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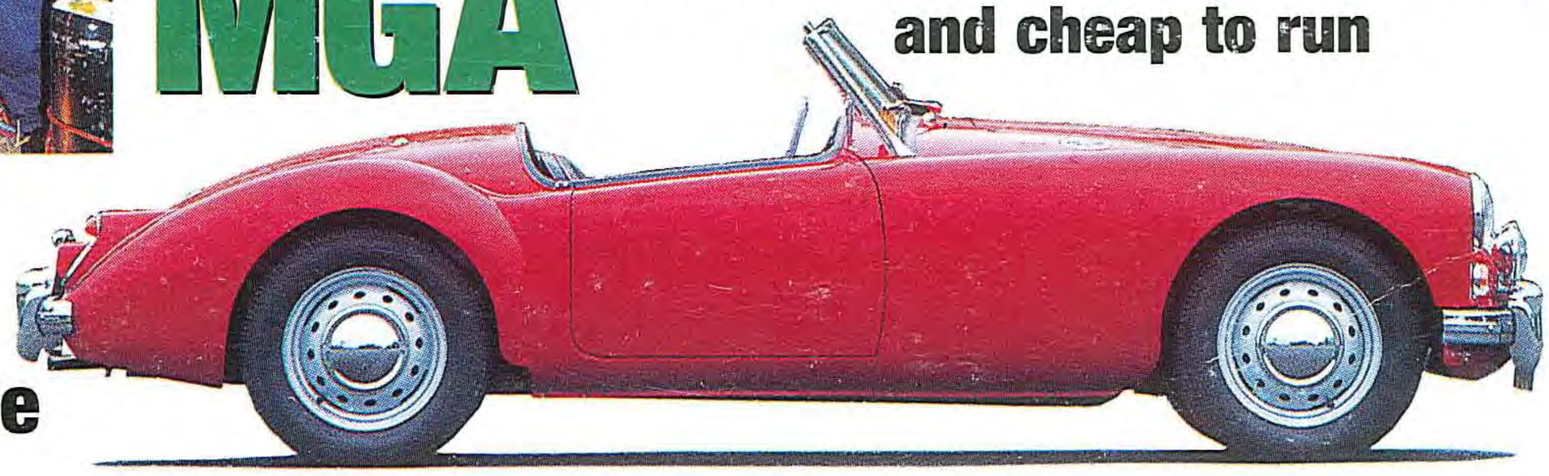

