Underbody rustproofing

When corrosion bites hard, it can write-off a car. **Rob Marshall** investigates which preventive methods are at your disposal.

hile many people imagine that modern cars are immune from corrosion, this is far from the case. Ian Allen, proprietor of Rustbuster Ltd of Lincolnshire and our technical consultant for this feature, says: "While superior design, galvanised metals and improved factory-applied coatings have made most modern car bodies far more resilient than they were in the days of the Alfasud, for example, long-term maintenance of the original rustproofing is a sound investment, especially after the car reaches between five and seven years of age."

Out of sight, out of mind?

In truth, many people do not bother with regular anti-corrosion inspections, assuming that, should there be no obvious rust on exterior panels, everything will



Rust can develop within metal joints that have been crimped or welded together. Look for suspicious bulging or changes in profile. You will need to break into the joint to access and repair the underlying rust.

be fine underneath. It is only when they receive a rude awakening at MOT test time that it might be too late. While recent models are unlikely to fall apart as quickly as those built in the days when underseal was a dealer-applied optional extra, the decreased need for 'rot' repairs has seen the work become more specialised. As we pointed out in our welding feature (*CM*, August 2017), fewer garages offer welding services these days, making it more expensive. Additionally, because many modern bodyshells utilise a variety of high-strength steels in their

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Preventive rustproofing will save you money in the long term and give your car a better chance of keeping out of places like this for as long as possible.

construction, welded repairs may not only fail to restore the area back to full strength but may also be uneconomical when the car's resale value is considered. Corrosion also tends to extend far further than is immediately obvious.

Choose your product

At factory level, a variety of rustproofing products are used by car manufacturers, chief among which are flexible, waxy coatings. A thick underseal might be chosen to protect metal areas that are



PREVENTION IS BETTER THAN CURE

► The great thing about rust prevention is that it can make a huge difference, even at this time of year. Keeping the paint clean enhances not only the car's appearance but also its ability to protect the metal beneath. Consider washing areas that are not obvious, too, such as within the door shuts and beneath the doors. Under the car, clear drain holes to reduce the chance of water seeping into the interior and becoming sandwiched between the carpets and the floor.

In addition, use appropriate car cleaning products. Some household cleaners, such as washing-up liquid, can strip the protective wax from the paint and dull the lustre – and their high salt content accelerates the corrosion process markedly. Using polish on the paintwork not only ensures that it looks good, but also offers an additional protective element. Many commercial polishes contain wax, but these tend not to offer the same protection levels as a dedicated product.

Hosing beneath the car regularly is a sound idea, but be cautious of the

bombarded regularly with road dirt and water. Alternatively, a hard-drying, rubberised stone-chip paint and seamseal may be employed. A thinner wax may be sprayed into box sections beneath the car, as well as within the doors and behind the inner wings. None of these coatings lasts for ever. Topping up the protection is well worth the effort on a typical car of average age, especially if you live either near the coast or in colder damage that water can cause in the wrong places. If using a high-pressure washer, direct the jet carefully. It could force water into areas where problems will result, such as electrical connectors, ECUs and rubber gaiters. Clean inside the wheelarches frequently and consider that the inner-to-outer wheelarch lip is a common rust trap on many cars, because water can enter the seam, causing rust to establish itself and the resulting expansion will cause the joint to split.

Road salt is not easy to remove because of its ability to cling stubbornly to metal. According to Rustbuster's lan Allen, even power washing will not shift it and his company sells a special surfactant that lifts the contamination. The last thing you want to do is hold salt against metal by undersealing over it. As with many DIY car maintenance procedures, preparation is key.

DIY rustproofing is very weatherdependent, because not only will you need to clean beneath the car but it must also be allowed to dry. The work is best

and saltier northern regions of the UK.

