the propshaft universal joint.

### 1.4. EXHAUST SYSTEMS

Incorporating comments from Jaap Blenk and Paul Wise

Some members have found it possible to modify the donor exhaust system to fit into the Sabre chassis ( see Jaap Blenk's diagram of his modifications to the 2L dohc system) but this is feasible only if the donor system is in very good condition. Rather than buy a new Ford exhaust and modify it, it may be more economical to have a system made up by an exhaust specialist. An example of this is shown in Paul Wise's diagram for his 2L sohc engine. Which ever course of action you take, the important thing is to get the exhaust system tucked up as close as possible to the underside of the car in order to maximise the ground clearance. Critical points are where the down pipe passes under the gearbox support cross member and where the exhaust pipe passes under the differential or rear drive shafts.

Remember also that the tail pipe must not have sharp edges so think about fitting an after market trim extension that has a rolled end.

### 1.5. THROTTLE CABLE ALIGNMENT

(Comments from Les walker)

It is important that the hole in the bulkhead for the throttle cable is in line with the cable attachment at the top of the throttle pedal as any misalignment will result in a sharp bend of the inner cable as it comes through the bulkhead which will eventually lead to fraying and a broken cable, probably on a dark wet night miles from anywhere.

If there is a misalignment, the solution is to elongate the original hole in the bulkhead until the cable is in line with the top of the throttle pedal and then fit a small cover plate over the elongated hole with a new hole to locate the outer sheath of the throttle cable. The cover plate should be sealed to the bulkhead to exclude engine bay fumes and the throttle cable adjuster reset to give the correct throttle pedal position.

### 1.6. ALTERNATOR MOUNTING BRACKET

Several members have reported that with some engine installations, the alternator may foul the steering column. Sometimes fitting a slightly shorter fan belt may overcome the problem but if not , an alternative solution is to fabricate a new alternator mounting bracket to lift the alternator clear of the steering column. A diagram of the bracket used by Paul Wise is shown at the end of this section.

## 7. IDLE SPEED CONTROL VALVE

On 2L dohc fuel injection engines the idle speed is controlled not by a throttle butterfly valve but by the idle speed control valve which allows a metered amount of air to bypass the closed throttle, thereby enabling the idle speed to be controlled by the ECU regardless of the engine temperature, load on the engine, etc. If an engine is prone to erratic idling, it is often due to a fault in the idle speed control valve.

The idle unit is a solenoid controlled needle valve which opens and closes very rapidly in response to signals from the ECU, the open/close ratio being adjusted by the ECU to maintain the correct idle speed but as the unit ages, it tends to start sticking and fails to respond correctly to the signals from the ECU.

With the unit removed from the inlet duct, it is possible to separate the solenoid from the valve and wash them out with petrol or meths which may overcome the problem for a short time but in the long run a replacement will be needed.

## 8. EFI FUEL PRESSURE CONTROL VALVE

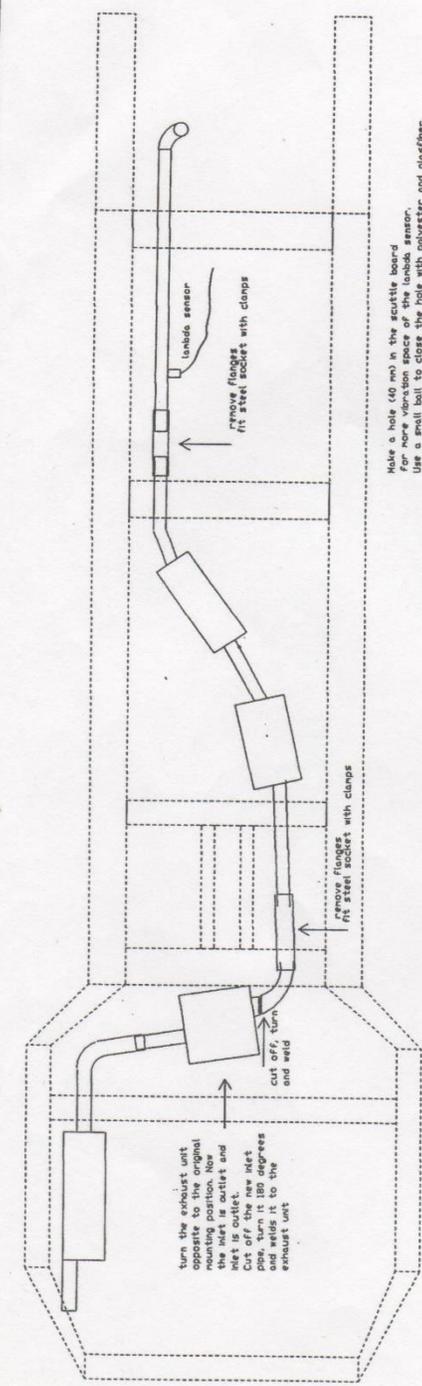
If your EFI engine is making a noise not unlike a helicopter, it may well be due to high frequency oscillations in the fuel pressure regulator valve and is most noticeable at tickover when the engine is hot. When Ford identified this problem they introduced a new valve with modified damping and most cars will have been upgraded under warranty but if your unit is suspect, the part number of the modified unit is 7045224.

## 9. ROVER V8 ENGINES

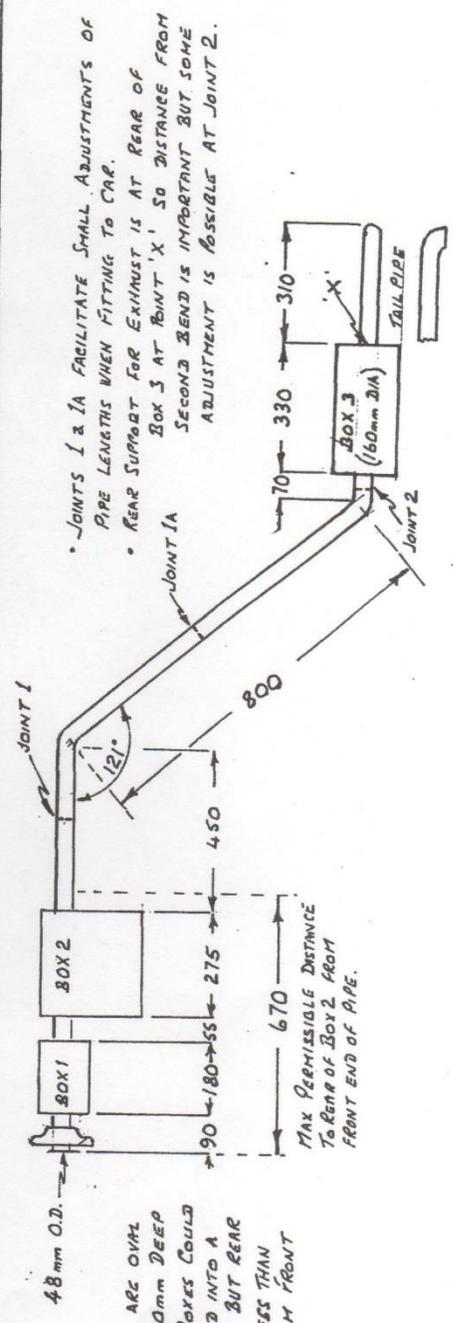
Although the Sabre is designed specifically to accept the Sierra/Granada range of engines, at least two owners have undertaken the installation of Rover V8 engines which fit very neatly into the Sabre engine bay. This requires modifications to the engine / gearbox mountings and the radiator installation together with other minor modifications but nothing drastic so if you are thinking of going down this track you could find it worth while having a word with Bob Jeffery on 01270 760996.