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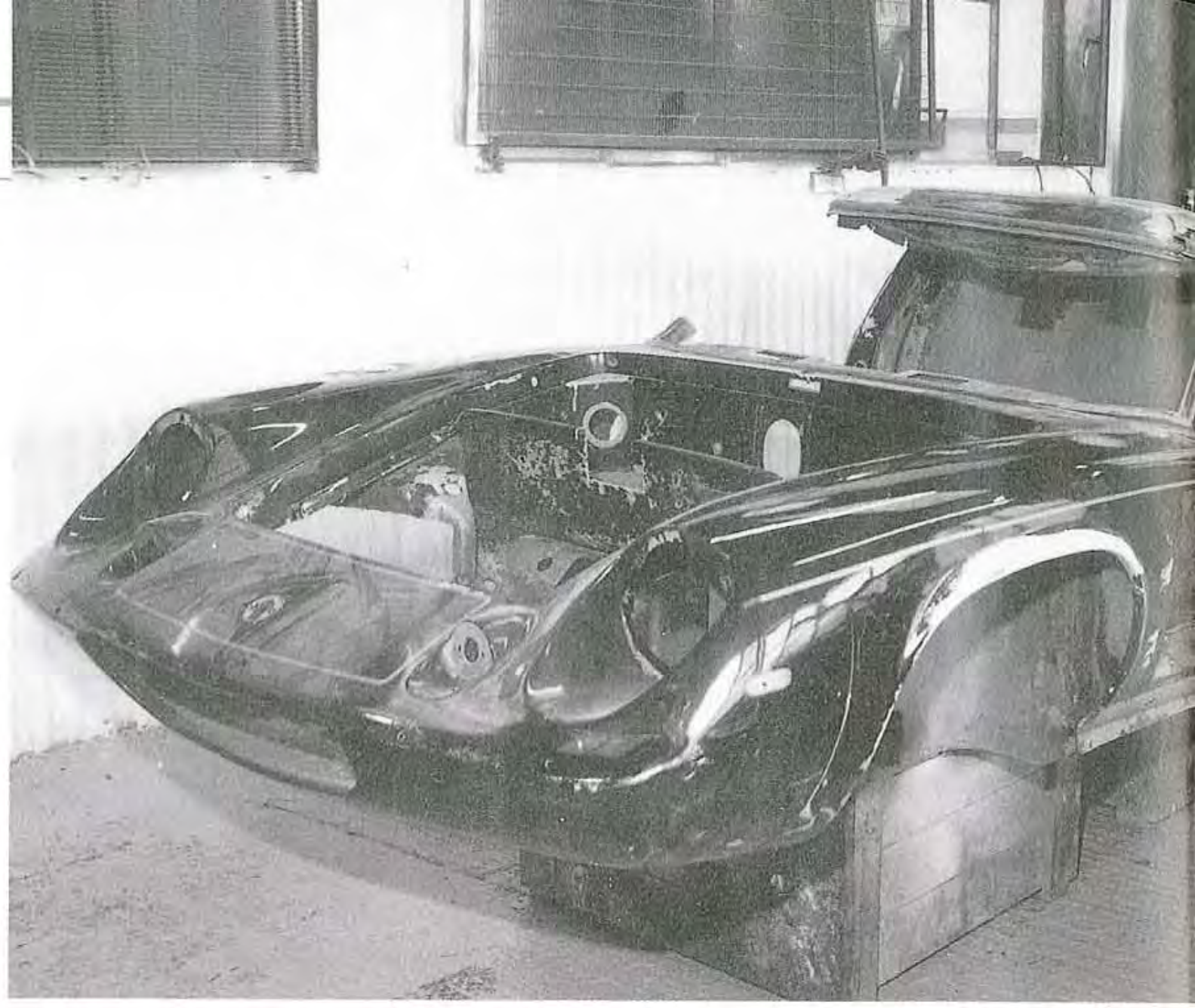


Sticky fingers

Glassfibre: it doesn't rust, it can form complex, sensual curves and if it gets damaged it's simple to fix. Chris Rees shows you how in easy stages

GLASSFIBRE. THAT RUST-FREE, strong, lightweight substance which bodies so many exciting sports cars by the likes of Lotus, Renault-Alpine, TVR, Reliant, Ferrari and, of course, the Chevrolet Corvette which appeared as early as 1953. That long-lived material which so many enthusiasts rave about. That stuff which, frankly, gives most people on the verge of a restoration the willies.

Generally that's down to misunderstanding or plain ignorance. The common conception is that glassfibre is easily damaged and very difficult to repair. In fact, damaged glassfibre is simple to fix and has several advantages over steel: for example, although you can't unbolt a panel and just replace it, you can reconstruct even a quite badly damaged area.

Glassfibre can be shaped into any form and, unlike a filled steel panel, a glassfibre repair can be made as strong as, or stronger than, the original panel.

Glassfibre, also commonly called Glassfibre Reinforced Plastic or GRP is formed from layers of glassfibre matting bonded together with resin which hardens the material.

The two common areas of damage which can be repaired by the home restorer are stress cracks (or crazing) and minor accident damage. Crazing is the pattern of cracks found in the paintwork or the thin outer layer, or gel coat, of glassfibre bodies. Such cracks form because of stresses in the bodyshell, usually in areas where there is most movement or most pressure, such as around door hinges. It happens because the GRP is slightly flexible whereas the gel coat on top of it is not. There will often be cracks in the glassfibre itself beneath the gel. This is even more likely if the crazing is the result of a stone chip or a ding in the bodywork.

