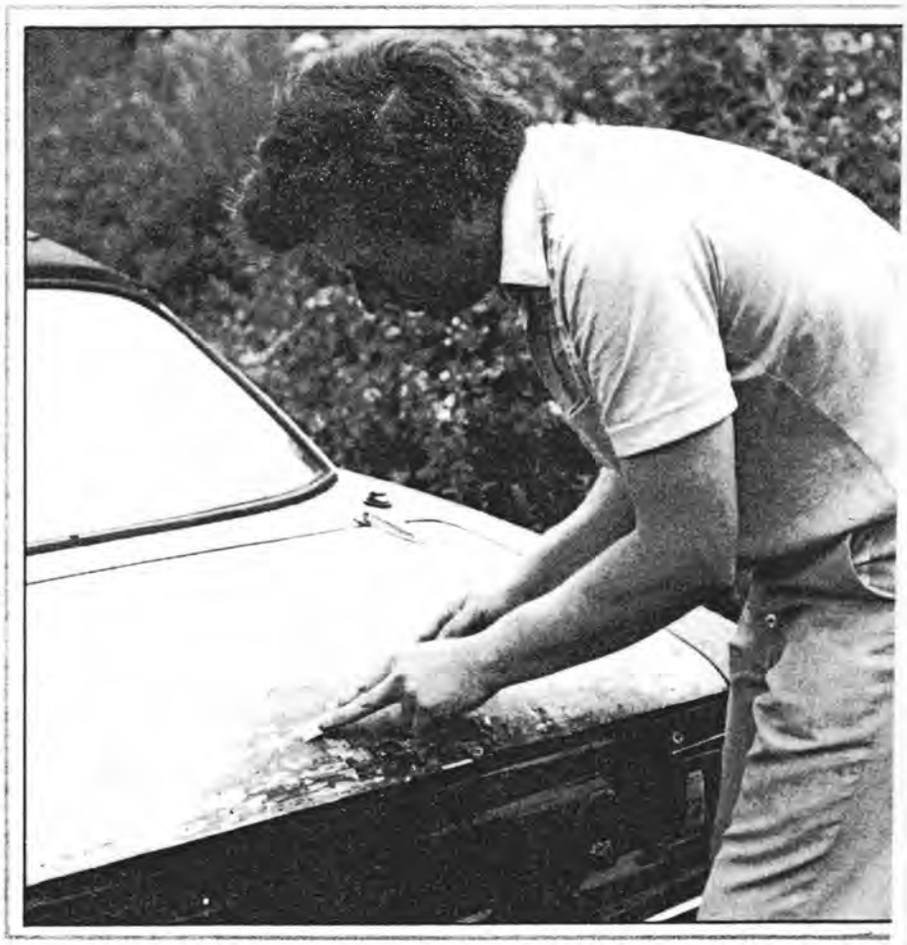
USING GLASS FIBRE



PART 4: Miles Wilkins concludes this series by looking at paint systems and preparation for painting.

Painting GRP is not the same as painting metal and the quicker everybody realises this the better. The preparation required takes far longer as does the painting time so different painting techniques have to be applied. There are literally only a handful of professional GRP sprayers in the UK who achieve a finish that will last for at least 10 years or so.

Why does GRP painting differ so greatly from metal painting? The main reason is sinkage. GRP is a 'soft' material compared with metal and any repair NOT done properly will show due to the thinners in the painting process sinking into the GRP and then evaporating out, bringing the repair with it. Any excess of paint layers, ie. after about three resprays, will always show as a boundary around the repairs for this reason. The thinners will soften the receding layers of paint and lift the repair.

There are several matters arising from this. First, when doing a full repaint, if there is any shadow of doubt as to the soundness of the ORIGINAL factory paint, ie. microblistering or flaking off, or the car has had more than one or two resprays, it ALL HAS TO BE STRIPPED OFF. This cannot be stressed enough. Adopt any other approach to the problem and the end result will look terrible. You cannot paint over blisters, flaking paint etc. Secondly, all repairs must be done absolutely perfectly otherwise you're wasting your time and, thirdly, choose the paint scheme correctly, ie. stick with one system all the way through and use the same manufacturer, be it cellulose or the isocyanate 2K system (known as two-pack acrylics). Spraying cellulose systems requires a different technique from that used when spraying on metal; keep the thinner content to a minimum and build up the layers of paint almost dry. High thinner content will just flood the GRP surface to cause problems later on. If the original finish was cellulose use it again — nothing is worse than seeing an orange peel, lurid acrylic coloured Elan when it should be a flat-finished cellulose original factory colour.