## 10. UNLEADED HEADS

Tony Blackwell has been in touch with the Ford Technical Support Unit regarding 2L sohc cylinder heads suitable for running on unleaded fuel and they state that as an alternative to having an earlier head modified, it is quite in order to fit the head from a later unleaded engine. It seems that they are fully interchangeable and the unleaded head has the added advantage of larger valves which will give better economy / performance.



JANP BLENK - NETHERLANDS  
 MODIFIED FORD EXHAUST FOR 2L DOHC WITH CATALYTIC CONV. & LAMBDA SENSOR (REF SECTION 1.4)

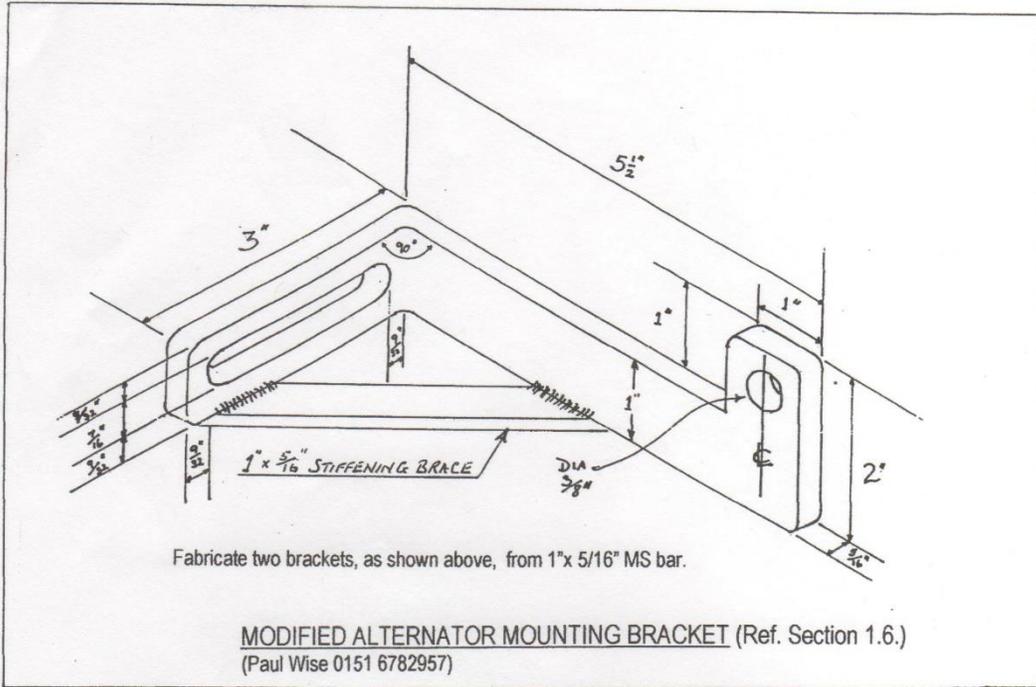


- JOINTS 1 & 2 FACILITATE SMALL ADJUSTMENTS OF PIPE LENGTHS WHEN FITTING TO CAR.
- REAR SUPPORT FOR EXHAUST IS AT REAR OF BOX 3 AT POINT 'X' SO DISTANCE FROM SECOND BEND IS IMPORTANT BUT SOME ADJUSTMENT IS POSSIBLE AT JOINT 2.

BOXES 1 & 2 ARE OVER SECTIONS, 110mm DEEP THESE TWO BOXES COULD BE COMBINED INTO A SINGLE BOX BUT REAR FACE MUST BE LESS THAN 670mm FROM FRONT OF PIPE.

CUSTOM BUILT EXHAUST SYSTEM FOR GRANADA 2L SOHC ENGINE (DIFF BY CUSTOM CHEMIE) REF SECTION 1.4.

(PAUL WISE OISI LTB2957)



## SECTION 2 - ENGINE COOLING and HEATER

### 2.1. RADIATORS

Incorporating comments from John Preston and John Kelly

Long association with kit cars leads me to suspect that cooling is one of the more common problems experienced with some kit cars but fortunately this seems to be relatively rare in Sabres. However, even in the UK climate, adequate engine cooling is essential and especially so if the car is to be used for touring holidays on the Continent. It is well worth investing in a good quality high capacity radiator and if it is not brand new, making sure that it is given a good flushing out prior to installation. It is also a wise precaution to flush out the engine cooling passages, especially if the engine has been drained and left standing for some time – coolant sludge sets very hard when it dries out. A new thermostat and unrestricted hoses are a must and it is worth checking the radiator level during the initial engine run just in case there are any air locks in the system.

John Preston recommended the use of a Cortina Rally high performance radiator core. This, or a similar 3 row high performance core can usually be made up by a radiator specialist for no more or even less than the price of an over the counter after market unit which will probably be of inferior performance. Having a core made to your own specification has the additional advantage that the inlet and outlet stubs can be positioned to suit your particular engine plumbing.

In addition to an efficient radiator, a good cooling fan is essential in order to cope with the inevitable summer traffic jams but if the original engine driven fan is retained, there is a risk that it may be too far away from the radiator to ensure an adequate flow of air through the core. Some builders have fitted after market electric fans such as Pacet or Tripac and these can usually be fitted either in front or behind the radiator. Most motor factors can supply electric fans but it may be worthwhile contacting specialist suppliers such as Southport Radiator Co. 01704 500062 who can often offer better value for money.

