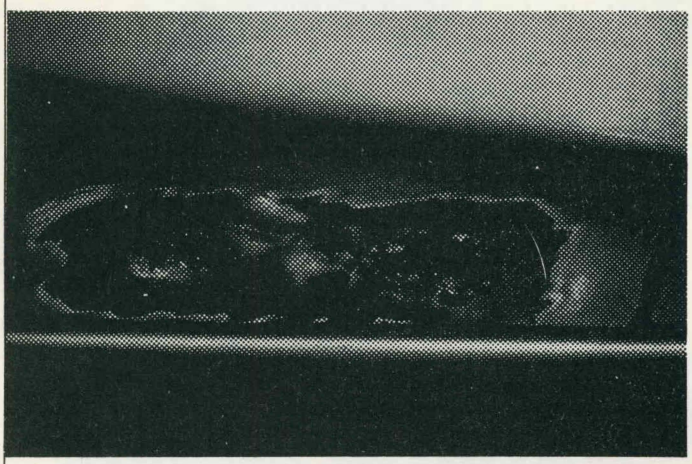
Repairing a rust hole in a panel

As we all know only too well, the little rust devil is always looking to attack our precious bodies (i.e. the bodies of our precious motorcars - let's not carry this Man of Iron thing too far).

When a piece of panelling rusts through, it is important to determine whether the strength and hence the safety of the vehicle is being reduced. If the answer is yes, then obviously it is essential that the structure must be repaired in such a way that the strength is restored. Usually this will require some welding in of new metal.

However, small holes rusting through panels (called perforations by the manufacturers) are often of no structural significance, but may be very offensive to the eye of a critical beholder (e.g. a potential buyer or a concours judge). A typical situation is the perforation of the lower edge of an outer door skin.



While purists may say that welding in of new metal is the only answer, new metal is no guarantee against further perforation. Further, there is often the risk of fire if the panel is not removed for welding. Obviously, all these factors add to the time, skills and specialised equipment required for the welded repair.

Cold repair techniques, involving modern plastic polymers, avoid many of these problems, and, properly applied, should give very satisfactory and long-lasting results.

The approach advocated is to clean up the rusted area, inactivate the metal surface and then apply a filling material in such a way that the area is sealed off from further attack ("encapsulated"), and finally the visible surface is restored to its original contours and finish. Incidentally, this is in principle exactly how a dentist goes about fixing a damaged or decayed tooth, so we are in good company, even if not as well rewarded for our efforts!

Let us look at a typical problem and how it was repaired.

1. This door had previously been treated internally with bituminous and water repellent materials. Obviously, complete coverage had not been obtained. Note that perforation has occurred along the line where the three elements of iron, water and air come together in the poorly drained area just up from the bottom edge of the door.

2. Trim back the edges of the perforations and adjacent thin areas, sand off all paint for 2-4 cm around the holes with a coarse disc on an electric drill and tap this area down slightly below the original surface line. Remember to use eye protection when sanding, brushing or using hazardous liquids.

3. Gain access to the inside of the affected area by removing the door trim panelling and use a wire brush or coarse steel pot scourer to loosen dirt, scale, etc. Blow, suck or wash this debris out. If necessary, use a degreaser and water wash to remove oil, tar, etc. from the repair area.

This and later steps will be difficult to carry out on the inside of boxed-in and inaccessible sections which do not have existing access holes. In such cases, special access holes may be cut or drilled into the section, later variously hiding the holes behind trim, plugging them, or filling and refinishing over them, depending on location. Remember however, that boxed sections may require welded repairs because of their contribution to body strength, and that holes will tend to weaken them.

4. Neutralise the cleaned inner and outer surfaces of the panel with a phosporic acid or of some commercial brew such as BALM's Deoxidine. Leave the neutraliser some hours to react, ideally overnight. Phosphoric acid will form a dull grey coating of inert ferric phosphate when it reacts with clean bright iron.

5. Wash off unreacted phosphoric acid residues by liberally sponging the treated areas with clean water, and dry off the water thoroughly e.g. with the hot air blast from a hand-held hair dryer.