Using the chisel to remove paint from the boot lid which is still attached to the car. When finished everything is removed from the car as explained in the text.

The paint systems

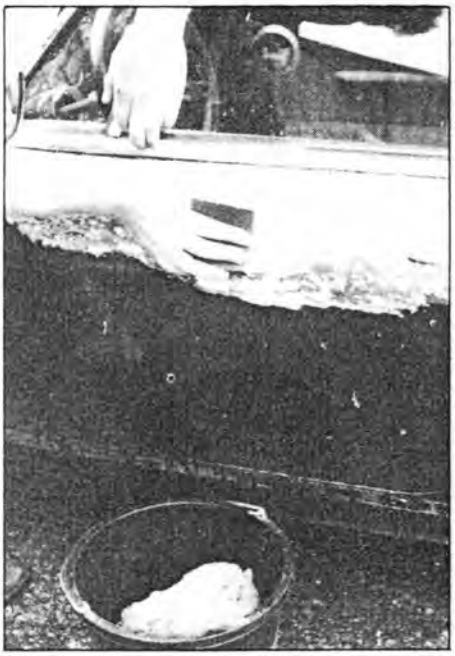
It is worth mentioning the advantages and disadvantages of various paint schemes.

1. Cellulose — These have improved considerably over the past 15 years or so. Don't be bamboozled by the fast-talking sales rep about synthetic whizzos etc. They do NOT always understand about GRP but only about high volume spray shops dealing with Minis, Escorts etc. where turnround is all important. Cellulose was used (and still is of course) on all GRP cars up to the early '70s (Lotus changed to a polyurethane paint in '71 on their Elans etc.). So, first for originality on your classic, use it. Secondly it is easier to apply and can be blown-in locally if a mistake is made. Thirdly, a superb flat mirror finish can be achieved by

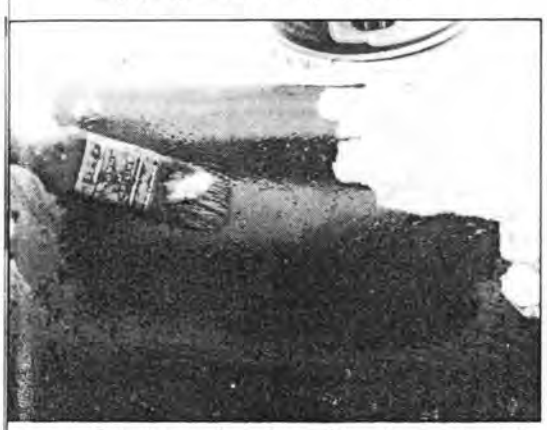
Essential equipment: Paint remover, chisels, multi-sided scrapers, wet and dry papers, bucket, sponge and washing up liquid.

Scrape the paint off using a multi-sided scraper.

The paint is so thick here that chiselling was the best way. Keep the blade as flat as possible to minimise the risk of digging through to the gel coat.



Flatting the area by hand down to the bare GRP.



Painting on the stripper. Note the reaction bubbles; some paints will not do this — the stripper just softening the surface — leave on for 5-10 minutes.

Coming now to the first primer coat (white) and an old repair.

Flatting off by hand with 220 grade paper back to bare GRP on this three-quarter panel. Sponge is squeezed to supply a constant dribble of water. Eventually the whole car has to look like this.

hand-flatting and polishing. If looked after, cellulose will last for ten years plus. Metallics are also done in cellulose or by using the system known as base coat and clear. Here a base coat colour is sprayed on, followed by the clear lacquer which is then flatted and polished. This system is awful to match on part repairs since the final colour is not known until the lacquer has been painted on.

