

# **Body Repairs and Working with Fibreglass:**

## **Introduction:**

Although I did a course on using fibreglass in the early sixties I had allowed any skills to lapse and don't profess to be an expert, but in the last three years I have restored three fibreglass bodies without problems.

To help me in my body repair endeavours I had my previous knowledge and a copy of the book 'How to Restore Fibreglass Bodywork' by Miles Wilkins. I bought this book in 1985 when it first came out. The main message from Miles book is that all damaged areas have to be removed in order to carry out a long lasting and as good as new repair. He makes particular reference to the fact that you cannot effectively repair a crack by gouging it out and slapping on some filler. The general consensus from contributors to Miles book is that "you cannot make a silk purse out of a pig's ear and it is normally best to avoid kits with poorly made bodies, and repair sections from sources other than the original manufacturer!"

There are two main components used in fibreglass repairs, namely the fibreglass 'Mat' and the 'Resin'. The mat comes in different thicknesses one of which is very thin and fine, this is referred to as fibreglass 'Tissue'. You can also buy fibreglass 'Cloth' – 'Tape' and 'Rope'.

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## **Fibreglass general information:**

When using fibreglass wear protective kit including eye protection, a face mask and disposable gloves. Keep pets away from the working area.

The fibreglass mat has random glass strands which mesh/bond with the surfaces above and below them. The fibreglass tissue is generally used where a thin smoother layer is required. Fibreglass resin acts as the 'glue' and bonds the different layers of fibreglass material together. Fibreglass cloth does not bond well to other areas of fibreglass as it is smooth and does not have random strands; it is generally used for sheaving components; e.g. wooden panels to protect them from the elements. Fibreglass tape and rope is useful for reinforcing the centre and edges of large panels.

The general technique is to brush a layer of resin on the substrate, position the mat and stipple more resin into the mat until it is thoroughly bonded and wetted to the substrate below it. It should be noted that it is very difficult to get thick mat to bend round corners so multiple thinner layers are best for these situations. It is also important to eliminate air pockets (best done with a metal roller) and not to have an excess of resin compared to mat. On the exterior bodywork the final layer (prior to filler) is normally tissue when carrying out repairs but during production a 'Gel-Coat' is applied to the inside of the mould which becomes the outside surface of the body.

Cleaning is carried out with acetone and the best quality kits include; mat, resin, hardener and acetone. Expect to pay in the region of £25 for a kit to cover 1 square metre in a single layer of 300gm mat. The resin has a best before date so is best bought as needed. There is not enough acetone in the kit for the cleaning of rollers etc. expect to pay around £20 for 2.5 litres of acetone, which can also be used for cleaning the body prior to application of the new fibreglass.

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## **Preparation:**

Filler and fibreglass doesn't adhere well to a dirty or polished surface so the first task is to give the body a good clean. I tend to scrub the body with detergent then wash down with spirit vinegar before finishing off with a light pressure washing. As water in the fibreglass is very detrimental I leave the body to dry out for at least a week.

Prior to applying filler or fibreglass I clean the area with a cloth damped with acetone and leave to dry for about thirty minutes. If I get called away and return to the job at a later date I wipe over the area with a tack-rag.

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### **Eliminating minor blemishes to the body exterior:**

After cleaning the area with acetone, the depressions are filled with 'David's Isocon P38' and after thirty minutes\*\* it is block-sanded to conform to the original contour with P200 paper used dry.

#### **Note.**

*\*\* Don't leave it too long before contouring to shape as once fully cured P38 is really hard and will vigorously resist your efforts with the abrasive block etc.*

After leaving to fully cure overnight I apply a very thin smear of P38 and after thirty minutes I sand it down with P400 grit paper used wet.