Alternatively you could use recycled units from the breakers yard, as described by John Preston :-  
*"I start from the premise that most of the current Sabres are being built with 2L dohc engines and as such the water temperature sensor has a two stage switch, the donor being equipped with two fans as standard. It therefore seems logical to equip the resultant Sabre with two fans to take advantage of the two-stage switch. It should be noted that I have placed my radiator (Cortina competition rad.) behind the frame supplied by Royale. As I have not fitted an expansion tank, this gives easier access to the filler cap and leaves plenty of room in front of the radiator for my fans. I obtained two Maestro fans at £5 each from a local scrap yard – I take the nice man's word for it that they are from Maestros!!*

*These come complete with shrouds and in their original setting they sit with two lugs downward and one upwards. If one saws off the single lug on each shroud and then turns them on their sides, joining them with two small bolts on the sides from which the lugs have been removed. Take care with the penny washers – it may be necessary to trim them as the close proximity of the fan can catch them.*

*The resultant amalgamation is just short of the width of the radiator support frame. It is then a simple job to make two plates to protrude forward to carry the fans by their two lugs each side. I put a short length of rubber hose over each lug and then a short length of alloy tube over the rubber followed by a further piece of rubber tube over that also (talk about over-kill!!) These were then a push fit into holes in the new side plates. I sprayed the fans and surrounding furniture in matt black before assembly and they look as if they grew there.*

*There is a small gap between the shrouds and the radiator core from which the propelled air can escape without going through the core but I have made little rubber infills riveted to the shrouds at the top only and the air flow is excellent to the extent that one fan triggers off for only about 20 seconds to bring the temperature down and switch itself off. Having run the engine for ages at intermediate revs on the other summer day of this season, I have only managed to trigger off one of the fans. Perhaps the South of France will encourage the other one to come into play."*

John Willett suggests that the 5 bladed electric fan from the MG Maestro is worth considering and my own advice would be to use the largest fan that you can fit into the space available.

Several members have reported that controlling the electric fan via the existing engine thermostatic switch gives satisfactory operation but others have preferred to fit an independent control switch on the dashboard so that the fan can be cut in at will before the temperature starts to rise. This will also be necessary if an original engine driven fan is replaced by an electric version as the engine is unlikely to have a thermostatic switch in the cooling system.

Some members have maximised the airflow through the radiator core by blanking off the space between the radiator header tank and the top of the radiator cowling but I am a little concerned that cutting off the flow of cool air through this gap may lead to an excessive rise in temperature in the engine bay - ventilation from the top of the engine bay is limited unless you have extra louvers punched in the top of the bonnet.

## 2.2. HEATER INSTALLATION

Comments from John Preston

*"Late in the build programme the heater assembly is fitted from the inside of the car. Two pipes, flow and return, protrude through the bulkhead into the engine compartment and these are sealed to the bulkhead on the engine side with a plate and foam seal secured by two self tapping screws.*

*It is impossible to drill for these two self tappers or to drive the screws home with the engine in place without first removing the inlet manifold (2L dohc) so I recommend that the heater unit be fitted before the body is placed on the chassis - it does not interfere with anything thereafter.*

*I have also found that it is impossible to achieve the necessary clearance between the underside of the scuttle and the heater flap by merely sticking additional foam to that already on the aperture surround of the heater assembly. My solution was to remove the existing foam and scrap it and then fit a suitable wooden spacer around the aperture together with a new foam seal. The surface of the seal should be lubricated with Vaseline or similar and the heater fitted into place under the scuttle. Lubricating of the seal is necessary as the heater is a tight fit and as it has to be slid in sideways there is a risk that the foam seal will be scrubbed off.*

*To save contortions at a later stage, before fitting the heater it is advisable to make and fit blanking plugs to the outlets that normally feed the fresh air vents. Plugs can be made from 3/4" ply and secured with small screws through the sidewalls of the heater outlet stubs.*

*Also, blanking plugs should be fitted to the demister outlets and holes cut in them to accept the flexible tubing that couples on to the stub pipes that you will be bonding to the back of the windscreen demisting duct.*

*The build manual suggests using the control cable from the Granada rear footwell duct to connect the heater control lever to the heater unit. If this is not readily available, visit your local motorcycle dealer and purchase a length of his thickest Bowden cable and outer sleeve. A little solder makes the cable amenable to clamping in the standard control lever spring clamp at one end, whilst at the other end I clamped and soldered an electrical ring terminal which just slips over the protruding lug on the relevant control lever on the heater unit. Because this cable is more flexible than the original Ford item, the heater control panel is easier to fit and gives a very smooth action. The thickens of the cable and the short travel on the 'push' action overcomes any tendency for the cable to kink".*

Space behind the dashboard is strictly limited so installing the flexible ducting between the heater and the stub pipes to the de-misters is not easy. As an alternative to the conventional convoluted hose you could try vacuum cleaner hose which is the correct diameter and very flexible with less tendency to kink.

## 2.3. HEATER AIR INTAKE

Comments from several members

Several members have commented that the air supply to the heater seems to be restricted, especially at speed and I suspect that this may be due to the airflow over the bonnet side louvers creating a reduction in pressure which acts in opposition to the heater fan thereby reducing the airflow through the heater. A possible solution is to seal off the heater intakes at each end of the scuttle moulding and duct air into the heater from the front of the car. On my 2L dohc engine installation I used a length of rectangular section plastic ducting mounted directly below the bonnet hinge between the radiator cowl and the bulkhead. I believe that other members have used flexible ducting in order to achieve the same result.

## SECTION 3 - SUSPENSION, STEERING and BRAKES

### 3.1. POWER STEERING

(Comments from Jim Simmonds and others)

At the time that the Sabre was launched, Jonn Barlow advised against fitting power steering, based on his own trials with PAS on the prototype Sabre which indicated that it may make the steering over sensitive. However, several members have fitted PAS without incurring any handling problems but with the advantage of less effort when parking in tight spaces.

When fitting PAS it is important to remember that because the engine in the Sabre is much further back from the steering rack than in the donor, it will be necessary to fit longer flexible hoses between the pump and the rack and these must be the correct high pressure hose material with the appropriate high pressure hose connectors - NOT jubilee hose clips!! Suitable hoses can be made up by a local specialist at a very reasonable price and one member found a mobile hose repair specialist whose normal business is to provide on site repairs to JCB's, farm implements, etc., but was quite happy to make a home visit to a Sabre.

N.B. If you get the pump output and return pipes reversed you will experience violent oscillations of the steering rack when the engine is running - reversing the pipe connections should correct the situation.