2. Two-pack acrylic-isocyanates. Quite simply do NOT spray these yourself as external breathing apparatus is required. The fumes given off are lethal. Either use new isocyanate-free paint (only available in a few colours as yet) or get a professional firm to spray it for you. The advantages of this system are that it minimises sinkage (no thinner content) and it is more durable in service. Its disadvantages include the fact that it cannot be part blown in on a repair so the whole panel has to be done. It is very difficult to lose an edge and, unless flatted and polished within 24 hours, an orange peel finish will remain.

3. Synthetics. Nobody in their right mind uses these air- or chemical-drying plastic paints on a classic car. They provide a very cheap way of obtaining a shine and may be ideal for kit cars etc. but are virtually impossible to repair over and, as with acrylics, the edge cannot be lost. The whole panel has to be painted.

Do not bake

It is time that everyone, professionals included, realised that YOU CANNOT LOW BAKE ANY GRP CAR. Numerous bodies have been lost in this way and people still do it. A true low bake is 130°C. At that temperature, even for half an hour, the body will flow and become useless. The maximum temperature for any scheme is a FORCE DRY 85-110°F which is 30-40°C. I have had to arbitrate on several occasions on behalf of owners whose cars have suffered GRP flow after being painted by professionals.

What it costs

I repeat, GRP painting is very different from painting metal and it costs two or three times as much. There is no such thing as a 'cheap

(Continued)

USING GLASS FIBRE

Definitely a case for stripping. This Europa has suffered the ravages of time and loads of repaints.

(Continued)

£400 blowover'. The true cost among my professional 'friends', including ourselves, starts around £1500 to £2500 for a strip and repaint on, say, a Europa. Realistically the finished cost is over £3000 which includes new rubbers, rehanging doors etc. IT IS NOT CHEAP TO DO IT PROPERLY and to do it properly is the only way.

Preparing/removing the old paint

Now for the awful bit! Having decided the course of action for the repaint you have a choice of methods of preparation depending on circumstances:

1. The lazy one first — on self-coloured gel coat cars, namely kit cars or bolt-on GRP wings/panels etc., if any repairs have to be done, do as outlined last month. Then flat off the whole car/panel with 360 wet and dry (wet with a little washing up liquid in it) to provide the key. Dry thoroughly and then it is ready for the painting process.
2. If the original paint is sound or you elect not to strip it all off, repair the cracks/damage/marks etc. first, then REMOVE EVERYTHING from the car that can be removed ie. door frames, glass, lights, the lot, and flat off the entire car with 360, paying particular attention to the repair/paint boundaries. These areas must be absolutely perfect. Use lots of water and change the paper regularly. If the carpets/seats are still left in, cover them up well because wet coloured stains are quite difficult to remove when the crud has dried! Finally, when all has been flatted, wash with clean warm water and dry thoroughly.
3. Stripping a whole car will take a very, very long time whichever method you choose. People just do not realise the hundreds of hours it takes. Unlike metal where you can apply paint stripper everywhere and high pressure hose it off, paint stripper attacks GRP so extra care has to be taken. If using the paint stripper method buy the water soluble stripper only. Do NOT buy the special GRP ones that are intended for marine purposes only. They do not remove cellulose/acrylics. If you are stripping an original finish take it off BY HAND. DO NOT use paint stripper because, if you do, one pass of the scraper and you'll be through. Start with 80 grade wet and dry finishing with 220 and 360.

Before starting with paint stripper first dewax the car with petrol or solvent but be sure to eliminate all risk of fire. Wipe clean and then key the surface with 80 grade paper to provide a grip for the stripper otherwise the first applications will remove only the remaining wax polish! Work on a small area at a time and scrape the paint down to the original primer coat only. Always leave doors, boot lid etc. attached to the car because it is easier to work on these when they are anchored in position.

When you have finished with the stripper take off the door handles, frames, glass, lights etc. and finish around these points by hand with wet and dry paper. Taking everything off first may seem logical but you do not want stripper all inside the car eating into vinyl seats etc. and the build-up of unremoved stripper in and around door handle holes etc. will give horrible paint problems later on. After each patch has been done thoroughly, wash off with water to neutralise the stripper. Go over the whole car, leaving any old repairs — do not paint strip them out. When the car is, hopefully, in its original primer, flat off by hand with wet 220 wet and dry. Next wash the entire car and then TACKLE THE REPAIRS both old and new (gel cracks show up as dark yellow lines). Finally flat off again totally with wet 360 grade wet and dry and the car should be ready for painting.