It is not practical to repair the gel coat, and in most cases it would be pointless. The crucial factor is to remove all cracks and weaknesses in the glassfibre itself. The longer a crack is left, the worse it will become, like a crack in a laminated windscreen. It is likely that the GRP cracks will extend much further than the exterior surface indicates.

So the first thing you need to do is to establish the extent of the stress cracks. Rub down the area with coarse (40 grit) sandpaper, or the same in an angle grinder, until you have gone through the paint and gel coat and reached the glassfibre underneath.

To see the cracks in the GRP, wipe the area with spirit wipe (a degreasing solvent) – but not thinners, because this can damage the GRP. The spirit wipe evaporates in seconds and shows up any cracks as dark chasms in the shell. Look carefully at the cracks to see of they extend beneath the paintwork. If they do, you must continue rubbing away the paint until all the cracks are in view.

Then grind down the cracks until they disappear completely. Any cracks that are left will only show up again later, so it's important to get rid of all of them. Sometimes, if a crack is particularly bad, you'll need to grind right the way through the glassfibre – don't be afraid to do so. You must wear a mask when grinding as glassfibre dust is harmful to the lungs; also wear goggles and cover your head. Continue wiping the area with spirit wipe to check whether any cracks remain.

One thing you might uncover,

1 Cracks in the paint, or crazing in the gel coat almost always indicate damage to the glassfibre beneath. Stress cracks are caused by movement of body

2 To check the extent of stress cracks rub down the damaged area with 40 grit sandpaper until you've gone through the paint and gel coat to the glassfibre

Safety first

- ★ Always wear a mask when grinding, glassfibre dust is harmful to the lungs
- ★ Always wear goggles
- ★ Wear rubber gloves, particularly when mixing resin and catalyst, to protect against heat generated
- ★ Take care when handling hardening agent for resin, usually benzol peroxide, it is harmful to the skin and can cause blindness

3 To see the cracks in the GRP wipe the area with spirit wipe, not thinners as this can damage the GRP. If cracks extend beneath the paintwork, keep sanding

4 Grind down the cracks until they disappear completely. If a crack is bad, you'll need to grind right through to the glassfibre. Don't be afraid to do so

5 Make a paper pattern and cut a piece of glassfibre matting to match the area you've sanded. Don't make it too large so you trap old paint beneath new matting

6 Pour pre-accelerated resin into a plastic container, then measure the catalyst using a polythene burette and mix them together. Gloves are a must

as we did when we tackled the badly damaged Lotus Europa shell you see in the pictures, is an air bubble trapped during the original moulding process. This is a common phenomenon, but it is not a stress-related condition. You'll need to fill any such air pockets up with small pieces of glassfibre matt in the same manner as replacing the ground away glassfibre.

When you're sure that no cracks remain, you can start the process of building the area back up with glassfibre matting.

Several grades of matting are available but the best to use for stress cracks is shredded glassfibre, also called roving. Thicker and stronger woven matting is more expensive and is best used in areas where strength is required. Very thin tissue matt can also be used for very small areas of crazing or for finishing off a repair to get rid of any pinholes that may remain.

Cut a piece of matting to match the size of the area you have sanded away. Do this by laying a sheet over the area and marking it with a felt-tip. Try not to go too much over the painted areas as you will trap the old paint and only have to sand the area down again before repainting.

Now you will need to mix up your resin. In practice, the only resin you will find is pre-accelerated resin, which already has the accelerator (which speeds up the curing process) pre-mixed in it. Avoid resins for which you need to mix in the accelerator separately: unmixed accelerator and hardening catalyst make a highly explosive combination.

Always wear rubber gloves during the mixing. Use a plastic container to mix the resin in, because the hardening process generates quite a bit of heat and can easily burn your skin. Plastic containers are also re-useable. Pour as much pre-accelerated resin into your chosen the container as you need (probably no more than 500g).