#### **Notes.**

*I've used David's Isocon many times and find it reasonably easy to use, although again you cannot hang about as it has a limited working time of about ten minutes. David's P40 is a filler/fibreglass mix and has strength; P38 is a smooth filler with little or no strength so is used for final finishing.*

*Quite often very minor blemishes only reveal themselves when you start to paint the car. On steel bodies it is normal to apply what is often referred to as a 'guide-coat' of paint. On a fibreglass body I use a plastic primer as a guide coat. Obviously you repair any blemishes revealed by the guide-coat.*

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### **Mixing the resin:**

The liquid resin requires the addition of a 'Catalyst' (Accelerator/Hardener) in order for it to set. Adding more hardener will reduce the setting time, adding less will extend the setting time. If the hardener is less than 1% the resin will not properly cure and will be weak. More than 3% and it will cure too quickly, which again can make it weak.

The normal resin/hardener mix is a ratio of 100:2 (or if you prefer 2% hardener). The common recommendations vary between 1% and 3%. You need 20ml of hardener to 1000g (1kg) of resin to give a 2% mix.

With my kits the hardener was supplied in a plastic bottle which had straight sides and contained 20ml, enough for a litre of resin. For a recommended (by Miles Wilkins) mix of 2% you need 5ml of hardener in every 250g\*\* of resin. I mark the top level of the hardener on the side of the bottle with a felt tip pen and then make another mark at the half way mark before marking again in between the marks. The distance between each mark thus measures 5ml.

#### **Note.**

*\*\* I used Margaret's very accurate kitchen scales for weighing out the resin and got her to save me several empty dog food tins which when thoroughly washed made good mixing receptacles for the resin. Glassware such as jam jars etc. should not be used for mixing as the heat created during the chemical reaction could shatter the glass.*

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### **Repairs to star damaged fibreglass:**

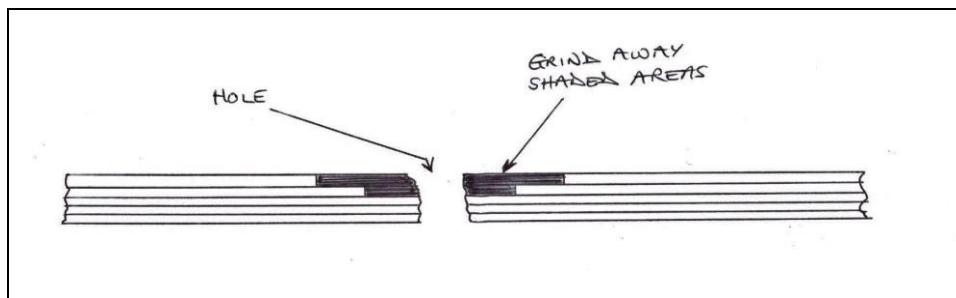
Minor impacts can cause what is known as ‘Starring’ where short cracks in the gel coat radiate out from the impact point. Repairs are often made by grooving out the star lines and applying filler, which is not a long term solution.

To carry out a lasting repair you need to remove all the damaged gel coat down to the fibreglass substrate. Now apply a layer of fibreglass tissue before filling and contouring the depression with P38 etc.

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### Repairs to badly damaged fibreglass:

The general technique for repairs is to remove an area of mat on the inside of the body that extends beyond the damaged area; if the fibreglass is particularly thick\*\* you might need to remove more than one layer. The layers should overlap each other and be tapered at the edges as per the sketch below. The shape of the repair is unimportant provided it covers the damaged area. The area around the patch should then be thoroughly abraded and cleaned ready to accept the new fibreglass used in the repair.



If the fibreglass panel being repaired has split then the broken fibres will prevent the panel returning to its normal shape and it will be necessary to run a saw blade etc. along the ragged split to allow the panel to re-align. The panel can be held in place/alignment with blobs of ‘Isopon P40’ on the exterior side of the panel or with aluminium etc. plates, held in position with self tapping screws. To prevent the aluminium being glued/stuck to the new fibreglass you can polish it with some form of release agent, or cheat like me and trap some polythene sheet between the plate and body. Remove the plate and polythene etc. after applying one or two layers of fibreglass material.