Using paper or a multi-sided scraper for the awkward bits.

Chipping off the paint using chisels is an alternative to paint stripper. This can sometimes prove to be quicker provided that the paint comes off easily. You will find this method is best when the car has many layers of paint. Use a 1in wide chisel (maximum) or smaller sizes for the fiddly bits. Do not gouge into the GRP. If you do scrape too far and remove the gel coat treat the area as a gel crack for repair. This applies also to gouges made when using paint stripper.

Another method of stripping is by hand-sanding. This will really take forever, especially if you have to take off six repaints; to use an electric orbital sander or equivalent is a waste of time. NEVER be tempted to use a grinderette or a cintride disc as these will tear through the paint and straight into the GRP. By far the quickest method is to use a compressed air orbital sander starting with 40 grade paper and working down to 220 grade. The flexible backing pad will allow awkward corners and curves to be reached. Be careful when nearing the initial primer coat. Stop and take this off by hand otherwise, after painting, you'll wonder why the beautiful gloss finish has a myriad of squiggles all over it.

Further Reading

"How to Restore Fibreglass Bodywork" and "How to Restore Paintwork", both by Miles Wilkins and published in the Osprey Restoration Guide series. Both of these books can be obtained direct from Miles at £7.95 each including postage and packing and his address is Fibreglass Services, Charlton Saw Mills, Charlton, Singleton, near Chichester, West Sussex.

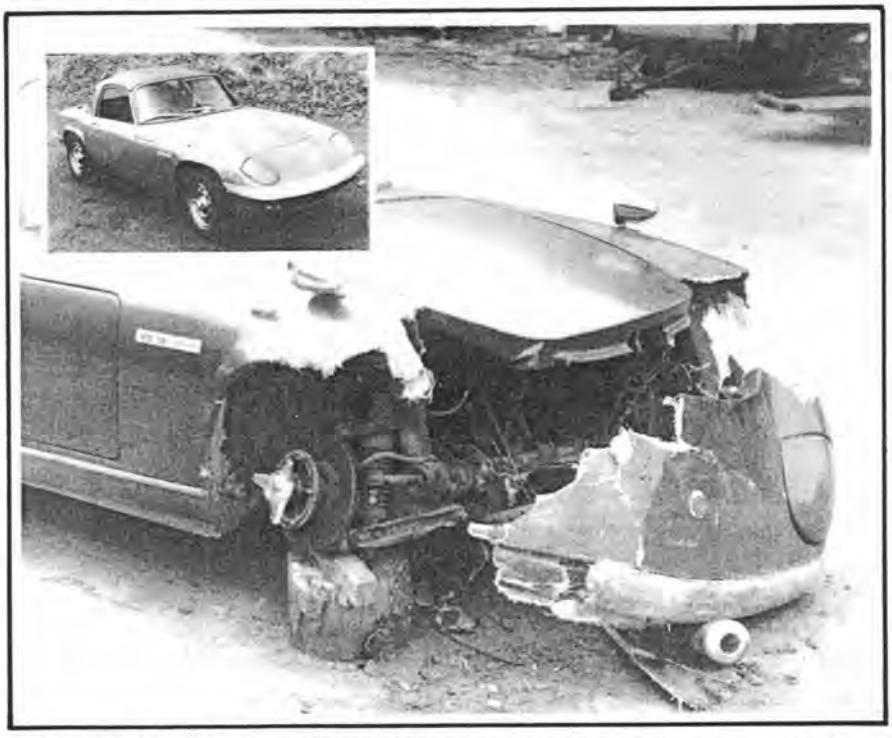
For the bare body use ICI (or Glasurit) spray filler. This is designed to take out 80 grade marks and is self-etching. I never use Lessanol as I believe that it can cause problems later on. DO NOT use spray fillers over painted surfaces but only over the repairs. After the spray filler use high build primers and then your colour. Or, if the body is perfect, use a two-pack primer (which should prevent sinkage) and then your colour whether cellulose or two-pack scheme.