On some donor engines the PAS pump may be fitted on the right hand side of the engine below the alternator where it may interfere with the lower section of the steering column. If this is the case you will have to :

- a) reposition the PAS pump to the other side of the engine with all the problems of new mounting brackets and drive pulleys, or
- b) modify the lower steering column with additional universal joints but this calls for careful design .

Most members seem to find that non-PAS steering is completely satisfactory so complicated modifications may not be worth the effort.

If you decide to dispense with the power steering pump but wish to retain the convenience of the spring loaded belt tensioner you will have to source a shorter Poli-Vee drive belt. Oliver Cooke reports that a 1448mm belt is suitable and if you do not have easy access to a power transmission specialist, you could try a Rover agent as a similar belt was used on the Rover 220 range.

### 3.2. TRACK CONTROL ARMS

Any damage to either of the track control arms or wear in the outer ball joints (which are integral with the track control arms) will have serious effects on the steering and suspension geometry. Replacement TCA's are available from Ford agents but a very cost effective alternative is the Quinton Hazell units available from most motor factors. Part numbers are QSJ 1155S and QSJ 1156S and are priced at approx. £36 each including a new inner pivot rubber bush.

### 3.3. STEERING ALIGNMENT

The Sabre seems to be somewhat critical to steering alignment, particularly toe-in. Too little toe-in and the steering goes vague and needs constant adjustment to maintain a straight course, too much toe-in and the steering becomes heavy and the front tyres show early signs of uneven wear. I have found that approx 3mm toe-in measured at the tyre wall is satisfactory.

Sierra front suspension is very susceptible to deterioration of the compliance bushes between the anti-roll bar and the track control arms and is a common cause of MOT failure. Defective bushes should always be replaced as a pair, using the latest heavy duty Ford bushes or possibly SuperFlex polyurethane bushes .

### 3.4. ANTI-ROLL BARS

Several members have found that the ride comfort of the front suspension can be improved quite significantly by reducing the torsional stiffness of the front anti-roll bar without causing any noticeable increase of body roll when cornering, the centre of gravity of the Sabre being very much lower than in the donor vehicle.

The anti-roll bars fitted to the Sierra/Granada appear to be either 26mm or 28mm diameter and although some early Sierras used a 24mm bar, this is not interchangeable with the later models due to differences in the fixing centres of the chassis clamps. The torsional stiffness of the standard anti-roll bar can be reduced by carefully grinding two flats along the length of the bar between the chassis clamps but it is vital that the ground faces are flat and free from any surface defects or sharp corners which would create stress points. The ends of the flat sections must be gently tapered back into the circular section of the bar before it enters the chassis bushes and I suggest that the machined area should be finished with a very fine grit grinding disc to give as smooth a finish as possible. Grinding a standard 26mm bar down to 18mm across flats will give a reduction of approx 40% in torsional stiffness and 16mm across flats will give approx 50% reduction, either of which will give a noticeable reduction in road shock when one front wheel drops into a pothole.

I have covered some 25,000 miles on my modified anti-roll bar without any problems and I have had no reports of problems from other members but I know of one case where an MOT tester refused to accept this modification although I understand that the MOT authorities subsequently were of the view that this was not justified as the anti-roll bar was not being used in its original Sierra installation. To date I have had no feedback on the reaction of the SVA testers to modified anti-roll bars.

I understand that John Barlow did try the prototype Sabre with the anti-roll bar replaced by compression struts as used in rally cars. These are solid bars between the track control arms and the chassis to maintain the steering geometry but without imparting any anti-roll torsional stiffness - in the rally cars a separate adjustable anti-roll bar is fitted ahead of the front suspension to provide better tuning of the suspension. John told me that the Sabre handled quite satisfactorily without any anti-roll bar but the absence of any rubber bushes in the compression struts resulted in a harsh ride due to the transmission of road shock into the chassis.

### 3.5. SPRINGS and DAMPERS

(Comments from P.Hare and others)

Although new front coil springs are provided with the Sabre kit, the rear springs are taken from the donor vehicle which may be either Sierra or Granada and hence may be very variable in length and rate.

On my own car I found that the donor Sierra rear springs were marginally soft with the car fully loaded and I added spring assisters (as used for caravan towing) which have rectified the problem without making the suspension too stiff when lightly loaded.

Several members have voiced their concern at the seemingly excessive angle of the rear drive shafts at the rolling chassis stage but resist the temptation to cut any turns off the springs - once the full weight of the body has been added, the drive shafts assume their normal attitude.

Members who have used Granada springs seem to find the rear ride height and stiffness quite satisfactory so builders using Sierra donors may wish to consider substituting Granada springs during the initial build.

The front springs supplied by Royale seem to be best suited to the heavier V6 engines and hence may be just a little stiff with the lighter 4 cylinder engines. In the light of this many owners find it preferable to run with the front dampers set at or near the minimum damping. I have found that this gives a comfortable ride for long distance touring without detriment to the handling.

### 3.6. TYRES

Regarding tyres, I do not think that there is any advantage to be gained by exceeding Royale's recommended size of 185/80x15 which look right and give satisfactory road holding. Also, with tyres that are wider than 185/80, there is likely to be a problem with rubbing on the chassis on full lock and fouling of the front wing valance below the front bumper.

Although 65 or 70 section tyres are more readily available, it is definitely worth searching for 80 section tyres as these are more compliant and give a more comfortable ride, they look much better in the Sabre wheel arches and they give a slightly better ground clearance.

Tyre pressures are also fairly critical for a comfortable ride so it is worth experimenting to find the best balance of comfort and handling for your own particular choice of tyres.

### 3.7. WHEELS

Many owners opt for alloy wheels but some feel that they look too modern and prefer a steel wheel in the 1930's style. For those using Granada donors, some of the 15" Granada steel wheels have plain circular punchings which have a 30's look but these will not transfer to Sierra based cars due to the difference in the wheel studs. Fortunately there is a 15" steel wheel for the Sierra, part number 16616400, but these are not generally available in the UK as they were produced primarily for the German market to facilitate the use of snow chains during the winter. These can be ordered through UK Ford agents but significant savings can be achieved by ordering through Perrys Engineering, Benfleet, Essex. tel. 01268 773227. In 1995 I was charged £203 for a set of 5 wheels delivered to my home and judging by the German paperwork in the box, it appeared that they had come direct from the German stores.

Although Perrys are primarily trade suppliers of Ford Power Products to specialist vehicle manufacturers, they seem prepared to accept private orders - it may help to mention the Owners Club!