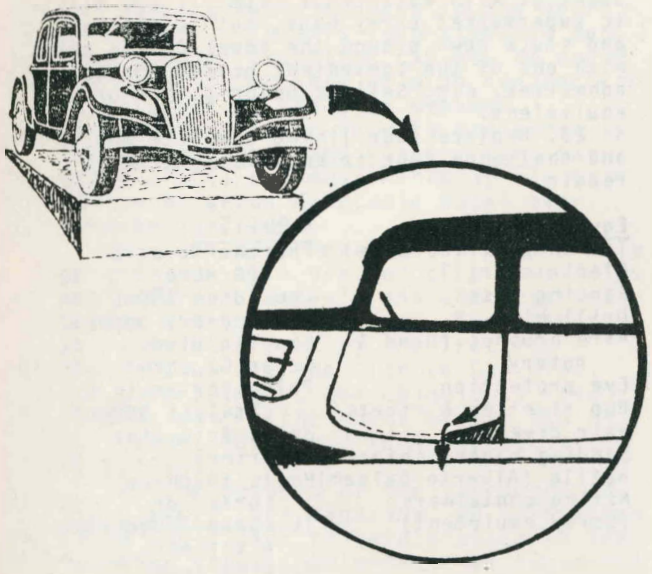
6. Cut some scrap galvanised iron (G.I.) sheet to shape so that it overlaps the perforated area by at least 2-3 cm if possible. The GI sheet should also be curved to follow the surface form of the damaged panel. Obviously, thicker sheet is stronger, e.g. 20 gauge, but 22 gauge (which is thinner of course!) is about the limit for easy cutting with simple tin-snips.

7. The GI sheet reinforcement usually needs to be attached securely to the back of the old panel. Positive attachment enables the zinc of the GI to provide some sacrificial protection to the old panel as well. Pop-rivets are the easiest fixing. Using the minimum sized drill bit to suit the medium sized pop-rivets to hand (about 3 mm diameter), drill through the sound panel and the reinforcing sheet and rivet the two together at three or four places. Make sure that the panel is well tapped down in the vicinity of the rivets so that their tops will require little if any grinding or filing to get them below the final finished surface.

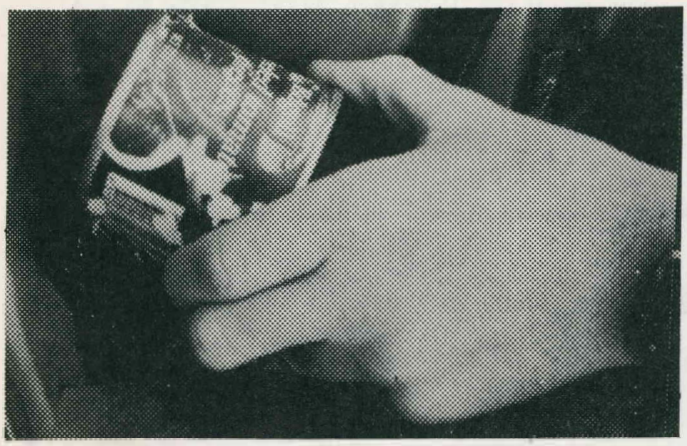
8. The area is now filled with a free-flowing plastic filler from the back (and the front if necessary) so that the weakened area is strengthened and encapsulated. Polyester resin (as used in boat repairs) is easily obtained, works well and adheres to clean metal. However, being a syrupy fluid, it must be held in place until it sets. Broad masking tape and paper is pulled taut and used to seal over the outer surface in the repair area during setting. Leave the tape "floating" over the depressed area itself so that the resin can flow out and

encapsulate the outer surface of the repair. The normal drain hole in the bottom of the door inner skin near the repair area is also taped over temporarily.

9. Water lodging between the inner and outer door skins, especially near the lower door corners where drainage to the existing drain holes is difficult, is a major cause of lower door rusting, as in the present instance. It was therefore decided to allow the polyester resin to set between the skins "at an angle" so that it formed a sloping surface seal, actively draining water away from the door corner. This was achieved by raising one end of the car on a ramp (a jack could be used) before pouring in the resin. Because the hole being fixed was in the rear corner of the door, the front of the car was raised.