Now you can add the catalyst, which is the hardening agent for the resin, usually benzol peroxide. Extra care needs to be exercised when handling this: it is harmful to the skin and ▶▶▶

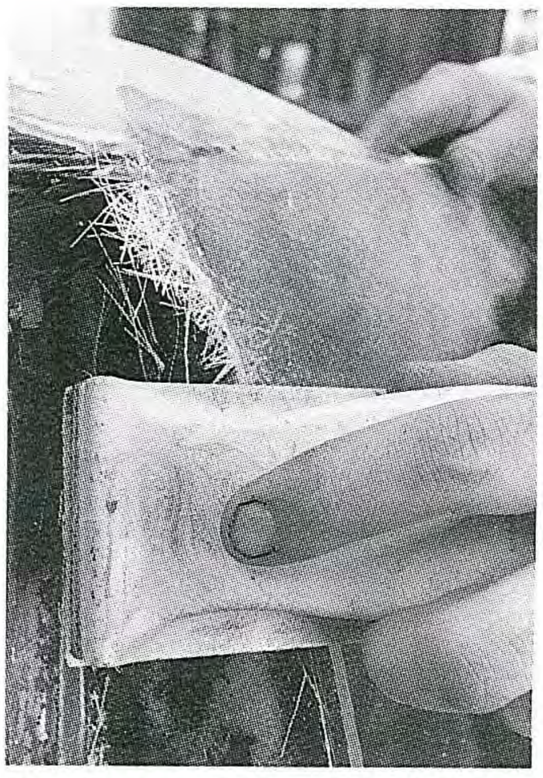
7 Paint resin over area to be repaired, lay on the matt and thoroughly wet it by 'stippling' it with the end of the paintbrush, brushing may cause matt to come apart

can potentially cause blindness. Ideally use a polythene burette for measuring it out; these are obtainable from specialist glassfibre suppliers. The quantity you need depends on how hot the day is, but generally you'll need about 10ml for each 500g of resin. On hot days, the curing process is speeded up, so you can use as little as half the amount of hardener. Mix the two together in the container.

When the resin is ready – usually it takes a couple of minutes – it will change colour and begin to stiffen. Take a new brush and paint resin over the whole area to be repaired. If you can still see some cracks, you must clean the area with spirit wipe and go back to the grinder.

Now lay the matt on to the repair. Thoroughly wet it with resin by 'stippling' it with the end of the paint brush. Do not brush it, because the matt can begin to come apart. Stippling also has the effect of pushing out any air trapped in the matting. Make sure the whole of the matt is soaked and then wait for the area to dry, which takes from a couple of hours to half a day.

When you come to clean your brush wash it in thinners, but take every care that all trace of the thinners is removed before you use it with resin again because thinners can damage glassfibre.



9 Once it's dry, rub down area until it becomes flush with the paintwork

When it's dry, rub down the rough edges of matt, or chop them away with a knife. The whole of the repair must now be rubbed down so that it becomes flush with the paintwork, which is by far the longest procedure in the whole repair. Where any matting has gone over the existing paint, you should rub it down or the paint will peel up later.

When you are happy that the matt is absolutely smooth, use an airline or a brush to clear away the dust. You will probably see a few small craters in the matt. To

10 Once matt is smooth, use a brush or an airline to clear away the dust

fill these, add an extra coat of resin. Once this too has dried, use top stopper, or very fine polyester filler, and sand it down with 120 grade sandpaper.

From then on, the process of refinishing is the same as for any steel- or aluminium-bodied car: filling any remaining pin holes, priming and painting.

The technique for repairing deeper air bubbles or areas where there are holes in the glassfibre is essentially the same, but you should use small pieces of matt, starting from the centre of the

11 Fill any small craters with extra resin, then top stopper or very fine filler

hole and moving outwards with increasingly large pieces.

So much for repairing stress cracks: the whole process is not as daunting as it may sound. The second type of repair is accident damage, where the glassfibre is actually torn apart. Again, repairing it is much easier than you might think.