On a final note, it usually takes about 250 hours to strip and paintspray a Lotus Elan +2. If you have done it yourself you have probably found that it has taken hours more. Painting and polishing alone in a cellulose scheme will account for around 70-80 hours of that time.

□

The final result. All the body was stripped and repaired and 16 coats of colour applied, flatted off after every four and finally hand-polished.

USING GLASS FIBRE



Part 2: Miles Wilkins explains the causes of GRP damage and how to prevent it.

Every GRP car on the road today has a gel crack on it or at least a blemish in the GRP paintwork. Even the best prepared car at a concours event, or or brand new car even, will have a mark somewhere if you look close enough! Gel cracks are really GRP's answer to metal rust and, like rust, most of them should never appear. So, apart from the obvious accident damage (about which more later) how do gel cracks appear, and why, and what can be done to prevent them from happening in the first place?

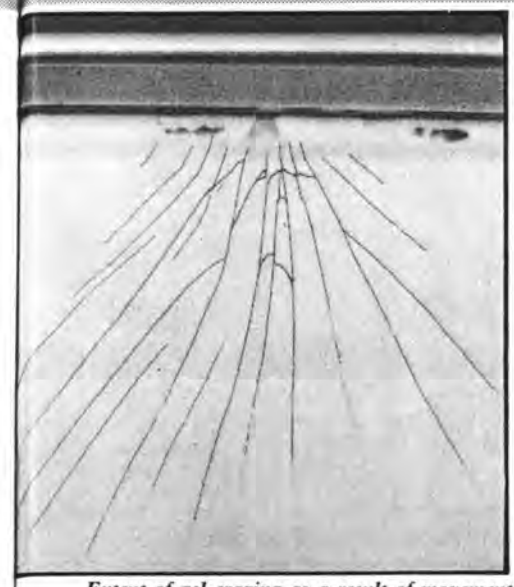
Starting at the beginning, causes are from the mould itself. If the mould has been constructed from GRP (be it epoxy or polyester resin) and has an inbuilt crack in it or any other blemishes, then the pattern of the crack will be transferred to the moulding and will show as 'crack indentation'. This is fairly common on, dare I say it, low budget kit cars and on cheap replacement wings, bonnets etc. for Morris Minors and the like. At least with the replacement parts the offending mark can be flatted off with wet and dry paper and then the whole panel primed and painted but, with self-coloured panels (where the colour is in the gel coat layer), then the blemish is there for all to see and if it is on, say, a flat bonnet area it will stick out like a sore thumb, much to the detriment of your pristine car. The only recourse is to paint out the fault and get the manufacturer to rectify the mould and make another one. (The classic example, as reported to me when I admonished one poor kit car manufacturer about the shocking state of a door panel was 'Oh, they're all like that'!).

From the mould itself we move on to the next stage where the moulding is released from the mould. If, for any reason, the moulding has not fully cured (ie. it is still green), or has stuck fast because the release agent failed to release and too much force is applied, stress lines and cracks will appear and will show up as white lines. Then, if left unchecked, they immediately show through the paint that is applied subsequently. The remedy here is to make sure all the release agent is evently applied — especially into any awkward corners — and that the moulding has fully cured before attempting to release it. It may also be that the mould design itself has been constructed in the wrong way to allow an easy release from the moulding ie. too sharp a radius on corners, overhanging angles, double curvatures, etc. If necessary a re-design must be done to prevent inherent cracks in the moulding.

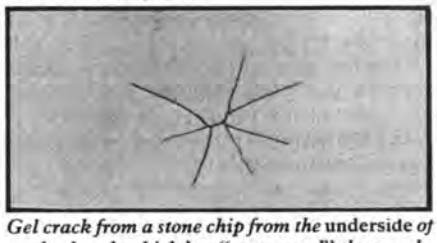
A rather extreme form of damage illustrating GRP's ability to absorb the impact and then shatter, restricting the area of major damage.