Always cut out your repair patches prior to mixing the resin. After stirring the mixed resin thoroughly, it is ‘painted’ on the work area, then you place the mat on top of the resin and stipple the mat with more resin making sure that the mat is thoroughly wetted and free of air bubbles. For larger areas use a metal roller to eliminate air bubbles.

### Notes.

*Stippling is done with a paint brush but I think that stiff brushes work better and with soft bristled brushes I cut the last inch or so off of the bristles. I never bother cleaning a used paintbrush; instead I buy the cheapest brushes available and throw them away after one fifteen minute application session.*

*If possible, always position the component so that you are working downhill and gravity is holding everything in position.*

With the inside of the repair built back to its original level it is often beneficial to add one extra layer which overlaps the whole area. Don’t put too many layers on though as it could lead to stress in other areas.

Once the inside of the repair is finished you repair the outside of the body in a similar way; i.e. grind the damaged material away and work in layers from the centre out. Finish off with fibreglass tissue and filler.

When the repairs are thoroughly dry, I block sand\*\* the area to make sure no repaired areas are above the normal body profile.

## **Note?**

*\*\* Block sanding means to wrap the sandpaper in a block of rubber or cork etc. to help prevent sanding low patches.*

The problem with doing any fibreglass work is that your working time is only about 15 minutes. Ideally the temperature should be between 15 and 20 degrees C, preferably closer to the latter.

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## **Repairing/eliminating simple holes:**

For the repairing of simple holes; i.e. those that are in the wrong place and without star cracks/splits radiating from them, I employ a totally different method and follow the procedure below; which was later adopted for the numerous unwanted holes in my NG TA radiator cowl and all four mudguards.

1. Countersink the original hole on the outside with a countersink bit, or with a small (20mm-ish diameter) abrasive ball mounted in a hand drill, I have a number of these abrasive balls on small mandrels and they are very useful.
2. Clean with acetone and fill the countersunk depression on the outside of the panel with David's Isopon P40.
3. When the P40 is dry clean off and abrade the body on the reverse side of the hole.
4. Apply a small fibreglass patch (approximately 30mm x 30mm) over the inside of the hole followed by another layer approximately the size of a playing card.
5. Working on the outside of the panel sand of any high spots with P80 used dry.
6. Apply a skim of David's Isopon P38 and sand with P100 used dry.
7. Apply a second light skim of P38 and sand off with P400 used wet.

## **Notes.**

*This method is **not** suitable for holes with cracks/splits radiating from them (like the mounting holes for my front and rear mudguards) these should be repaired as per a normal damage repair as previously described.*

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## **Technique for drilling fibreglass:**

Once you have filled in the unwanted holes you will need to drill new holes in the correct position. There are two main methods of drilling through fibreglass without damaging the gel-coat. The easiest way is to grind away the sharp corners on the drill bit and drill the correct size hole, but this doesn't always work. If you are a perfectionist you will want to follow this procedure, which will avoid chipping the gel coat.

1. Put masking tape over the area where you are going to drill, this helps to prevent the drill bit slipping.
2. Mark through the masking tape with a pin or the fine point on a compass etc. where you want your hole.
3. Without applying too much pressure drill through each position with a small drill bit.
5. Now countersink each hole so that the edge of the countersink is fractionally larger than the finished diameter of your fixing.
6. Drill the hole with the correct sized drill bit.

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## **Summary:**

I hate working with fibreglass and usually have to give myself a good talking to to summon up the energy etc. to get started. Once started the work normally progresses well over several days. I still don't enjoy working with fibreglass, but I don't dread it any more.

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## **Postscript:**

The good thing about doing a job like this is that we learn from our mistakes (well some of us do) and by the time I was finished my first full body repair I realised that following Miles Wilkins repair methods for

damaged areas was way over the top for a simple hole repair, especially as I repaired and filled in over twenty unwanted holes. These were in addition to the six holes that required major repairs.

**Alan Myland**