The procedure for each repair will vary according to the individual ding, but the basic techniques are the same. We chose as an example a cracked wheelarch which also had a piece

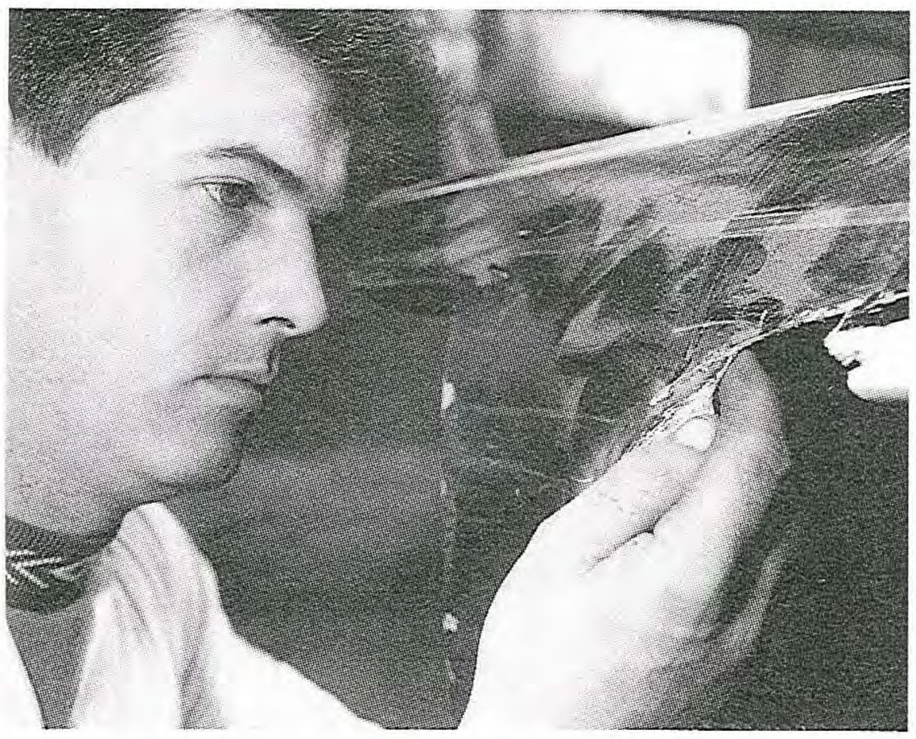
USEFUL CONTACTS

Our thanks go to **Simon Anthony** (0793 695427) and Paul Holden and Steve Mills of **Chelworth Auto Finishers** (0666 577279) for all their help in compiling this feature.

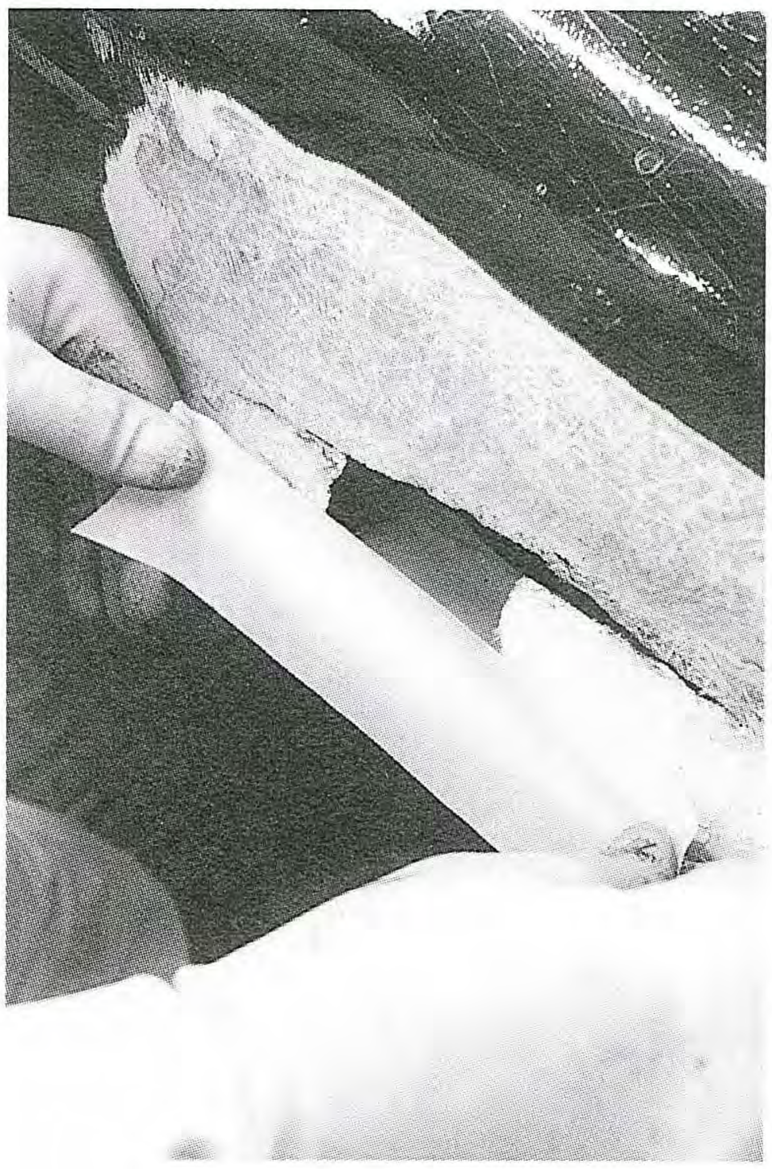
Any high street motoring shop or superstore should have small GRP repair kits.