With a crack-free moulding released, inbuilt stresses may eventually appear as a crack, especially on hard butt edges where not enough thickness has been applied. Unless bonded to GRP correctly different materials, such as plywood or steel bulkheads, can move, causing stresses on the GRP. A thick laminate joining a thin flexible panel or a door panel beefed up around a hinge point will cause a gel crack to appear in time where the thin panel flexes and the stiffer hinge panel doesn't. The remedy on any panel is to grade the weight of mat accordingly, rising evenly to a maximum around the stress point. Sadly, too many new GRP car manufacturers don't even bother and the factory laminators just slop it on any old way. If the cars were built correctly then they would be virtually bomb-proof and, having repaired just about every type of GRP car, I feel that so much could be done to prevent totally unnecessary damage.

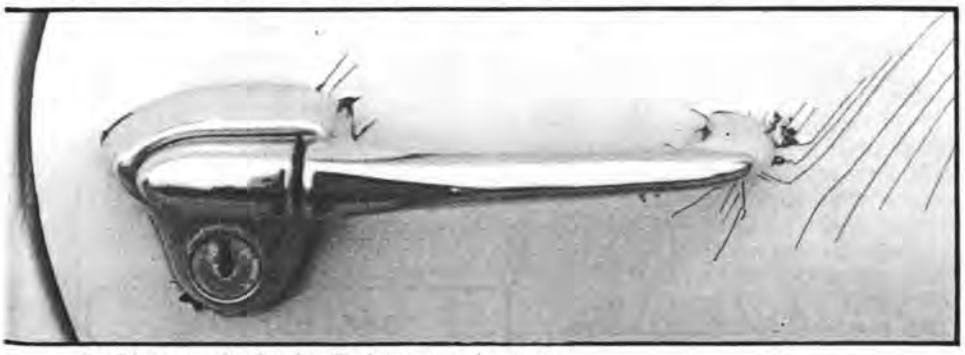
Moving to the vehicle itself, what can be done to prevent cracks? The main problems



Extent of gel crazing as a result of movement from a window frame.



Gel crack from a stone chip from the underside of a wheel arch which has "penetrated" the panel. This should be dealt with without delay while the damaged area is comparatively small.



Cracking around a door handle due to excessive stress.

are due to high stress points ie. door handles, hinges etc. and panel flexing due to a stiff bulkhead flexing the panel around it. This also applies to glass windscreens, be it front or rear, where the glass is heavy and does not give — but the GRP panel will. All fittings on any panel must have the load spread over as large an area as possible, especially around the door and boot handles. If necessary, add one or two extra laminates behind the handle and grade them over an area, then use large 'penny' washers when bolting up. With all fittings DO NOT bolt up like a gorilla. Use commonsense otherwise that sickening cracking sound will be heard and, yes, there is a crack on your brand new paint. Make sure with any panel that it fits correctly ie. all doors, bonnets and boot lids fit their shut lines, since tugging away on the handle trying to open the door will only succeed in cracking the panel. A correctly fitting panel will require no force to shut or open it but force, wherever it is applied, will lead to cracks. NEVER slam doors and lids because cracks will appear in time.

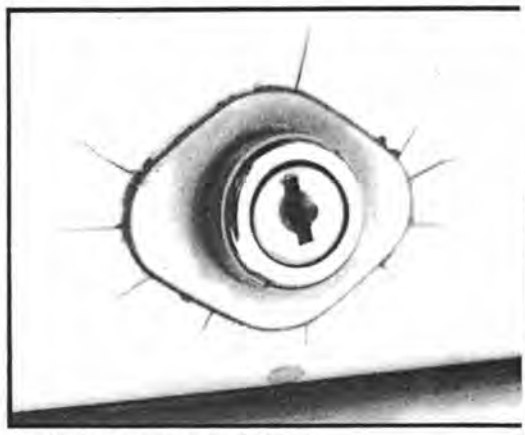
With bulkheads and glass windscreens, build up the area around the aperture to prevent flexing if required, but grade it away to the original thickness otherwise it will crack somewhere else.

Fitting trim and badges on a newly painted body is another cause of cracks and heartache. Drill the rivet or screw hole OVERSIZE ie. if using ⅛in rivets use a 9⁄64in drill; do NOT force in a rivet or screw because as soon as you tighten up — bang — a star crack will appear through the paint around the fixing. If possible always use a washer behind the rivet or screw to spread the load. With badges use double sided adhesive tape if possible to save using screws or rivets. Remember, any mark will remain for life and may spread. The only way to get rid of it is to do a repair and repaint. Fitting the 'pretty' bits causes more damage to new GRP bodies than any other operation.