While flexible seam sealer is an effective sound-deadener, it can promote corrosion, because the product dries, cracks and permits water to enter. Once moisture is trapped against the aged coating and the metal, very often the only route out is to rust the metal sufficiently to form a hole. Ironically, plastic liners may also cause problems. While they have played a big part in



Avoid rustproofing your car in excessively cold temperatures (below 10°C) or in very damp conditions. Professional companies use a dew point meter to assess the moisture content of the air of their workshops.

performed over a weekend and doing so at this time of year can be tricky, unless you have access to a large undercover area. Therefore, consider applying new coatings once spring has arrived.

reducing the number of mud traps in bodyshell design, their edges can chafe against the metal, rub through the paint and trap moisture. Invariably, rust will develop. Therefore, consider removing the linings periodically to both clean and touch-up any corrosion protection. In many cases, you will find that the panels behind are protected only by thin primer paint, so it might be a good idea to add extra coatings in those areas.







Rust develops beneath the paint, which tends to occur when water becomes trapped. Here, you can see that the rust has caused the paint film to fail and the blistering is pushing the coating away from the metal beneath. ► Certain modern fourwheel drive vehicles boast a separate chassis. While made from thicker metal, factory rustproofing tends to be scant. Owners should consider extra rustproofing almost immediately after taking delivery. Some vehicles can literally break in half – for example, there is now a UK Facebook page for Nissan Navara snapped chassis complaints!



www.greatmagazines.co.uk/carmechanics

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ΤΟΡ ΤΙΡ Rust is light corrosion. Rot is heavily rusted,

ROB'S

HOW TO RUSTPROOF YOUR CAR



Take time to wash the paintwork and the underside, including 1 the floorpan, wheelarches and any hidden areas, such as between the rear chassis legs and plastic liners.



A high-pressure lance alone will not remove the dirt effectively. 2 While Rustbuster uses a professional rotary cleaner, some pressure washer manufacturers sell DIY versions (see inset pic).



It is almost impossible to remove all 3 traces of corrosion-inducing road salt from the metal, but you can buy a solution that will dissolve it. Pictured is Rustbuster's Chlor-X 201, which can be used with a domestic hosepipe.



The car will need to be raised. If 4 professional ramps are unavailable, support the body on axle stands on a level surface. The road wheels should be removed and stored away from the working area.



The plastic wheelarch liners are secured 5 by a variety of metal and plastic fixings. Some of these are prone to being damaged during removal, no matter how careful you are. Keeping spares might be useful.



Fabric liners are effective for reducing 6 road noise being transferred into the cabin. Ironically, they are prone to holding moisture against the body, compared with those made from hard plastic - the inside of this moulding is damp.

This picture shows a problem with fabric liners: the edges tend to be effective mud traps and they can abrade against the metal. The resulting trapped slush allows rust to develop and spread beneath the paint, out of sight.

Additional 8 soundproofing measures may be fitted behind the liners, such as this bag, which covers access bungs (see Step 32). **Delicate tyre pressure** monitoring receivers and other electrics may also be visible in the inner wings.





TOP TIP Quality cavity wax drives moisture from the metal.

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HOW TO RUSTPROOF YOUR CAR continued



9 Badly corroded fuel filler necks pose an obvious safety hazard – this one is safe behind a plastic liner, but this is not always the case on other models. Their location and construction makes them an effective mud trap.



10 Plastic undertrays are employed by car manufacturers mainly for aerodynamic reasons and they can be as frustrating to remove as wheelarch liners. They can also hold water against metal and promote corrosion, especially on subframes.



11 Once all of the plastic coverings have been removed, you may uncover areas where mud has collected, especially at the join between two panels. Brush away any compacted deposits and wipe over the clean metal with a damp cloth.



12 With the underside bare, ensure that anything exposed that would usually be inaccessible to MOT inspectors is in good condition. This includes any cabling, pipes and connectors. You should also make sure that their fixings are sound.



13 Rustbuster employs a powerful jet of warm air that chases and dries water from the panels. A DIYer may have to leave the car standing for at least several hours on a warm day to achieve a similar result.

RUST – ASHES TO ASHES

Within a blast furnace, energy is introduced into iron ore, a raw material that is mined from the ground. Once several other additives have been included, the resulting metal - steel - might be more useful to us but is no longer a natural material. Oxidisation or corrosion/rusting occurs when water and oxygen release energy and turn the steel back into its weak, crumbly, brown natural form. The way to prevent corrosion is to protect the bare metal from water and air. This is



done by using waxy films or coatings that can be painted. This article focuses on wax-based products and rust converters that are used beneath the car.



