2-27. The rear deck on this car will not have looked too bad at first glance since the body filler (seen here sideways on) will have covered much corrosion. In fact the true extent of the problem will only have been revealed by looking at these panels from the inside of the boot/trunk or when the wing/fender was removed.

2-28. Although this is, of course, a TR6, it does demonstrate the care with which any potential purchase should be examined. This TR6 looked great from the outside but, a peak at the bonnet hinge area from within the engine compartment revealed the impending expense!

- Any external bubbling on the rear deck panel and forward deck section will signal trouble in the near future. Note that top repairs can be effected quite professionally, as photograph 2-27 shows, and hide, for a short while, the true seriousness of the situation – which is why an examination from inside the boot is particularly valuable. Feel where the rear wing is bolted to deck sections alongside the fuel tank. There will be cars where you will see daylight here because the panel has completely rusted away.
- Above and around the headlamps – the corrosion works back to the inner wings where the bonnet hinges mount, so look there too (from inside the engine bay). You will see an example of what to look for in photograph 2-28.
- Baffles behind front wheels. The corrosion often manifests itself by the fuse-box on the inner wing and can be seen from inside the engine bay, although the real problem may be obvious from a very quick look under the front wings. The baffle can almost completely rot away, as photographs 2-29 and 2-30 show.
- As photographs 2-31, 2-32 and 2-33 illustrate, the TR4 and 4A wing-to-body joints

2-29 (above) and 2-30. Not as smart-looking, this TR4 had a rusting door, but you would never have thought that the rear baffle behind the front wheel would be completely rusted away. This would have been obvious, though, from a look from within the engine compartment. This is not untypical of what you must expect when you remove the front wings. Devoid of a worthwhile amount of original paint, the splash plate has rotted away at the top, allowing corrosion to attack and hole the top inner wing. Note, too, the bottom inner wing is also corroded and holed. This car has still got its original sills as you can see the indentation (arrowed) pressed in the sill to allow water to escape from the original plenum chamber's drain hose, also arrowed. Less obvious, this picture also demonstrates the typical upturn that occurs with years of use at both rear corners of the bonnet. It is a good idea to reinforce the inner lip of the bonnet for about 12in (300mm) in front of both rear corners to stop it kinking in future. A special repair panel is available.

2-31. This picture demonstrates the extra vulnerability of the pre-TR6 cars. The stainless strip looks very attractive, but the reaction between dissimilar metals undoubtedly accelerates corrosion.

2-30.

2-32.

2-32 and 2-33 (above). The first photograph might seem to be a duplication of 2-31, but in fact serves to emphasise the 'body filler' problem. Although this looks bad, picture 2-33 shows the full extent of the corrosion with a lump of filler removed. You could not have failed to see the extent of this corrosion had you looked from the boot/trunk side of these panels.

Chapter 4

TR2-3A body restoration

INTRODUCTION

This chapter may use some component names, for example 'scuttle', that you may not be familiar with. Drawing D4-1 should help to clarify the locations of some of these panels.

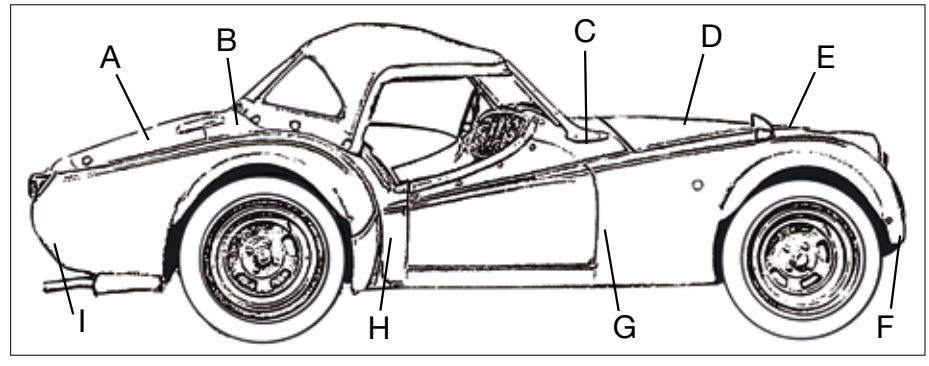
The recommended sequence for a sidescreen body restoration is to leave the tub on its chassis, and rebuild the middle of the tub around the doors first. Follow this up by focusing on the easier end – the front – before finally tackling the rear of the car. Leave the underside welding until the tub is complete, when you can remove the tub from the chassis, turn it over, and, after completing the underside, pop it back on the chassis. Then proceed with the bolt-on panels.