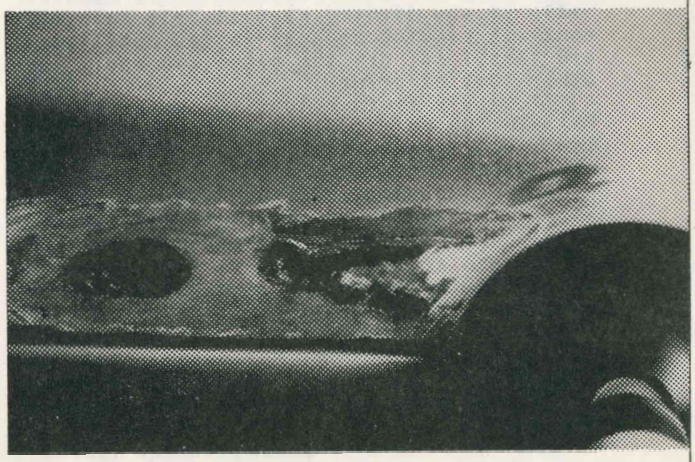


10. To be sure that the resin gets into and seals all the area of concern, it may be necessary to pour resin in through supplementary holes drilled in the inner door skin. These may be filled later as desired, and refinished exactly as for the outer panel.

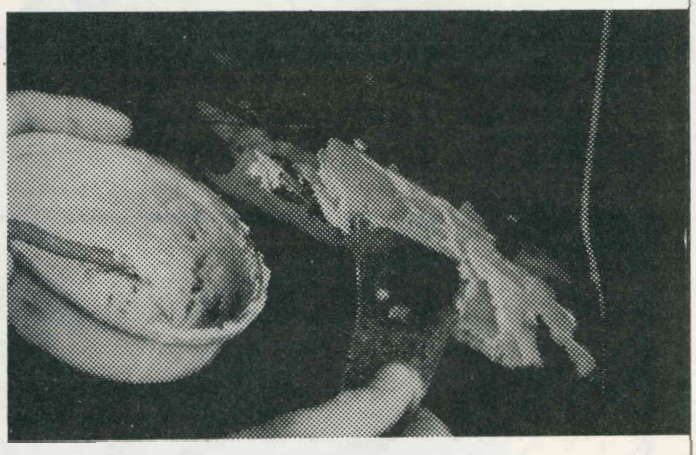


11. The polyester resin (e.g. Boatsheath Resin No.1 - RF Services) and its activator/catalyst are added together in the manufacturer's recommended ratio (usually about 30:1, say 30 drops of activator to 100mL or 3½ fl. oz. of resin). Mix thoroughly with a clean stick (ex-icy pole) in a throw-away container (clean dry soup can etc.). Do not mix excessive resin; mix 100-200 mL at a time, then mix more if needed. The time for the resin to set depends on the resin, its age, the amount of activator and the temperature. Setting occurs in half to several hours, and can be hastened by extra activator (but not too much) or heat (with the hair dryer, etc. - may be needed in cold weather). Leave overnight to cure if possible.

12. Remove masking tape and paper as far as possible, and, using a medium to coarse disc on the electric drill, cut the resin surface back to just below the final finished surface of the outer panel.



13. Mix up body filler paste and its activator/catalyst (e.g. K & H Handyman Plastic Putty) in its recommended ratio and press onto the repaired surface with a throw-away spatula (see 11 above). For a minor job, one or two tablespoons of filler should do. A handy tip from Practical Classics is to lay newspaper onto the filler (better still, clear plastic such as Gladwrap) so that you can work the filler onto the surface without it sticking to your hands. Work it in so as to thoroughly cover the surface and fill in any flaws etc. in the underlying resin or metal. Roll the filler down with a bottle or similar, removing any surplus, so that the filler is at or just above the final desired surface. Filler sets in about 20 minutes. Ideally, leave a few hours before the next step.