For larger jobs or for significant savings on supplies of glassfibre matting, resin and accessories, try **Freeman Distribution** in Gloucestershire (0452 422866) or **Scott Bader** in Brentford, Middx (081-568 7191/1645).

8 Firm stippling will also push out any air bubbles trapped in the matting



12 Crash repair is easier than you might expect. Grind down the damaged area as before, grinding back beyond tears. You will need to bridge any gaps to retain the right shape



13 What do you do if there's a gap? What would you with steel? Make a new bit to fit it. Screw strip of steel or tin on to the inside or use tape to hold the shape and support the new matting

14 Using thin strips of matt, build up the shape inside the wheelarch. Once again use plenty of resin and stipple it in with the brush to get rid of any air trapped within the matting

15 Cover the whole inner area with one larger piece of matt and soak both sides in more resin

16 Once this has dried apply matt on the outside, taking care to duplicate original line, then sand down

missing from it.

Once again, you need to grind down the whole area so that all cracks are removed. Don't worry about tears, as long as you have ground back beyond the tear.

Where there is a gap in glassfibre like this, you need to bridge it to retain the shape of the curve. Ideally, on a wheelarch such as this, you should use a strip of steel or tin and screw it into the undamaged arch on either side of the gap, but you can also use gaffer tape or masking tape as a support for the new matting, to prevent it falling out.

Using thin strips of matt (on our repair, these were about one inch wide), build up inside the wheelarch to bridge the gap. Again, use plenty of resin, stippled in with a brush. Then cover the whole area inside the arch with one larger piece of matt and soak it in resin. This should mean that you end up with about three layers of matt on the inside.

Wait for this to dry. Incidentally, some applied heat speeds up the curing process, but it must be carefully applied. A hairdryer would do, but hold it no closer than one foot away or the paint could start to peel off. Ideally, apply the heat from below so that it filters through gradually.

Once it has dried, you can apply matt on the outside of the repair as before, taking care to build up a shape which duplicates the original line. When building up and sanding down, make use of feature lines in the bodywork to reproduce and accurate shape.

For more serious repairs, such as the bashed-in roof of the Europa, more drastic methods need to be used: in this case, metal plates would be bolted through on both sides of the damage. In such cases involving structural or major surgery, it is really better to hand the car over to the professionals.

Owners of glassfibre cars should take heart that GRP repair is not the black art that folk myths purport. For minor repairs and restoration of stress-cracked bodywork, the DIY owner will find working on glassfibre as easy as any of the other skills in his restoration bow.