The very best results are obtained when a TR has its door gaps set up with the chassis on its wheels/suspension, not merely with the chassis supported. Gaps set with the chassis on axle stands or a lift can change when the car is set down on the wheels. Keep the door braces in place throughout the repair process, the blasting, and the painting, right up to the time the body is permanently remounted on its chassis.

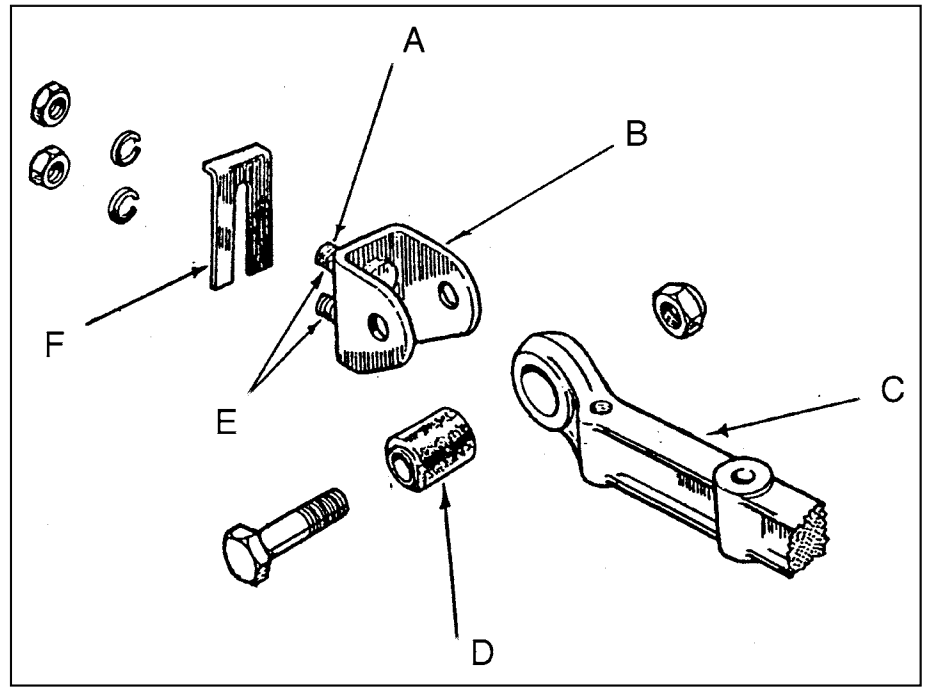
Body restoration is one of the crucial points where many enthusiasts get out of their depth and, for that reason, it's best to effect the minimum of change at any one time. If you have bought well, there should be no reason to divide the body into two and re-attach it at each end of the new floors and sills. It's possible to rebuild a sidescreen bodytub by that route, but the home restorer is less likely to lose his way if the body is kept in one-piece and retained on the chassis. If just one panel at a time is replaced, then each step is small, and the home restorer should be able to keep pace.

Not surprisingly, restoring the bodywork of a TR is not without its difficulties. This chapter is aimed at helping you identify those difficulties, and their respective solutions. I'm not trying to dodge the issue, but bodywork restoration on all but the TR6 is perhaps best avoided, or at least minimised, particularly if you haven't carried out the restoration of a car (any car) before. The TR6 replacement panels come largely from original tooling, and, consequently, the 'fit' is significantly better than on earlier TRs, particularly the sidescreens. This makes replacing the panels much easier for the amateur/first time restorer, and the subsequent welding does not call for the super skills necessary when panels do not properly abut (fit) one another.

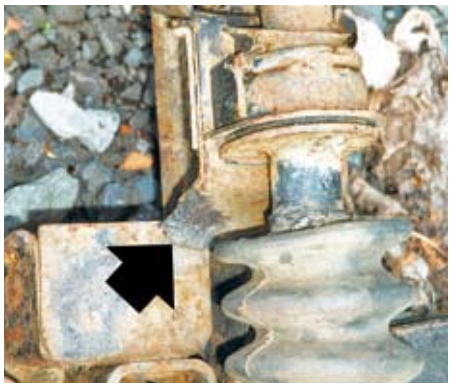
Every sidescreen car is different, and it is, therefore, basically a coachbuilding job when it comes to body restoration. Most of the panels are available, but the trouble is that today, most are produced from 'soft' (non-original, low volume) tooling. However, some of the panels are only purchased in minuscule quantities (five to ten per annum), and there is then no alternative but to make each by hand, which, of course, increases



D4-1. Body panel terminology. A. Boot/trunk. B. Rear deck. C. Scuttle. D. Bonnet/hood. E. Apron. F. Front valence. G. 'A' post. H. 'B' post. I. Rear valance.