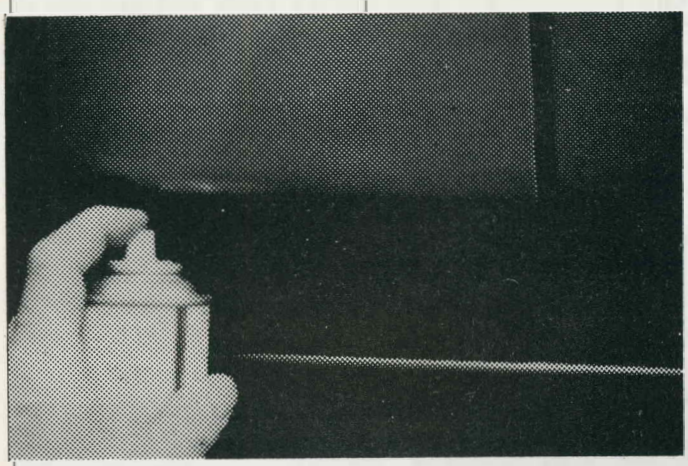
14. Sand back with "wet-and-dry" paper starting with medium (say 100 grade and finishing with fine (say 800 grade). If the panel is flat or slightly convex, use a flat sanding block to support the paper. If the surface is dished inwards, wrap the paper around an old barrel shaped shampoo bottle, filled with water and tightly capped. Keep the paper clean by swishing regularly in a bucket of water. Work the surface down carefully until it is smooth

to the eye and touch and appears to blend perfectly into the original panel surface. Dry off with a lint-free cloth and the hair dryer.

15. Apply a thin uniform coat of grey zinc-rich primer/undercoat to the repaired area, keeping the pressure-pak nozzle about 25-30 cm from the panel and using gentle sweeping arcs (see side of can). Allow to dry one-two hours.

16. The uniform grey coat will help to reveal any surface irregularities, especially if you lightly sand it. If necessary continue sanding down as in 14, until you are satisfied, dry the panel and apply another coat of primer.

17. Apply final colour to the panel, building up in a series of thin coats, and for a really good finish, fine sanding with wet-and-dry between coats. If your car is a current colour, you should be able to obtain a standard pressure-pack of touch-up colour to do the job (follow directions on the can as for undercoat). If it is not a current colour, you will have to have some finish mixed up and matched by a panel repair shop or specialist supplier, e.g. B.S. Stilwells in Kew, Melbourne. You will then have to buy or borrow spray equipment or have someone apply the finish. Perhaps the purchase of one of the rechargeable aerosol cans, suitable for paints, lubricants, cleaners, etc. e.g. "Aerosol Jenni Can" @ $25 approx. might be worth considering.



18. When the final coat is hard in a few days, finish off with a good quality polish, initially in a cutting grade.

19. At this stage you might consider putting a layer of polyester filler across the inside bottom and as a sloping seal in corners of all the doors, whether they are showing perforations to the outside or not.

20. Make sure that the drain holes in the bottom of the doors are absolutely free. Run a quarter inch drill bit up to cut through any resin that may have flowed across the holes. If this exposes any new metal, touch up with primer and final coat.

21. Spray the lower inside of the door with a thorough coating of your favourite rust-stopper sealer (Waxoyl, Tectyl, Ensis etc., even WD40 or RP7). Repeat this every six months or so.

22. To prevent water getting at the inside of your door lining, seal off the openings with waterproof film. I use plastic supermarket carry bags, cut to shape, and stuck down around the edges of the holes with one of the convenient gelled contact adhesives, e.g. Selleys Gelgrip, Goa or equivalent.

23. Replace door lining and fittings, and challenge your friends to spot the repair.

Equipment:	Materials:	
Tin snips (fine nose)	Phosphoric acid 100 mL or	$2
Electric drill	Deoxidine 500mL	$5
Sanding disc	Wet-and-dry paper	$2
Drill bits	Sanding discs	$2
Wire brushes (Hand & rotary)	Scrap GI sheet	$0.50
Eye protection	Polyester resin & catalyst 500mL	$5
Pop rivetter & rivets	Holts Auto-zinc primer	$4
Hair dryer	Holts touch-up spray or	$4
Sanding block, shampoo bottle (Alberto Balsam)	1L spray lacquer & thinners	$20
Mixing containers	Masking tape	$2
(Spray equipment)	Body filler 500g	$10
	Re-po Extra Cut polish	$6
	Contact adhesive gel	$4
	Total approx.	$45

The indicated material costs of about $45-80 will of course be determined by your particular circumstances and materials to hand. The minimum quantities indicated should be sufficient for several small repairs of the kind described.

Good luck with your body beautiful!

Bill Graham.