Other areas to watch are the fitting of non-standard items like sun roofs, fancy air cleaners etc. and not realising that they are chaffing on the adjacent GRP panels, thus causing damage. With any item do not force a panel over it; always check first that it does not foul before shutting the panel. With any exhaust system, wiring and water pipes make sure there is a large enough hole or air space around the pipes so they don't touch and cause cracks. With any wiring always use a rubber grommet to prevent the raw edge cutting into the wires. Make sure underpanels, such as wheel arches, are well protected by anti-stone chip paint (3M supply a good one) or a good FLEXIBLE underbody seal so stones flung up by the wheel do not star crack the GRP from underneath (Lotus Elans and Europas suffer from this).

Most, if not all, of the foregoing can usually be avoided with simple precautions and attention to detail. The next cause cannot! It is that of accident damage. Proper GRP cars (such as Reliant, Lotus, TVR and Marcos) are infinitely better in an accident than metal cars because GRP will absorb the impact and shatter, NOT deform, thus minimising panel damage. Metal will deform and go on deforming ie. a front panel through the wing, a post, roof, door etc. and be a total write-off. Furthermore, pulling out metal bodywork, aligning on jigs and welding on new panels actually puts more stress into the bodyshell, whereas bonding on a new GRP panel should cause NO stress at all.

After a major accident the extent of gel crazing may not be evident until some days or even weeks later, when it shows. Driving a car after a minor accident will cause the cracking to spread, making life difficult for any accident estimator to assess the TRUE damage. I always look for the slight deflections of light over the paintwork to tell me where the cracking stops, even though nobody else can even see the cracks underneath the paint. It goes without saying that all the accident damage/crazing must be removed completely to prevent any further stress/gel cracks occurring again on the 'repaired' area. All too often new sections are bonded in and 6in behind the joint all that is under the new paint are the remains of gel crazing from the accident. If new sections are bonded in it is essential that the thickness of



Cracks due to stress around the lock.

Extent of crack travel from a nudge on a wheel arch.

USING GLASS FIBRE

Fire damage. Note how the resin has burned leaving the powdery mat.

Overflexing will cause cracks and paint splitting.

Too much strain will cause a tear as shown by the lighter line.

How to shut a door properly with a hand flat against the panel to spread the minimum force necessary over as large an area as possible.

the new laminate matches the old and the join itself must be graded over a wide area.

Other causes of GRP damage, apart from fire which we touched on last month, are confined to nature. GRP will delaminate if left out for years with no protection; water will enter the mat strands which act like capillaries and, if there is a severe frost, the layers can physically separate. Once water is in GRP then it must be dried out in an oven for about a week at 85-100 deg. F before any attempt at repairs or painting can take place otherwise water will just break through, giving unsightly bubbles and blisters on the paint surface.

Part of an Elan boot lid after an accident showing extensive gel cracks and paint peeling off between the gel crack lines.

Severe heat will distort the panel or bodyshell. Above 140 deg. F the resin MAY start to 'flow' and, once set again, the deformed panel will have to be replaced. This is why one NEVER low bakes GRP bodies when painting (however, many people still try with disastrous results).

Chemical damage is confined to paint strippers (methylene chloride), hydroflouric acid (glass etching) and certain fuels over a period will leech out the resin (after all, resin is derived from fuel).

Paint strippers will eat into the gel coat and resin and, if left, will make a hole. The only action is to cut out and repair. Hydroflouric acid not only will eat into the GRP but will eat into you as well! HF is NOT available to the public due to its lethal qualities. Brake fluids and anti-freezes do not attack GRP. Fire is the most feared and any fire damage on GRP MUST be cut away since only the glass mat is left. The mat has no strength at all after the resin has burnt away. Never bond new panels to fire-damaged old ones because, at best, you will make a very weak bond.

GRP is pretty indestructible and really will last a lifetime if looked after correctly.

NEXT MONTH
Crack repair and bonding on a new section.