14 As much surface corrosion needs to be removed as possible. Pictured is an MBX Metal Blaster wire brush. Fine steel/brass wire brushes are popular, but they polish the metal and this affects the adhesion of subsequent protective coatings.

15 Loose paint and rust flakes are removed using the brush when fitted to an angle grinder. Wear goggles and thick gauntlets to protect your body from any flying debris. You can remove surface rust with a flap disc.



16 Note that some rust converters require a degree of light surface corrosion to remain on the panel in order to work properly; read the instructions. If this is required, aim to achieve the pictured standard of finish.





18 It is not a bad idea to brush off any corrosion from fixings, because this and any subsequent wax coating will not only make any future removal attempts easier but also reduce the chance of the mount fracturing.



19 Certain bracings, bumper mounts, fuel tank straps and even subframes tend not to be rustproofed at the factory to the same degree as the main body monocoque. Do not be surprised to find more corrosion in those areas.



21 Use a handheld wire brush for delicate areas as this will reach sections that an angle grinder will not. Buy a new brush – an old one used for mechanical repairs will grind dirt and grease into the steel.



22 When heavier non-holed surface rust is discovered, remove all paint surrounding the brown oxidised deposits until you reach clean metal. Almost inevitably, this will lead to the repair area growing considerably.



17 While it is not entirely necessary to remove surface corrosion from steel suspension components, it enhances the look beneath the car. When wire-brushing, however, take care that you don't damage any rubber bushes or gaiters.



20 Factory seam sealer tends to dry, crack and trap water against the metal after the car reaches around five years of age. Wire-brush any loose seam seal and attend to any rust/rot that might be uncovered.



23 Wire-brushing by hand around metal brake and fuel pipes and unions might uncover some corrosion, even on factory pipes that are rubber-coated. If you feel that they have been weakened, replace them.

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HOW TO RUSTPROOF YOUR CAR continued

ROB'S TOP TIP

Cavity waxes are flammable, especially immediately after application.

24 Should holes be discovered, the corrosion must be cut out and a welded repair made before any further rustproofing takes place. For more information, consult our welding feature in the August 2017 issue.



25 Before any coatings are applied, you must protect areas that are at risk from being contaminated with wax. The brakes especially should be covered. A DIYer can use plastic bags secured with adhesive tape.



26 If applied correctly, rust protective products will get everywhere in a DIY setting, even outside. Within this professional workshop, the lower portion of the body is protected by a plastic film edged with masking tape.



27 This is followed by the top of the car being masked. These products can be obtained from a body shop supplier. Should you consider this to be obsessive, removing wax and underseal from glass and paint is even more time consuming.



28 Final checks include wiping down any paint surfaces with a cloth moistened with panel-wipe solvent, prior to using compressed air to blow away any lingering dirt within the body's inaccessible crevices.



29 A rust-converting solution should be poured into a non-metallic container or else it will start reacting. Read the instructions carefully. Rustbuster uses its own FE123 that converts iron oxide to iron tannate and adds a protective quality.



30 While rust converter can be applied to suspension components, it should not come into contact with brake friction surfaces. Use gloves and eye protection. Most modern rust converters are waterbased and non-toxic.



31 Many people are familiar with rust converters turning a blue-black colour when they have reacted with the metal. As they tend to be water-based, they need warmth to dry – do not apply in low ambient temperatures.



Protect any internal and external plastic trim as it can be damaged by underseal and cavity wax.

HOW TO RUSTPROOF YOUR CAR continued



After the converter has cured, go 32 around the car and remove any underside bungs that provide access to the body's box sections, such as within the wheelarches and between the inner and outer sills and doors.



You can buy the DIY equivalent of 33 these extension probes, usable with a small compressor. Being vapourised, the wax is very effective at covering a wide area and, being of such thin consistency, is excellent at creeping between joints.



Insert the probe deep into the cavity, squeeze the gun trigger and slowly pull the 34 extension from the body. Note that mist may be expelled from other holes along the car - this is desirable and shows that the wax is spreading.