These wheels seem to complement the Sabre styling but they really need a chrome hub cap to complete the image. Suitable hub caps of approx. 10" dia. can be found at classic car shows but a modern alternative is Lada part number 21060/3102014/00 at approx £57 for a set of 4. Once you have your hub caps you have to find some method of attaching them to the Ford wheel. I used three stainless steel clips fastened to the wheel with M5 bolts but some members have used the ball headed studs which are normally used for anchoring the ends of gas struts on hatchback tailgates, a possible item being Ford part no. 6730558 (but be warned - they cost over £1 each). A possible alternative is to use spherical headed grease nipples which are probably much cheaper.

### 3.8. WIRE WHEELS

Some builders may wish to fit wire spoked wheels to their Sabres in order to enhance the traditional look and there are two possibilities :

a) Traditionally, wire wheels are built on internally splined centres which fit on to matching splined hubs on each axle. Because Fords were never produced with splined hubs it is necessary to fit proprietary bolt on splined adapters but these result in the wheels being displaced outwards by a significant amount leading to a degradation in handling due to 'bump steering' and an increase in the unsprung weight. While wheel offset can be reduced to some extent by increasing the negative offset built into the wheel, there is a limit to the amount of negative offset that can be incorporated into a wire wheel. A specialist wire wheel supplier can minimise these problems but you should make sure that you explore all of the implications before committing to the not insignificant expenditure.

Also, second-hand wire wheels are sometimes advertised but these should be approached with great caution as loose or damaged spokes and worn splines are potentially dangerous.

b) A compromise is to use bolt-on wire wheels. These are similar to traditional wire wheels but instead of having splined centres, they are built on to centres that have bolt holes to correspond with the standard wheel studs on the Ford hubs. Because there is no splined adapter, the offset problem is greatly reduced but these wheels are still heavier than standard steel wheels and much heavier than alloys.

### 3.9. BRAKES

Installation of the braking system is usually straightforward but in the interests of safety it is most advisable to use new brake pipes and hoses and to renew all hydraulic seals

Once the car is on the road it is advisable to go round and check all nuts and bolts for tightness, especially those securing the callipers to the hub flanges.

If you are using an ABS braking system, it is important to ensure that the hydraulic unit has the fluid reservoir on the inside i.e. nearest to the engine. If it is on the outside, it is likely to foul the side of the bonnet.

## SECTION 4 - ELECTRICAL EQUIPMENT

### 4.1. WIRING LOOM

(Comments from P.Hare and others)

Royale can supply a wiring loom designed specifically for the Sabre and this can be invaluable if you are not using a single donor vehicle or if your donor loom is badly damaged.

However, if your single vehicle donor loom is in good condition and worked in the donor, then it should work in the Sabre provided that you transfer it carefully and reconnect all of the electrical components exactly as they were in the donor. My personal assessment of the advantages and disadvantages of this exercise are as follows :

#### ADVANTAGES

1. The original wiring colour codes and Ford / Haynes wiring diagrams are retained which could be an advantage if you ever have to call upon the services of a Ford garage.
2. All of the original fuses and relays are retained in the original fuse box.
3. Sub looms for the engine management system, electric windows, central locking, etc. are all retained and correctly interfaced into the main loom, using the original Ford plugs and sockets.

#### DISADVANTAGES

1. The Ford fuse/relay box is quite large and it is not easy to locate it in an easily accessible position in the Sabre.
2. There will be a large number of redundant wires in the donor loom which are not used in the Sabre.
3. Some of the cable runs will be either too long or too short for the Sabre installation and will require appropriate modifications.
4. Some of the Ford plugs in the dashboard loom will need to be reworked to provide connections to the separate instruments.

If you feel that the advantages outweigh the disadvantages, the following comments may be of some assistance.

The first essential is to securely label every plug, socket and terminal as you disconnect it during removal from the donor vehicle - don't rely on memory - by the time you come to reinstall it in the Sabre it will have entangled itself into a malevolent ball of multicoloured spaghetti which bears no resemblance to what you recall of the original loom.

The first task is to decide where to install the fuse box and most builders seem to favour the right-hand side of the scuttle underneath the air intake moulding - approximately the same position as in the donor. By cutting away part of the base of the fuse box, the top of the fuse box sits just below the top surface of the air intake moulding and can be accessed through a cut-out in the moulding with a removable lid. In this position the fuse box takes up the space normally occupied by the wiper motor but this can be relocated without too much effort.

The whole of the wiring loom is attached to the fuse box and the loom has to be fed down through a hole in the scuttle below the fuse box and hence it is an advantage to remove all the unwanted wiring from the loom in order to make it more flexible and easier to install. This is a somewhat time consuming task and requires careful checking of the redundant wiring against the wiring diagram before it is chopped out. Keep all the redundant wire as it will be useful at a later date for extending any circuits that are found to be too short.

Initially the mass of wiring under the scuttle looks rather daunting but by separating it into sub looms for the dashboard, engine management, front lights, rear lights, etc. it will become more easily managed and can be neatly taped and secured behind the dashboard. Sections of the loom that are too long (such as the wiring to the rear lights) can be coiled up and tucked out of sight but if you decide to cut out the surplus, it is advisable to solder all connections and insulate the joints with heatshrink sleeving. Those sections of the loom that are too short (such as the front lighting) will have to be extended and the surplus wire previously removed may be used, preserving the correct colour codes where ever possible.

Earth connections are a frequent source of trouble, frequently intermittent, which makes them more difficult to locate and rectify. To minimise the risk of such problems, it is advisable to create dedicated earth points at strategic positions around the car using brass or stainless steel bolts. Even if these earth points are in contact with the chassis, it is advisable to run substantial earth wires back to the battery negative.

If you have been careful and methodical, all the circuits should function as they did in the donor vehicle!!

On the other hand, if you decide to use the dedicated Royale loom the initial installation will be relatively straight forward but it does not include the sub looms for the engine management system, central locking, electric windows, ABS system and these must be salvaged from the donor vehicle and interfaced into the Royale loom. Instructions for this are included in the Royale manual but because some builders seem to experience difficulties, I have prepared some additional schematic wiring diagrams and connection schedules for the Royale looms, which may be of assistance.

Also, because there are a large number of variations in the engine management systems, I have produced simplified block diagrams for some of the more popular engines which builders may find easier to read than the diagrams in the Haynes manual and I have indicated what I believe are the appropriate interface connections into the Royale loom.

This additional information is available from the Technical Coordinator.

#### 4.2. ELECTRIC WINDOWS

I know that many builders find the setting of the stops on the electric windows a frustrating business, especially as the final setting can only be made after the fitting of the hood and the associated side rails. There is a small margin of adjustment in the original Ford assembly but this may not be adequate once the unit has been fitted into the door.