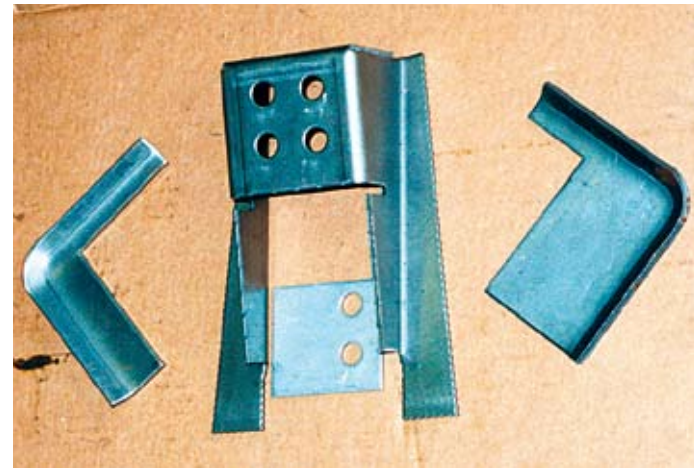


D6-3. The lower mounting bracket details for the TR4A (1 stud) and the TR5/6 (2 studs). A. The 1 stud of the TR4A. B. Lower fulcrum bracket. C. Wishbone arm. D. Bush. E. The 2 studs of the TR5/6. F. Shims. (Courtesy *TRaction* – the magazine of the UK TR Register).



6-35-1. The TR4A steering rack (note the 'D' washers welded to the rack and the rubber cushion mounting), used, in fact, on TR4As, 5s, 250s and TR6s, with its traditional, but most undesirably cracked, mounting (arrowed).

6-35-2. We see from a slightly different angle the front lower wishbone mounting bracket (in the centre), together with the steering rack mounting, this time without the steering rack in the way. The crack is arrowed and we can see the full area where a stiffening plate should be welded in.



6-36. All the premier TR restoration specialists will supply you with strengthening gusset kits. This is one quarter of Revington TR's front suspension kit (RTR7017), plus an example of their substantial lower wishbone attachment bracket. Note the pressed radii on the edges of the gussets which add considerable strength. This particular kit can be welded to the car with the body in situ.

two of 88155847, one of 88155531 and one of 88155532 – to quote the official Triumph part numbers (see photograph 6-36). All can be purchased from Revington TR, or indeed any premier TR restoration specialist, as strengthening kits with, you will note, pressed gussets for maximum rigidity.

The first step requires we get the strongest and most satisfactory mounting brackets welded to the chassis, which is probably best achieved by removing the TR4A's rear lower fulcrum brackets and checking the frame carefully. However, if you are sure the existing brackets and welds are completely satisfactory, it is possible to use the original brackets as the basis of reinforced mountings (with some additional mounting holes), see photographs 6-37-1 to 6-37-3.

Drilling extra holes will probably not be necessary if you replace the welded brackets completely. However, if you retain part of the original mounting points you are well advised to spread the considerable loads via additional studs, which, of course, require additional holes. Drill an additional hole below each original TR4A hole in preparation for fitting post-1972 TR6 suspension brackets. These can be identified by the four mounting holes shown in drawings D6-4 and D6-5, and the square backing washers they employ. The backing washers can be bolted through

6-35-3. The bottom front wishbone mounting bracket on the left side of the car. One strengthening plate has been added to the rear of the bracket, between the turret and the steering mounting crossmember, and the recommended rectangular plate (arrowed) added to tie the steering mounting to the top of the wishbone mounting.

8-17. Now that is complicated! As a matter of interest, this is the second TR ever built ... TS2, in the course of refurbishment at TR Enterprises.

fastenings. Disconnect the battery's earth terminal and all bullet connections to the electrical wires that feed under the front apron. With a helper, remove the front bumper and, in the case of a TR3A, the over-rider stays. There are one or two steps (depending upon the car) before you get to the next critical operation, but do approach removing the six apron securing screws with caution if they are rusted into their captive nuts. If the bolts are stubborn, apply lots more penetrating oil for several days before trying again, since too much effort will spin the nuts in their cages and that will not only extend the apron removal time but also add time when welding new nuts to the reassembly!