SOLID COATINGS



Schutz flexible, black underseal is not the only product available. While good underseals will be touch-dry after a few days, they should remain flexible. Coatings that dry completely are appropriate to use on areas where there might be contact with yourself or other passengers. They can also be overpainted in body colour. However, many air-drying paints are too inflexible and can be vulnerable to being chipped away. As they cannot flow efficiently into any small pits that might have been caused by corrosion, the risk of existing surface rust breeding beneath the paint is increased. This leads to the paint film being pushed away from the metal. We can vouch for the effectiveness of a two-pack epoxy mastic solution for its toughness, especially in areas that are vulnerable to stone-chips, such as rear chassis members and outer sill panels. While it can be sprayed with a compressed air-powered spray gun, it can also be applied by brush and rubbed down with wet-and-dry sandpaper once dry. It does not contain any toxic isocyanates, unlike many professional two-pack paints, making it safer to use for DIYers.



While sills, floors and inner wheelarches have been mentioned 35 already, do not forget to treat the front (pictured) and rear chassis legs, bumper mounts and suspension turret box-sections. There is no need to flood the cavities.



After working around the car in a methodical order, and after 36 the main monocoque has been completed, pump wax into cavities within any subframes that are bolted to the underside.



37 As mentioned earlier, because you are vaporising the cavity wax into a mist, you'll need to not only protect the working area but also wear breathing apparatus to avoid inhaling particulates.



38 An extension probe is impractical to apply wax behind panels and heat shields. A smaller low-pressure probe applies the wax evenly and ensures that it reaches vulnerable areas, especially wheelarch lips.



39 Professionals use a very high-pressure underseal gun that minimises overspray – Rustbuster uses its own Techshield black underbody wax. DIY Schutz guns are inexpensive to buy and safe to use, but they're messier.



40 You can buy film thickness gauges to check for a sufficient coating. This gauge shows that the Jaguar is receiving a thickness of between 600 and 700 microns, which is to Rustbuster's specification.



41 When undersealing the floorpan, it is vital that you are methodical and work logically. Pictured is underseal spread across a box section on the nearside. It looks like a good job but...



42 ...when viewed from the other side, a large section remains unprotected. The same approach needs to be applied when undersealing behind any pipework or difficult-to-access areas.



43 Professional underseal applicators are very accurate, Schutz guns less so. Therefore a DIYer must cover up the exhaust system. Burning underseal not only smells but may also pose a fire risk.

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HOW TO RUSTPROOF YOUR CAR continued

ROB'S TOP TIP

Buying underseal in aerosol cans is expensive – you really need a small DIY compressor.



44 Quality control checks to ensure that no spots have been missed take a surprisingly long time, proving how easy it is to miss very small areas. When discovered, such sections can be touched up. WITH THANKS TO Rustbuster Unit 2, Welland House, Cradge Bank, Spalding, Lincolnshire PE11 3AN. 01775 761 222 sales@rust.co.uk www.rust.co.uk

45 Once work has been completed, change your overalls and gloves, prior to refitting the plastic undertrays (see Step 46). Afterwards, remove and discard the protective film covering the paintwork.



46 Replacing the undertrays and wheelarch liners can be even more frustrating than removing them. You may be required to renew several fixings. Aftermarket clips are available for the most common designs.



47 With the wheels refitted and the car lowered to the ground, touch up the locations in which the axle stands were positioned. If refitting the plastic mouldings has scraped away any underseal, apply more.



48 Finally, use a panel-wipe solvent to remove any lingering underseal/cavity wax from the panel edges. Fresh anti-rust coatings will exude a mild odour, but this will dissipate after several days.

PRODUCTS

► Many people used to swear by spraying engine oil into car body cavities to deter rust. This is the wrong approach to use, for modern cars especially. Engine oils emulsify in contact with water, drain out of the body easier and require reapplication more frequently. You may even cause a fire if dripping oil ignites after contacting a modern DPF and/or a catalyser, which function at very high temperatures.

We also advocate that you buy highperformance professional products, which are available either via bodyshop suppliers or through classic car specialists. Consider also that well-known brand names may not always offer the best value and performance.