Les Walker anticipated this problem and replaced the original Ford stops with a pair of eccentric cams which engage with the Royale stop plates fitted in accordance with the build instructions. The cams are made from 1.25" dia. steel bar and are mounted on M8 bolts through two holes drilled in the Ford motor mounting plate, either side of the original adjuster slot.

See diagram for details.

Les recommends that the initial setting of the cams is made with the assembled door on the bench using a temporary 12 volt supply in order to get an approximate setting for the upper stop, the final adjustment being made once the hood has been fitted

#### 4.3. WINDSCREEN WIPERS

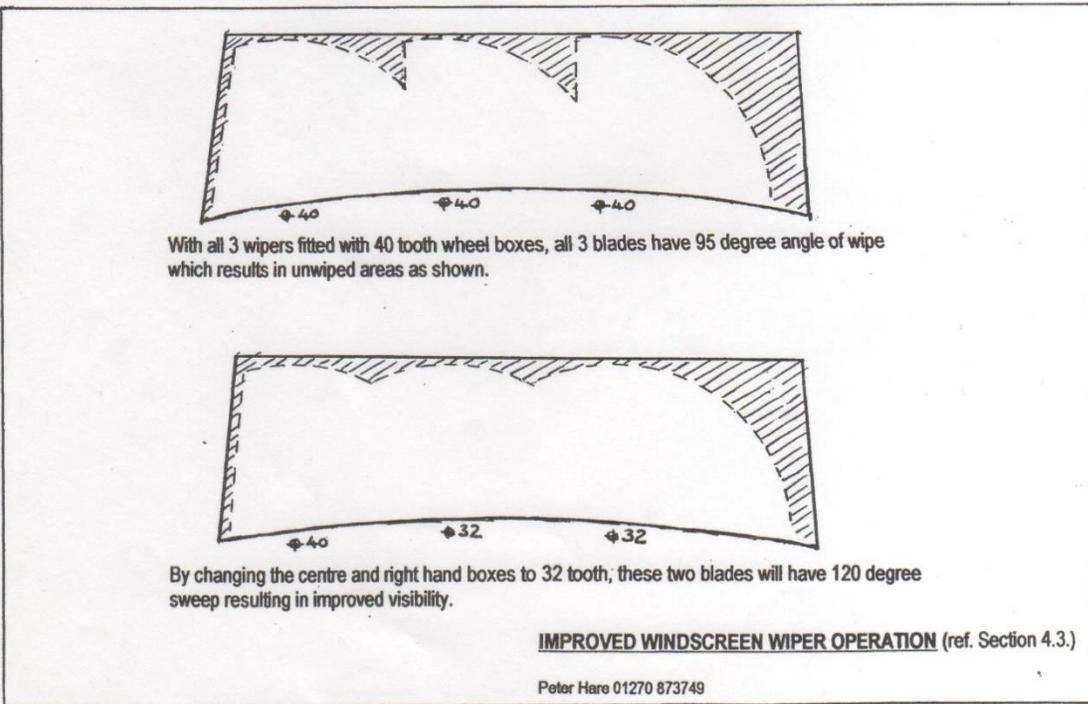
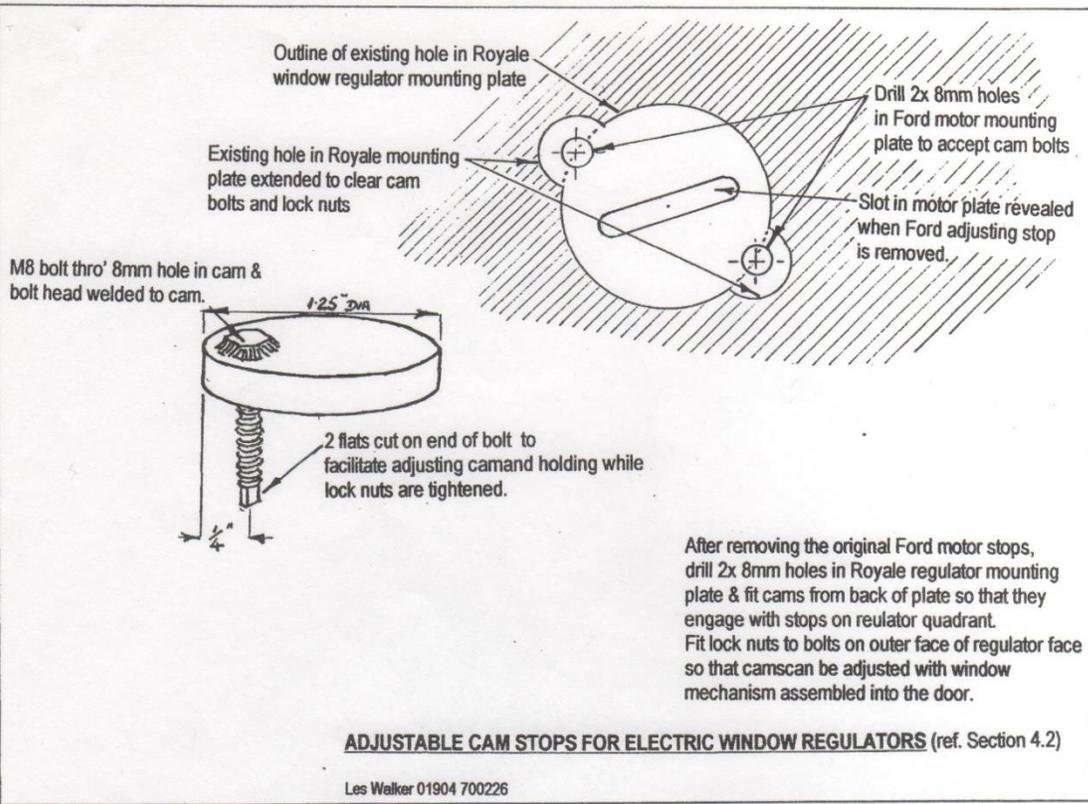
The Sabre is designed to utilise the Lucas wiper equipment as previously used by British Leyland on models such as the Mini and Marina. If you manage to find a serviceable unit in the breakers yard, make sure that you get the associated 5 pin plug and a short length of the connecting loom as this will make it much easier to interface the wiper motor into the Sabre loom (either the Ford donor loom or the dedicated Royale loom). The wire connections are:-

<u>BL wiper motor</u>	<u>Ford donor loom</u>	<u>Royale loom</u>
Black (earth)	Brown	Black
Green (+ve feed)	Black/Violet	Lt. Green
Brown/Green (park)	Brown/White	Brown/Green
Blue/Green (fast)	Red	Blue/Green
Red/Green (slow)	Green	Red/Green

In the Lucas wiper motor, the angle of sweep of the wiper blades on the screen is determined by the position of the crank pin on the crank wheel in the wiper motor gearbox and in order to cope with the many car manufacturers requirements, a range of interchangeable crank wheels were available and identified with sweep angles of 70, 80, 85, 95, 100, 105, 110, 115, 120, 125 and 130 degrees. These angles refer to installations using the standard 32 tooth wheel box on the wiper spindle but in order to increase the number of options, Lucas also produced 40 and 22 tooth wheel boxes.