There are a few, hopefully, easy steps before you again recruit someone to help you ease the apron upwards and forwards from the car. Be prepared to find some resistance from either a seal or a bead of long-set sealer between apron and each wing/fender. Finally, you can get to the radiator to unbolt it and remove it!

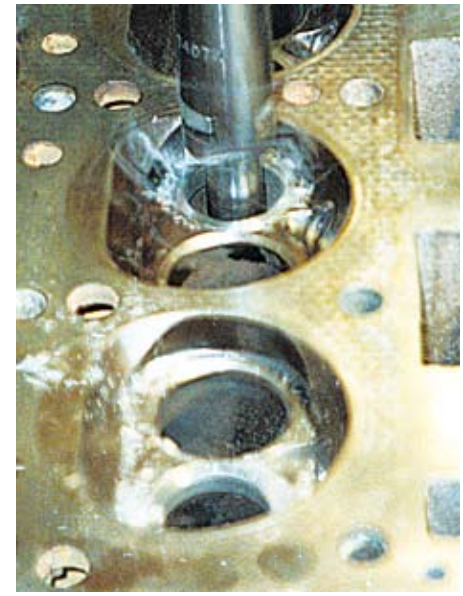
I guess there could be circumstances when you hope to refit the original radiator if it's at all possible. Most readers, having been through all that, will be intent on having the radiator re-cored before reassembly. I would strongly recommend the use of waxoyl or copper-slip on all fastenings during reassembly. However, while the radiator is away for re-coring, take the opportunity to examine the front of the engine, for access will never be easier for checking the fan, fan belt, water pump and steering gear. This is the opportunity to fit a steering rack if that's part of your thinking! Have a helper on hand when apron and bumper refitting take place, and use dumdum to seal between apron and front wings.

UNLEADED CYLINDER HEADS

So, how do you modify a cylinder head so that it's suitable for hard or sustained fast driving using unleaded fuel? The process is the same for aluminium heads and cast iron ones, and involves machining a recess for the hard-sintered valve seat insert used for each exhaust valve. This is definitely not a DIY job, but, since it's a topic that will be relevant to every reader at some time, I thought it would be of interest to establish the work and cost involved.

The machine shop needs to select the appropriate insert for your head, which means not only choosing the correct grade of sinter, but the appropriate sizes (bore and outside diameter), too. The size issue is relatively self-explanatory: you need a bore that is compatible with the throat size of the particular cylinder head you are about to machine, and an outside diameter that will accommodate the exhaust valve in question. There are hundreds to choose from! What most of us will not, perhaps, have appreciated is that there are also at least 3 grades of sintered insert to choose from. For unleaded fuel, it is usual to use a mid-range insert, but if one were preparing a cylinder head for, say, propane, LPG or natural gas, it would be necessary to use a harder grade of insert. The 'HM' (high-machinabilty) grade consists of a blend of finely dispersed tungsten-carbide tool-steel, and alloys of iron which the makers say provides machining characteristics comparable to cast iron, yet the insert is hard enough and therefore suitable for naturally aspirated and turbocharged engines.

The first step in the process is to remove the old valve guides and fit new ones. This is important since virtually every subsequent operation will rely on a mandrel that will be positioned in each valve guide to ensure the accuracy of each machining operation. The machining can be carried out by numerous pieces of 'kit.' Where high volume/repetition production is involved, the machines can be very sophisticated indeed, and correspondingly expensive. It is more likely to be carried out by a low-volume 'classic' car-focused restoration business rather than a high-volume engine reconditioner. The old valve seat is machined away, as can be seen in photograph 8-18, but with great care, for it's important to ensure that the outside diameter of the hole is absolutely correct for the selected insert. In fact, the hole needs to be a prescribed amount less than the insert's outside size, and to ensure this, the quality machinists actually bore the hole twice. The first cut is never quite to size because the cutter warms up and expands. Consequently, the boring tool is slightly adjusted after the first holes have been bored and before the second, much finer dead-size cut. The depth of the bore is also important and is regulated to a



8-18. The cutter can be seen forming number 2 cylinder's exhaust valve recess, while, in the foreground, the result of number 1 machining can be seen.

shade less than the depth of the insert; once the insert is in place, it will be slightly proud of the combustion chamber. More on this in a moment.