The standard Sabre set-up uses three 40 tooth wheelboxes with a crank wheel that gives approx. 95 degree sweep on the screen but this leaves annoying unwiped areas. By changing the centre and passenger side wheelboxes to 32 tooth versions, these wiper blades increase their angle of sweep to approx. 120 degrees, thereby eliminating the previously unswept areas

The vintage style wiper blades supplied by Royale look right but do not have the wiping performance of modern flexible blades. Modern 10" Tex blades, which fit the Royale spoon end wiper arms, are available from The Morris Minor Parts Centre, 0181 543 2264



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#### 4.4. UNDERBODY WIRING.

Some of the Sabre wiring has to be routed along the underside of the bodywork, notably the wiring for the head / side / indicator lights and it is essential that this is properly secured to protect it from damage. Frank Moir suggests bonding aluminium clips to the undersides of the front wings which can be used to clip the wiring harnesses out of harms way. It is much easier to carry out the bonding of the clips before the wings are fitted to the car.

## SECTION 5 - BODYWORK and TRIMMING

### 5.1. BODYWORK

The body panels for the Sabre are of a very good standard and require a minimum of surface preparation prior to painting but there is quite a bit of trimming to be done to the doors, boot, bonnet, etc. to ensure that they are a good fit in their respective apertures. Because the body styling is so good, many builders are tempted to try to achieve very small shut gaps around the doors and boot lid but be warned, the geometry of the hinges may result in doors fouling the openings as the doors open and close. I would suggest that 3mm gaps are a practical minimum and 4mm still looks very good (especially when you park next to almost any production car). If you are having your car professionally sprayed, it is worth asking about a low temperature bake before the panels are sprayed as this will help to stabilise the GRP and reduces the risk of localised distortion of the mouldings at a later stage. It is wise to check that your painter has had plenty of experience with the painting of GRP bodies as the techniques are marginally different to metal bodies if a long lasting first class finish is to be achieved. Try to choose a colour that is used by a volume car producer and make sure that you keep a note of the paint code and the make of paint that your sprayer uses - year on year, the same colour name can vary quite significantly in tone and it is important that you can get an exact match if you ever have the misfortune to need a panel re-sprayed. It is also worth mentioning that most paint factors can supply aerosols of the same colour that has been used to spray the car - quite useful for touching up minor chips.

Several members have reported great difficulty in removing the protective plastic covering from the bonnet panels, particularly if they have been stored in strong sunlight. Before risking damage to the aluminium by scraping, it is worth trying copious quantities of boiling water which will usually persuade the plastic coating to release its grip on the aluminium.

### 5.2. TRIMMING

If you have a look round some of the other club stands at any major kit car show, you will come across cars which have been built to a good mechanical standard but have been spoilt by an unplanned or uncoordinated trim and colour scheme. To avoid falling into this trap it is vital to plan the overall colour and trim scheme at an early stage so that the hood, interior trim, seats, carpets, etc. all compliment the exterior paint work, especially if you are going for a two tone paint job.

It is worth remembering that the range of colours for hood materials are strictly limited so if you want to get away from the ubiquitous black hood, it is wise to decide which colour of hood you are going to order and then take a sample of the hood material with you when you go to choose your paint - you will be surprised that for any particular basic colour there are hundreds of shade variations, some of which will tone with the hood much more pleasingly than others - Ladies seem to have a much better eye for colour matching than us blokes!

If you want to use a carpet colour that isn't offered by the kit supplier, find out who his supplier is and enquire whether he can supply the particular colour and carpet quality that you require. Alternatively, you can buy carpet from a coach trimmer and cut your own carpets. Most coach trimmers will bind them for you for a nominal cost or even free.

You may be lucky and find an after market seats that suit you and look OK in the car but this is unlikely and most builders seem to go for seats from a production car and have them reupholstered in a leather, vinyl or fabric of their choice to fit in with the overall colour scheme. Possible seats are earlier Ford Escort, Volvo 300 series or MGF. Seats that are being retrimmed can be subtly altered by adding or removing foam padding before the new covers go on.

OK, its all pretty obvious when you think about it, but sometimes by the time you've got the brain in gear you have already ordered a black hood and bought a pair of tan seats (well they were a bargain!) and you are well on the way to painting yourself into a corner.

While on the subject of trimming, long distance driving will be more comfortable if you have incorporated plenty of good quality sound deadening material into the trim. The rear wheel arches, rear floor panel and rear bulkhead will all benefit from attention, especially when travelling with the hood up or the hard top in position.

Plan ahead and you can make a good car into a really super one

Builders may care to note that several members have had their cars trimmed by John Cartlidge, Sandbach, 01270 761036 and Hinchliffe & Haley, Leeds, 0113 2704315 also have experience of Sabre trimming.

### 5.3. LOCKS

While it is advantageous to use Ford door locks in order to reduce the number of car keys, they are not easy to fit into the Sabre doors due to the increased thickness of the door panels compared with the donor and hence it is easier to use Triumph or Jaguar locks which are secured with a screwed locking ring which will accommodate the increased thickness of the GRP panel

Also, we have received reports that the door locks and latches on more recent Granadas are not compatible with the Sabre doors and earlier units will have to be obtained.

Paul Wise had the misfortune to suffer failure of his boot lock but fortunately he was already aware that the Sabre boot lock is the same as the engine cover lock on VW Caravanettes and was able to obtain a second hand replacement from a local VW restoration specialist - cheaper than a new replacement and although it is second hand, it is an original VW item and better quality than current after market look-alike replacements.

### 5.4 DASHBOARD

If you want to make your Sabre look a little bit different, a personalised dashboard layout can be created without too much effort but remember the SVA requirements for recessed switches, instrument bezels, etc.

Blank panels veneered in burr walnut are readily available but they require careful cutting to avoid chipping the veneer and they will have to be varnished, French polished or wax polished before installation. If you prefer to subcontract your dashboard, Rob Hancock on 01270 883933 has done the woodwork for several Sabres, including matching door cappings.

John Preston found that getting the dashboard to a good fit against the base of the windscreen was easier if the one piece Royale mounting brackets were replaced with two piece brackets with slotted holes in the centre section. This allows the brackets to be adjusted to the correct length during the initial assembly and avoids having to fiddle with spacing washers every time the dashboard is removed during the build process.

The lower section of the dashboard that houses the radio and heater controls may be found to be a bit floppy and this can be overcome by adding an extra steady bracket between the lower edge of the moulding and the transmission tunnel.

If you opt for a traditional Smiths style mechanical speedometer, it will have to be calibrated to your particular wheel/tyre size, axle ratio and gearbox speedo pinion. Your supplier may do this when you order your instruments but if not, firms such as Speedy Cables, 0171 2269228 or Richfield Speedograph, 0115 9264235 offer a recalibration service.

Be aware that Smiths and Ford fuel gauges are not directly interchangeable and using a Smiths gauge with a Ford tank unit will give inaccurate readings. One solution is to remove the Ford sender from the tank unit and fit a Smiths sender in its place. The float arm may need adjusting to give the correct full - empty movement.

### 5.5. HOOD

Fitting hoods is an art, not a science and after the relative accuracy and precision of the mechanical assembly, the hood can be a bit of a culture shock, especially as it comes at the end of the build cycle just when you think the worst is behind you. This is not unique to the Sabre - none of the hoods that I have fitted in the past were any different!

The secret is not to try and rush the job. Hood material is surprisingly stretchy so after fitting the press studs round the back edge, it is better to use lots of clamps to hold the hood in position on the hood frame and cant rail and to stretch it progressively over a period of several days, easing out the creases. Small adjustments to the position of the hood frame may also help. Several members have commented that the build manual drawings and instructions for the cant rail do not seem to be compatible with a well fitting hood so you may have to use some initiative with the shaping of the cant rail in order to get the hidden binding and its end fittings to sit correctly. I found that using a staple gun to tack the hood to the cant rail temporarily allowed me to stretch it progressively before finally gluing and tacking it to the cant rail.

The side rails were a late addition to the hood design so the early build manuals were a bit vague on this topic. Many builders have found that it is advantageous to fit fairly generous wooden formers to the upper side of the side rails to help to smooth the shape of the hood above the doors, where it is attached with Velcro.

With careful fitting, the Sabre hood is probably one of the best and in five years I have found that mine is totally draught-free and waterproof, even in the most foul weather and it is still taut and free from wrinkles.

### 5.5. STEERING WHEELS

Mountney are probably the most readily available after market budget steering wheels and Moto Lita a bit more expensive. For those who are looking for something rather more special it is possibly worth contacting Kenmore Industries, 01327 706881, who import a wide range of continental steering wheels, some of which complement the style of the Sabre. But be warned, they are not cheap!!

## SECTION 6. - GENERAL

### 6.1. SOURCING OF DONOR VEHICLES

The local scrap yard is perhaps the most obvious starting point when looking for a donor vehicle but by the time a Sierra or Granada gets to the scrap yard its probably in a pretty bad way and although you only want the mechanical components, they too will be well past their best and will require extensive refurbishing. The exception to this is the accident write-off which may be a lower mileage vehicle with severe body damage but with serviceable components. However, take care that the body damage hasn't extended to the suspension, engine or transmission components.

Rather than haggle with the scrap yard over one dubious donor, you may prefer to try your luck at one of the national auctions where insurance write-offs are sold, usually to the trade but private bids are permitted. You will have a much wider selection of cars to choose from but bidding calls for a steady nerve as its pretty fast and furious. Once purchased, cars have to be removed from the auction premises promptly, usually within 24hrs, so make sure that you have your transport lined up. Often there are carriers at the auction who will deliver your car but they can be a bit pricey.

Other sources are Yellow Pages, adverts in the local press or in Exchange and Mart. etc., - its wise to cast your net as wide as possible.

If your donor is in particularly good condition, you may be able to recoup some of your outlay by selling off the unwanted body panels, interior trim, etc but you will still be left with the body shell to dispose of - another hidden cost!

Yet another source is the specialist breaker who will sell you all the mechanical parts that you need, often from low mileage cars and you can specify exactly what you require. The drawback to this method is that you don't have the experience of dismantling the donor car so you must have a good working knowledge of the donor to know how all of the bits go together again. Also, you will not get a donor vehicle log book so when you register your Sabre you will get a Q registration number.

If you are having difficulty sourcing a specific component locally, you may care to try one of the many spares search facilities who advertise in Yellow Pages.

### 6.2. SVA

Sabres seem to be well regarded at the SVA testing stations but there are still a great many potential pitfalls awaiting the unwary or over confident owner. It is advisable to read up as much as possible about the test while you are building the car - most of the kit car magazines have published guides to the SVA process.

Problems reported by members include:

- After market steering wheels with slots or holes in the spokes - it might be wise to retain the donor steering wheel.
- Interior rear view mirrors without an enclosing plastic surround.
- Brake hoses rubbing on a tyre on full lock with the suspension at full travel.
- Sharp edges to bodywork, accessories, interior fittings, instrument bezels, switch toggles, etc. i.e. anything with an accessible radius of less than 3mm.
- Light units, wing mirrors, etc. without the appropriate 'E' markings.
- Side repeater indicators that are not visible from the specified 5 degree angle from the rear due to the curvature of the body.
- Wing mirrors with insufficient angle of view.
- Fuel pipes too close to the exhaust system.
- Speedo calibration. Make sure that you have the manufacturers calibration documentation or evidence from a rolling road test.
- Seat belt upper anchorages not high enough above the seat cushion. This should only affect early Sabres with the original anchorages - later cars have a higher anchorage.
- Axle design weights not known - Royale quote axle 1 730kgs, axle 2 870kgs, gross weight 1500kgs, train weight 2500kgs. Note - these are the maximum designed axle loadings, not the readings from a weigh bridge.

The advice from members seems to be:

- Go and see the testing people well in advance and try to cultivate a good relationship - try to find out if they have any particular problems with Sabres - try to make their life easy.
- Allow plenty of time for the test - it can take several hours - Thermos and sandwiches advisable.
- Take your tool kit, sticky tape, a selection of nuts and bolts, cable ties, etc., etc. You may be able to sort out a minor snag on the spot and avoid having to go back for a retest.

In general, most reports seem to indicate that testers range between fairly reasonable and quite helpful but none of them are a pushover!



This is the end of the document. Information has been compiled from the Royale Owner's Club archive files with the help of Peter Gibbons and Barrie Evans. It has been put into a computerised format by Julie Fisher – completed Dec. 2015