Next up is driving the inserts into their recessed bores, with the mandrel mentioned earlier in place to ensure the insert can only be driven home square to the valve guide. Although already an interference fit, the insert plays its part, too, by expanding into the bored recess, thus providing a dependable valve seat that will not move even at the elevated temperatures in a combustion chamber.

You may be surprised to learn that there are still two machining operations to carry out. The first involves the same set-up (including the all-important guide mandrel) and brings the top of the sintered insert down to the level of each combustion chamber. The second requires selecting a cutter that matches the profile of the exhaust valve to be used, and machining out the inside of each insert until the valve sits properly in the head/insert/combustion chamber – nothing to it, really! The final operation is carried out by hand to blend-in, where required, the base of each insert with the respective exhaust passage.

The cost of fitting new valve guides and unleaded compatible exhaust valve seats to a 4-cylinder TR head will range from about £120 for just fitting inserts to your stripped and pre-cleaned cylinder head, to about £300 for the comprehensive service of fully stripping, fitting inserts, suppling all parts and reassembling your head ready to bolt to the block.

19-2.

19-4.

19-6.

19-2 and 19-3 (above). The TR4 hood frame is smaller, lighter and much less cumbersome than later TR frames. So much so, in fact, that it can be stored behind the rear seat back, as shown in the second picture. The extra time it takes to erect a TR4 hood partly arises from the need to roll the three rear seat trims (shown in the first photograph) out of the way, then to replace them once the hood frame has been erected. You may be able to see in the second picture that the peg just in front of the boot hinge is a fraction taller than those either side of it. This is for securing the rear hood webbing.

19-4 and 19-5 (above). Comparative pictures of the post-TR4 hood frame/hood assembly. Picture 19-4 shows the hood frame without the hood cover, whilst 19-5 shows the hood cover in place. These shots are actually of a TR6, but, nevertheless, illustrate the differences in hood style and stowage of the later cars, compared to the TR4 shown in photographs 19-2 and 19-3.

19-6 and 19-7 (above). The first picture shows the earlier TR4 'lip' that runs right across the top of the windscreen to provide for the hood's front fastening. You can see the male press-stud that secures the end of the hood. The second shot shows the same location of the later car, and the now curtailed 'screen capping.'

securely onto the top of the windscreen by two hood catch assemblies of the type shown in photograph 19-8. You will note, from photograph 19-9, that the TR4 frame consists of three crossbars and a very simple single upright. Picture 19-10 shows the header rail, side supports and clamps used on the TR4A frame.

As I mentioned earlier, the two hoods have quite different erection arrangements. The 4A hood is definitely the simpler and quicker to put up. With the hood cover removed you basically pull the hood and frame over the cockpit, secure the front clamps and 'pop' three stud fasteners each side at the rear. Access to the TR4 frame, on the other hand, requires the removal of the rear seats before it can be pulled over the cockpit. Both rear webbings then have to be secured to the rear rail, as per photograph 19-11.

Photograph 19-12 shows the next step, with the hood secured under the front lip/extension atop the windscreen, and both end press studs pushed into place. Round to the back, and we then need to clip the 15 lift-the-dot fastenings shown in photograph 19-13 (as well as a few 'snap' fastenings inside the car), before tensioning the hood via the two levers shown in picture 19-14. The end result, pictured in 19-15, is very pretty – although the '4's hood does take time to secure, and there can be concerns that the front of the hood (where it hooks over the windscreen extension), is not as foolproof as the later frame/hood fixing arrangement.

REBUILDING HOOD FRAMES

Apart from helping you to identify each type of hood frame, and respective attributes, you will have realised that you must have the right hood frame for your car. Note, too, that neither type is readily available. Believe it or not, some owners lose the hood and hood frame. Typically, the assembly gets put in the garage or loft, maybe to fit a hard top, or perhaps because the climate makes a hood superfluous. In due course the car is sold, but without the hood frame that the owner has not seen for years! So, for whatever reason, hood frames are in short supply, so make sure that your prospective purchase has a (complete) frame, if not a hood.

You should also bear in mind that it's not unknown for a frame to be bent. This can be very difficult to rectify.

Whether you are replacing the hood as part of an upgrade or repair, or carrying out a full-car restoration, the decision to replace the hood should be accompanied by allowing sufficient time and cash to check and improve the hood frame too. The ideal solution is to go for a reconditioned/exchange hood frame from one of our premier TR restorers. The exchange frame will come back with any bent or mis-shaped